# Submarine Ring of Fire 2004

## Mariana Arc
## Submarine Volcanoes

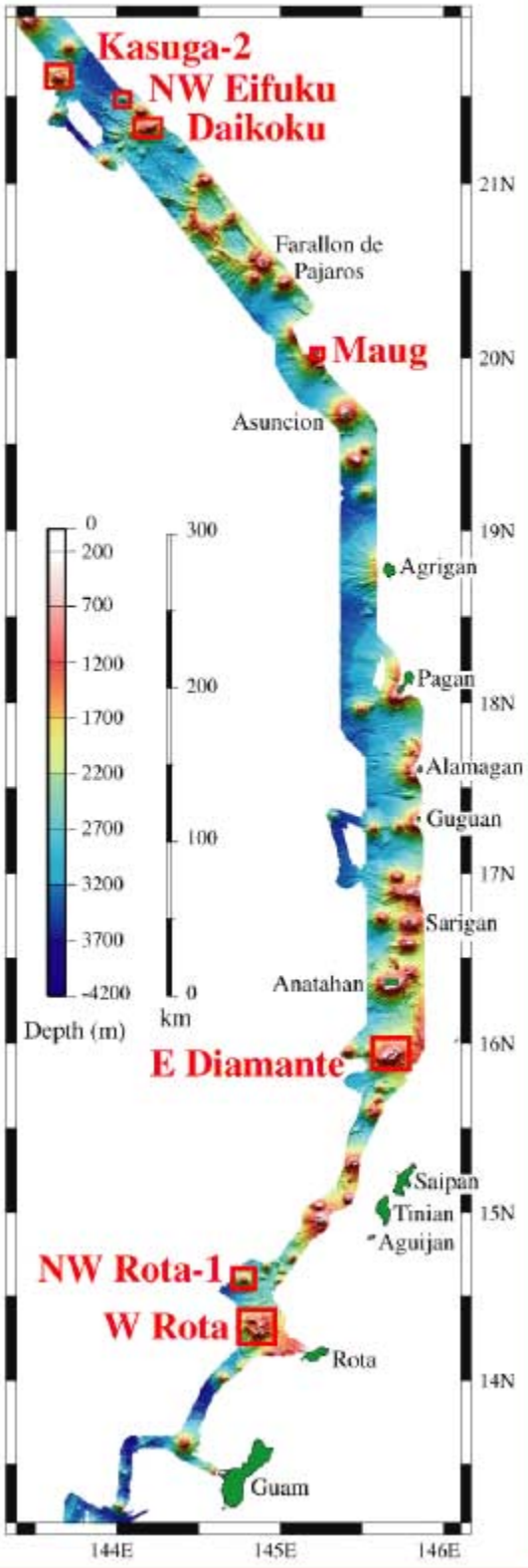
R/V *Thomas G. Thompson*
Cruise TN167
ROPOS Dives R782-R795
March 27 - April 17

### 2004 ROV Dive sites

Northwest Rota-1: R782 - R784, R786
West Rota: R785
East Diamante: R787, R788
Maug: R789, R790
Northwest Eifuku: R791 - R793
Kasuga-2: R794
Daikoku: R795

Island names in black.

EM300 bathymetry
is a compilation of
SROF 2003 and 2004 data.



# Submarine Ring of Fire 2004 - Mariana Arc

## R/V *Thomas G. Thompson*, Cruise TN167

## March 27 - April 17

### Chief Scientist Robert W. Embley

Cruise Report Compiled by: Susan Merle, Shannon Ristau, Bob Embley and Bill Chadwick

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# Figure Captions

**Cover**. Overall map of the Submarine Ring of Fire 2004 expedition. ROPOS dive sites (red boxes) are featured, overlaid on EM300 bathymetry data collected during the 2003 and 2004 expeditions. The bathymetry grid for this figure is 200 meter cell size. Full-resolution data ranges from 20 - 35 meter grid-cell size.

**Plate 1.** 1a) NW Rota-1. The first *in situ* documentation of deep submarine arc volcanic activity at Brimstone Pit. 1b) NW Rota-1. Shrimp at Cnidaria Area. 1c) W Rota. Interlayered basaltic (dark) and felsic (light) ash layers in the east wall of W Rota caldera. This cliff is approximately 3 m tall. 1d) W Rota. Close to the top of the caldera rim (Z=462m) the slope is covered with big yellow pumice blocks, 2-3 meters across, probably deposited by the last big eruption. 1e) E Diamante. The overlap zone between hydrothermal biota and photosynthetic biota (Z=199-188m). Both chemosynthetic microbial mats and photosynthetic algae were clearly co-located on the summit's central pinnacle. 1f) E Diamante. Three small (~30-cm) actively venting spires sitting on top of one of the chimneys in the Black Forest vent field. 1g) Maug. The top of one of the central domes in Maug caldera, covered with several different types of corals, sponges and algae. 1h) Maug. The HFS sampling hydrothermal fluids at Cave vent.

**Plate 2.** 2a) NW Eifuku. White chimneys at Champagne vent site, where fluid saturated with $CO_2$ was venting both in the form of supercritical fluid from small white chimneys (100°C) and as a liquid phase contained within large numbers of bubbles rising from areas surrounding the hotter vents. 2b) NW Eifuku. Mussels are so dense in some places that they obscure the bottom. The mussels are ~18 cm long. The white galatheid crabs are ~6 cm long. 2c) NW Eifuku. Microbial mat mounds, which are covered with a thin crust and small chimneys. The thin crust acts much like a thermal blanket, retaining the heat along with the vent fluid nutrients. 2d) NW Eifuku. Alvinocarid shrimp rapidly comb the mussel surfaces for bacterial filaments. 2e) Kasuga-2. Crabs, flat fish and barnacles in the Barnacle Boulder area. 2f) Daikoku. Flatfish (sole) were found in great quantities at both Kasuga-2 and Daikuku. Note the snails cocooned with filamentous microbial growth surrounding the flat fish. 2g) Daikoku. A close-up of the tubeworm *(Lamelli brachia)* found at both Kasuga-2 and Daikoku volcanoes. 2h) Daikuku. Diffuse venting was found intermittently over several hundred meters on the outcrops defining Daikoku's summit and over its northern, sedimented flank.

**NOTE ABOUT THE FIGURES:**
The SROF 2003 and 2004 EM300 bathymetry data were edited, processed, combined, and gridded at 35 meter resolution to create all maps and three-dimensional images in the cruise report. Navigation shown is post-processed. Errant points and outliers have been removed, and the tracklines have been smoothed. The ROPOS sample-numbering scheme was used for all dive maps.
**ROPOS sample abbreviations used on the divemaps are as follows:**
**Bio** - Biology; **Bio-Geo** - Combined biology and geology; **GTB** - Gas Tight Bottle; **HFS** - Hydrothermal Fluid Sample; **MP** - McLane Pump; **net** - plankton net; **RK** - Rock; **sed** - sediment; **SS** - Suction; **water** - Verena's mini water sampler.

**Figure 1.** Satellite derived bathymetry from Sandwell and Smith (1997) overlaid with EM300 bathymetry collected on the SROF 2003 and 2004 cruises to the Mariana Arc Region. SROF 2004 ROPOS dive targets are indicated with black circles.

**Figure 2.** Southern segment of the Submarine Ring of Fire 2004 expedition. ROPOS dive sites (red boxes) are featured, overlaid on EM300 bathymetry data collected during the 2003 and 2004 expeditions. The bathymetry grid for this figure is 200 meter cell size. Full-resolution data ranges from 20 - 35 meter grid-cell size.

**Figure 3.** Central segment of the Submarine Ring of Fire 2004 expedition. ROPOS dive sites (red boxes) are featured, overlaid on EM300 bathymetry data collected during the 2003 and 2004 expeditions. The bathymetry grid for this figure is 200 meter cell size. Full-resolution data ranges from 20 - 35 meter grid-cell size.

**Figure 4.** Northern segment of the Submarine Ring of Fire 2004 expedition. ROPOS dive sites (red boxes) are featured, overlaid on EM300 bathymetry data collected during the 2003 and 2004 expeditions. The bathymetry grid for this figure is 200 meter cell size. Full-resolution data ranges from 20 - 35 meter grid-cell size.

**Figure 5.** Three-dimensional bathymetry images of the seven submarine volcanoes visited with the ROPOS ROV during the SROF 2004 cruise.

**Figure 6.** Divemaps of all ROPOS dives at Northwest Rota-1. Dive tracks, navigation targets and sampling positions overlaid on the bathymetry. a) Dives R782 and R783. b) Dives R784 and R786.

**Figure 7.** a) West Rota overall map with R785 dive track overlaid on the bathymetry. b) R785 dive tracks, navigation targets and sampling positions overlaid on the bathymetry.

**Figure 8.** a) East Diamante overall map with 2004 vertical casts, tow-yos and ROPOS dive tracks (R787 and R788) overlaid on the bathymetry. b) Dive map of all ROPOS dives at East Diamante. R787 and R788 dive tracks, navigation targets and sampling positions overlaid on the bathymetry.

**Figure 9.** a) Maug overall map with 2004 vertical casts and ROPOS dive tracks (R789 and R790) overlaid on the bathymetry. b) Dive map of all ROPOS dives at Maug. R789 and R790 dive tracks, navigation targets and sampling positions overlaid on the bathymetry.

**Figure 10.** Divemaps of all ROPOS dives at Northwest Eifuku. Dive tracks, navigation targets and sampling positions overlaid on the bathymetry. a) Dives R791 and R792. b) Dive R793.

**Figure 11.** a) Kasuga-2 overall map with 2004 tow-yo and R794 dive track overlaid on the bathymetry. b) Dive map of ROPOS dive R794 at Kasuga-2 with dive track, navigation targets and sampling positions overlaid on the bathymetry.

**Figure 12.** a) Daikoku overall map with 2004 tow-yos and R795 dive track overlaid on the bathymetry. b) Divemap of ROPOS dive R795 at Daikoku with dive track, navigation targets and sampling positions overlaid on the bathymetry.

**Figure 13.** a) Northwest Rota-1 overall map with 2004 verticalcasts, tow-yos, and dive tracks (R782 - R784, R786) overlaid on the bathymetry. b) Northwest Eifuku overall map with 2004 tow-yos and dive tracks (R791 - R793) overlaid on the bathymetry.

# 1.0 SUBMARINE RING OF FIRE 2004 - MARIANA ARC EXPEDITION OVERVIEW

***Bob Embley, Chief Scientist***

The 2004 Submarine Ring of Fire expedition (SROF04; TN-1) was the second of two expeditions to explore the submarine volcanoes of the Mariana Arc. A total of 14 dives with the *ROPOS* were made along the Mariana Arc at seven volcanoes (Figures 1-5). The target volcanoes were chosen on the basis of the water column and sonar surveys made during the 2003 Submarine Ring of Fire Expedition *(Embley et al; 2004)*. Six of the target volcanoes (Northwest Rota-1, East Diamante, Maug, Northwest Eifuku, Kasuga-2, and Daikoku) had active hydrothermal activity. The seventh site, West Rota, was chosen primarily for geologic purposes because it has the largest submarine caldera along the Mariana arc.

The 2003 seafloor survey was designed to optimize for the MR1 towed sidescan. Because the typical swath width of this system was 8 kilometers, the average track spacing for this system did not result in overlapping swaths for the EM300 multibeam sonar, which produces much better bathymetric data than the MR1. In 2004 we were able to fill in many of these data gaps with the EM300 system during transits between dives. In addition to sonar surveys, we conducted CTD casts and tows and plankton net tows over all of the target volcanoes. In some cases the CTD provided additional information on the location of hydrothermal sites.

Northwest Rota-1, the first site (Figure 3), was undergoing an active volcanic event and the dives there (R782-R784 and R786) (Figure 6) mark the first *in situ* documentation of deep submarine arc volcanic activity. The eruptive vent (Brimstone Pit) is a small crater on the southward-facing upper slope of the summit ridge. Brimstone Pit was disgorging a high flux of sulfur-rich fluid at 548 meters depth (Plate 1-1a). Pebble-size (and smaller) pieces of volcanic ejecta were also being expelled from the pit and deposited on the surrounding slopes. Samples of both the ejecta and precipitated sulfur globules were recovered from the vehicle on its return from Dive R784. In addition, the discovery of a deep, high turbidity plume surrounding the base of the volcano below about 700 meters confirmed the high level of seismic/magmatic activity on this volcano. The biology at the summit of Northwest Rota-1 was consistent with such an active site. The biota consisted largely of motile species such as shrimp and crabs, probably because of the unstable slopes and the periodic rain of volcanic ejecta from the pit.

The dive at West Rota (R785) (Figure 7) was made while discussions were going on about how to approach the sampling for the final dive at Northwest Rota-1 (R786). The big surprise at West Rota was the extent of the pumice deposits both on the floor of the caldera and exposed on its walls (Plate 1-1d). These observations clearly showed that the last major event at this volcano was a very large, explosive eruption that probably formed the caldera. There was some speculation that the volcano may have even been an island prior to this event. The dive was made along the approximate track of a dredge made in 2001. The material recovered during the dredge included a substantial amount of highly altered volcanic rock. None of this material was evident on the seafloor during the traverse on R785, leading one to suspect that the dredge was sampling material below the surficial deposit of pumice.

After completing the final dive at Northwest Rota-1 (R786), two dives were made at East Diamante Volcano. This volcano is elongated east-west and has an old, partly degraded caldera with several large cones in the center. The dives (Figure 8) were all made on the center cones where the CTD tows revealed the presence of hydrothermal activity. During the first dive (R787) exploration of the easternmost cone discovered several active sites which appeared to line up along an E-W trend. A high temperature site at the top of this cone (Black Forest) consisted of multiple active black smokers. The highest temperature measured here was 239 °C, which is the boiling point for seawater at depth of the site (345 m). The Black Forest site is possibly the shallowest active sulfide forming hydrothermal site yet discovered (Plate1-1f).

During the subsequent dive (R788) the central of the three cones was explored. The most exciting result of this dive was the discovery of an overlap zone between the hydrothermal biota and photosynthetic biota. Both chemosynthetic microbial mats and photosynthetic algae were clearly co-located on the pinnacle between about 199 and 188 m (Plate1-1e).

The dives at Maug volcano (R789 and R790) (Figure 9) identified some areas of low-temperature venting with microbial mats on the flanks of the central cone (Plate 1-1h), but no extensive venting was found. More venting could well be located around the base of the caldera walls, but exploration of this area would have required much more time than was available on this expedition.

Dives R791 - R793 (Figure 10) were made at Northwest Eifuku Volcano in the Northern Seamount Province. This site was the deepest of the volcanoes explored during SROF04. The primary discovery here was the Champagne vent field, where fluid saturated with $CO_2$ was venting both in the form of supercritical fluid from small white chimneys (100°C) and as a liquid phase contained within large numbers of bubbles rising from areas surrounding the hotter vents (Plate2-2a). These bubbles had a filmy skin (probably a clathrate phase) that made them adhere in large clumps on the *ROPOS*.

The most distinguishing biologic components at Northwest Eifuku were extensive colonies of mussels in the proximity of the main vents (Plate 2-2b and 2d). Many of these mussels were growing in mounds on sites where there was no venting from directly beneath. It was hypothesized that they were being fed by $H_2S$ rich fluids carried by currents around the flank of the volcano. Other vent-related biota included shrimp, squat lobsters and limpets. Extensive orange microbial mats covered the summits of some of the spurs coming off the main summit ridge. Microbial "snowballs" were observed rolling down the slopes below the vent area, probably derived from excess production of the mat upslope.

The final two dives were made at Kasuga-2 and Daikoku Volcanoes. Both were "older" volcanoes in that they had more extensive sediment cover than at the other active sites. Kasuga-2 had been first explored during Alvin dives in 1988. Dive R794 (Figure 11) began in the summit crater at 685 m, traversed up the slope to the northwest, and surveyed the western part of the summit ridge of the volcano. The shallowest depth was 295 m. The low temperature vents were all located along the western part of the summit ridge. There was no sign of a deeper vent system in the 500-600 meter depth range predicted from the plume surveys of the volcano in 2003. Biota included abundant flatfish (previously described from the 1988 dives and from Shinkai 6500 dives made at the site) (Plate 2-2f) and the first sighting of tubeworms (Plate 2-2g).

Dive R795 was made at Daikoku Volcano (Figure 12). This site was unusual in the very diffuseness of the hydrothermal system. Diffuse venting was found intermittently over several hundred meters horizontally on the outcrops defining its summit and over its northern, sedimented flank (Plate 2-2h). Two primary types of faunal communities were found. Tubeworms and associated fauna were found at the base of outcrops where fluid was leaking out (but visible flow was difficult to discern). The other unique community consisted of large areas of densely packed flatfish (similar in appearance to the Kasuga flatfish) and snails cocooned with filamentous microbial growth lying on the northern slope. It is hypothesized that these communities are supported by very diffuse hydrothermal fluids diffusing through the permeable volcaniclastic sediments. On the eastern edge of the venting area ROPOS encountered the "Bottomless Pit". This was a steep-walled crater approximately 20-30 m in diameter near its rim and at least 135 meters in depth. It appeared that diffuse fluids were originating within this crater, but no well-defined source of venting was observed within the crater (although *ROPOS* never reached the crater floor).

The expedition arrived in Yokohama, Japan on 17 April, 2004.

## 1.1 ACKNOWLEDGEMENTS

The SROF04 expedition received major funding from the NOAA Office of Ocean Exploration to support the ship and *ROPOS*. Additional funding for ship time came from the PMEL pool of charter money for FY2004. Additional funding for the *ROPOS* was contributed by the Natural Science and Engineering Research Council of Canada. They also funded the participation of the group of Canadian biologists (Tunnicliffe, Dower, Juniper and Metaxas) on SROF04. The NOAA VENTS Program provided salary support for the participation of the NOAA Principal Investigators. This and the preceding expedition (SROF03) would not have happened without the trust put in the PIs of the expedition by Captain Craig Mclean, the Director of the NOAA Office of Ocean Exploration. Another key factor in the success of this expedition was the collaboration with the Archaean Park Program funded by the Ministry of Science, Culture and Sports of Japan (MEXT). This program used the *ROPOS* to conduct scientific studies of a site southwest of Guam in the Mariana back arc basin. The costs of mobilizing and demobilizing the *ROPOS* were cost-shared between the SROF04 and Archaean Park projects. Professors Tetsuro Urabe, Jun-ichiro Ishibishi and Akihiko Maruyama played key roles in this collaboration. We also thank Cynthia Loitsch, Gayle Elkins and Brian Lake at PMEL for their help and support in overseeing the MOU with the University of Tokyo, the contractural paperwork dealing with the cruise, and the scheduling and financing of the ship charter (*T. G. Thompson*), respectively.

A good portion of the credit for the extraordinary success of the SROF04 expedition belongs to the complement of the R/V *T. G. Thompson* and its shoreside support team led by Daniel Schwartz, who provided professional and enthusiastic support of the expedition, and the *ROPOS* team for their unstinting dedication to maximize the scientific return from the dive program.

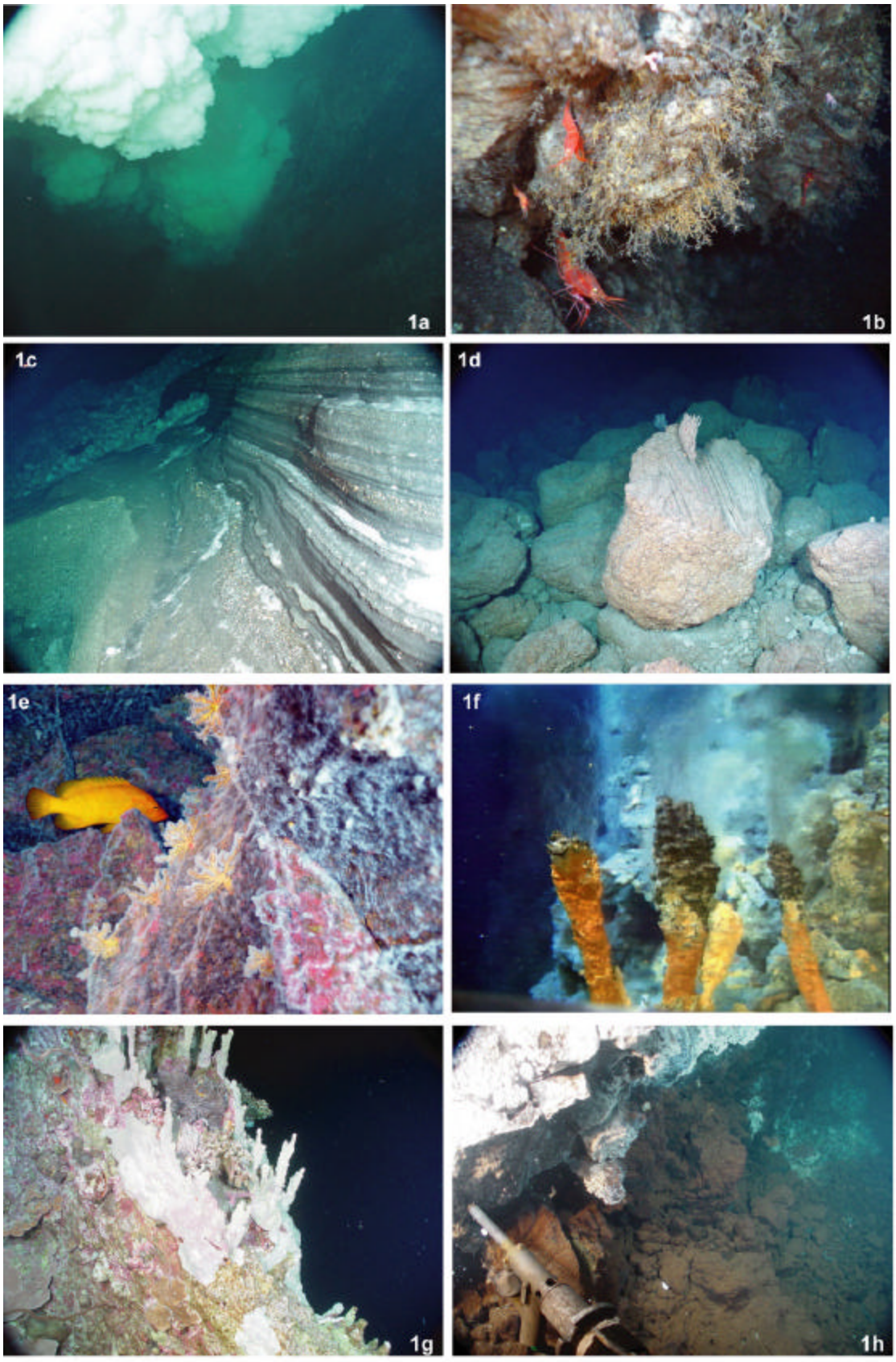


Plate 1

Plate 1 back

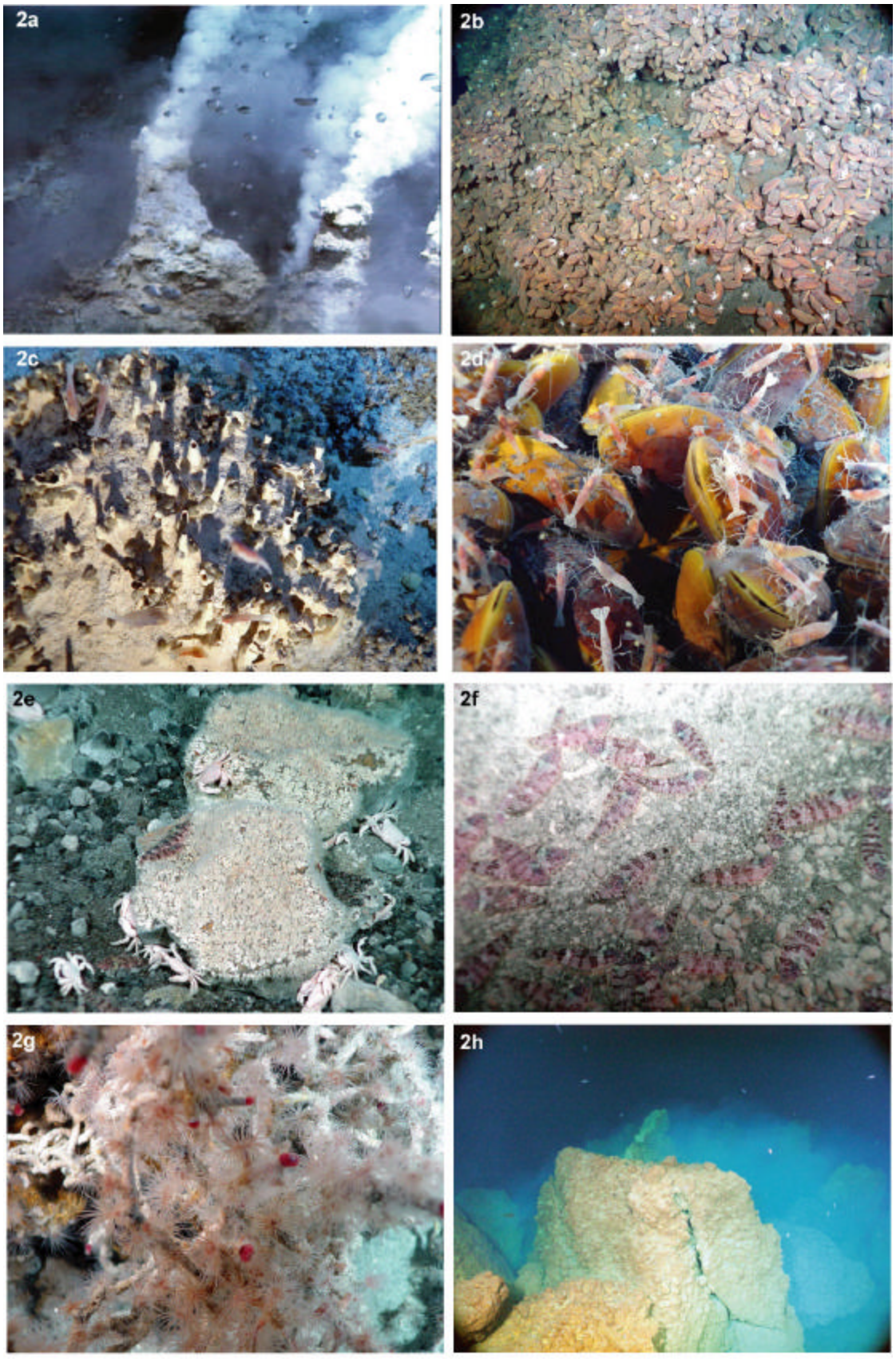


Plate 2

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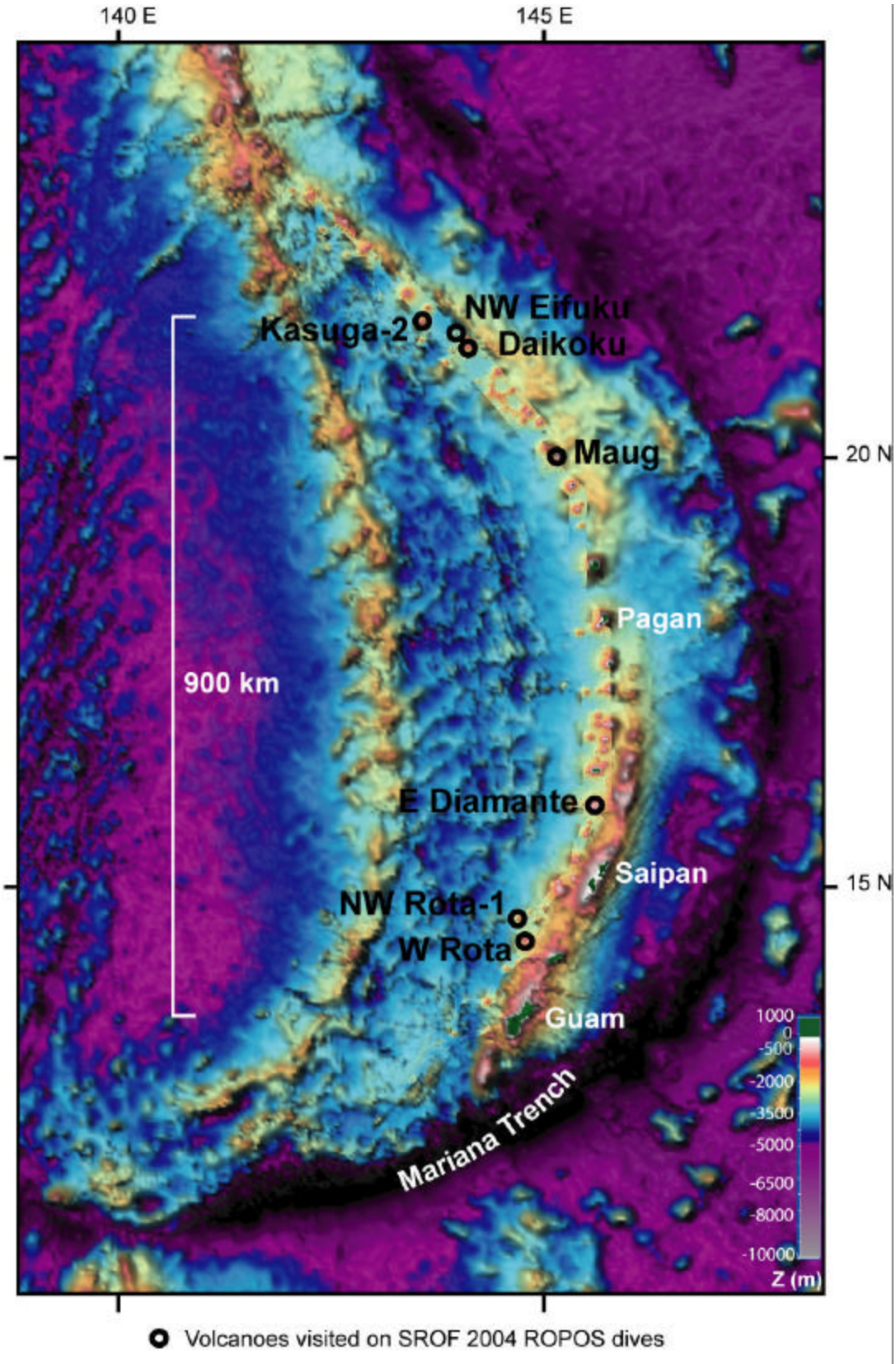
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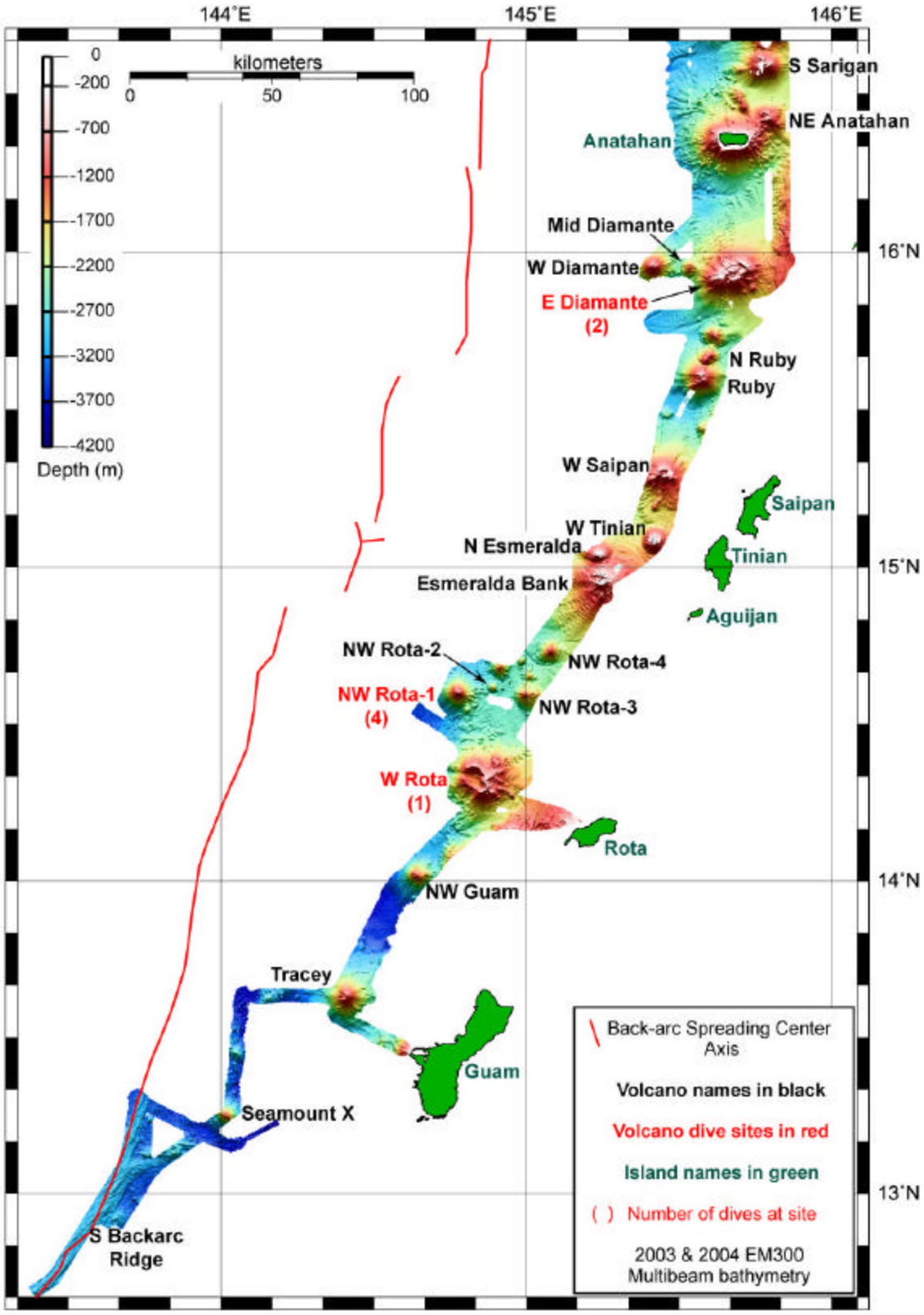
Volcanoes visited on SROF 2004 ROPOS dives

Fig. 1

Figure 1 back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Tracey
Guam
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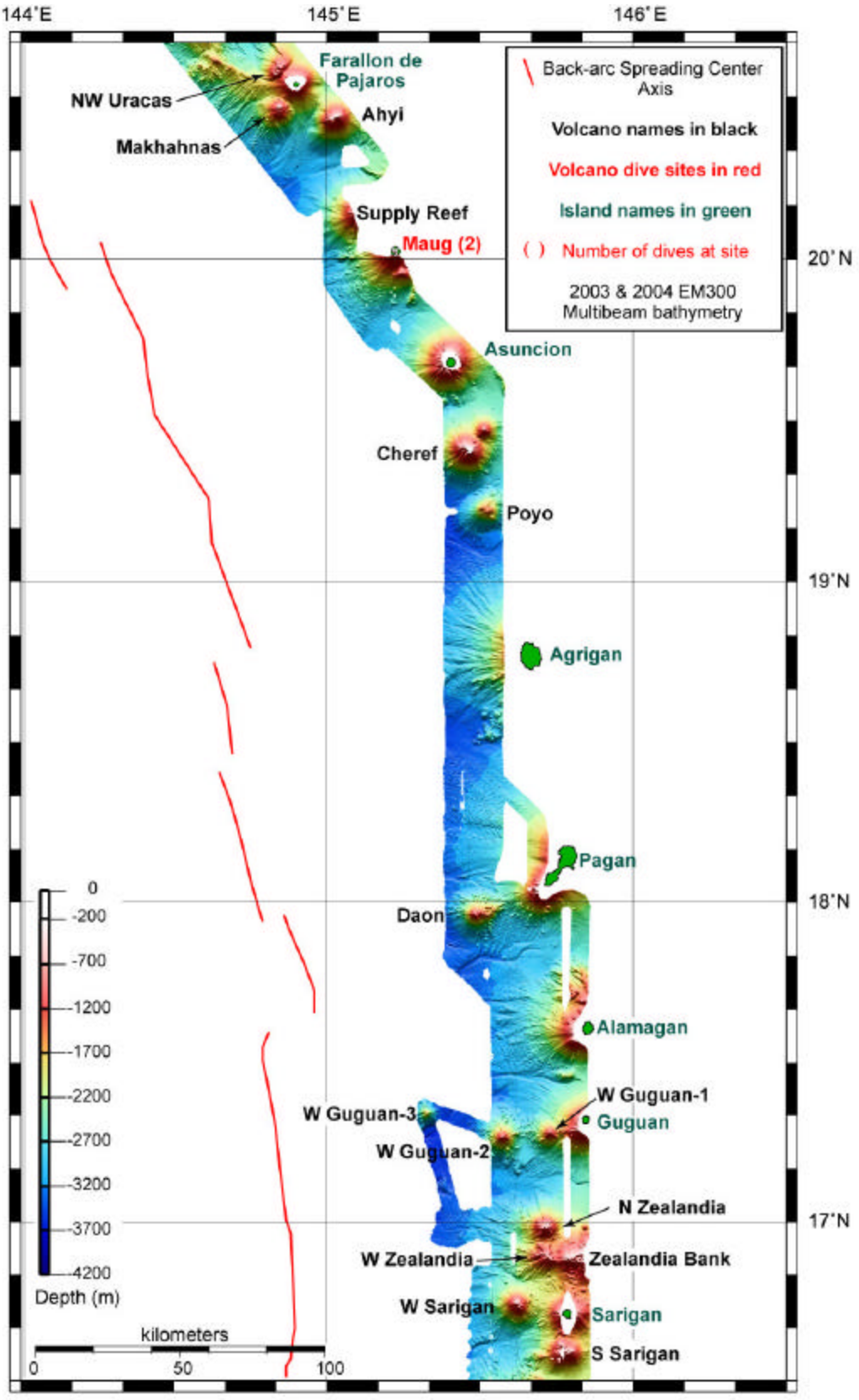
Ridge
Back-arc Spreading Center Axis
Volcano names in black
Volcano dive sites in red
Island names in green
( ) Number of dives at site
2003 & 2004 EM300 Multibeam bathymetry

Fig. 2

Figure 2 back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18°N
17°N
Back-arc Spreading Center Axis
Volcano names in black
Volcano dive sites in red
Island names in green
( ) Number of dives at site
2003 & 2004 EM300 Multibeam bathymetry
Farallon de Pajaros
NW Uracas
Ahyi
Makhahnas
Supply Reef
Maug (2)
Asuncion
Cheref
Poyo
Agrigan
Pagan
Daon
Alamagan
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W Guguan-3
Guguan
W Guguan-2
N Zealandia
W Zealandia
Zealandia Bank
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Depth (m)
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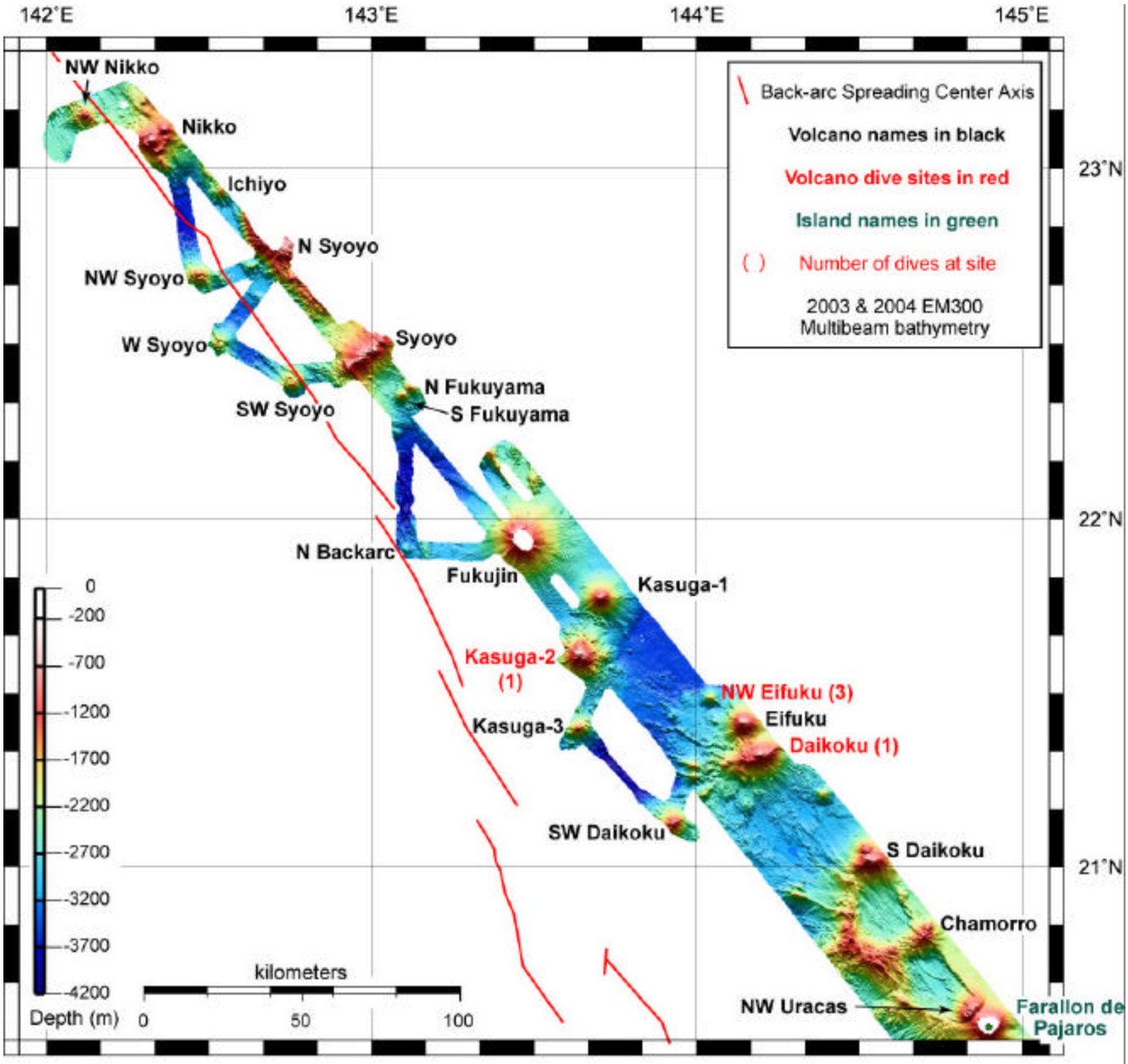
Fig. 3

Figure 3 back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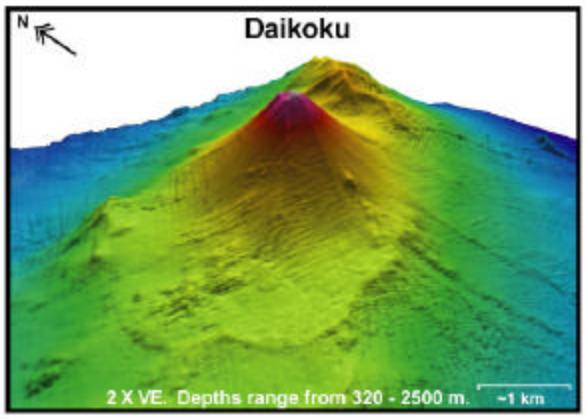
NW Eifuku (3)
Eifuku
Daikoku (1)
SW Daikoku
S Daikoku
Chamorro
NW Uracas
Farallon de
Pajaros
Back-arc Spreading Center Axis
Volcano names in black
Volcano dive sites in red
Island names in green
( ) Number of dives at site
2003 & 2004 EM300
Multibeam bathymetry
0
-200
-700
-1200
-1700
-2200
-2700
-3200
-3700
-4200
Depth (m)
kilometers
0
50
100

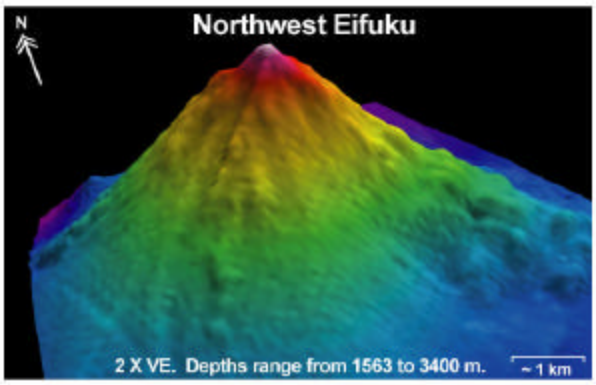
Fig. 4

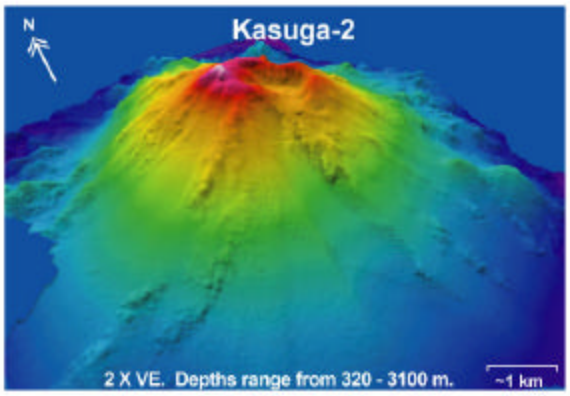
Figure 4 back

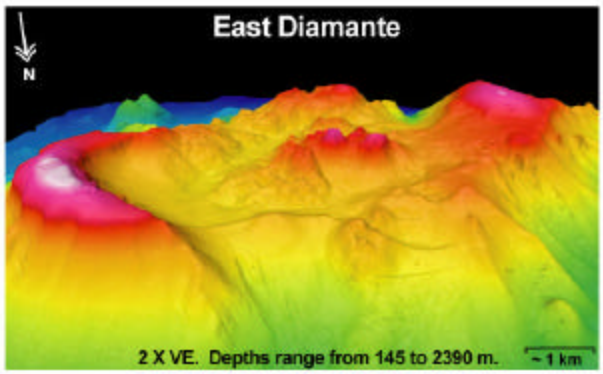
**Submarine Ring of Fire 2004**
**Mariana Arc Submarine Volcanoes**
**Visited with the ROPOS ROV**

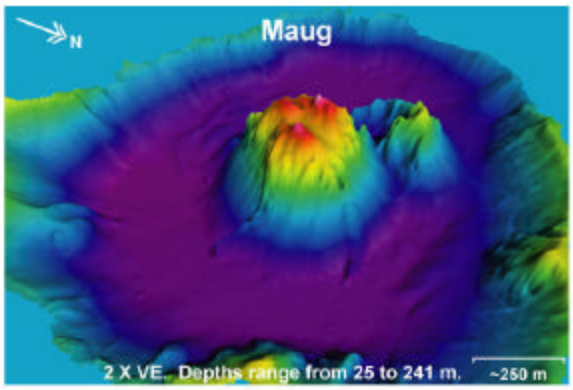
NW Rota-1: R782, R783, R784, R786
W Rota: R785
E Diamante: R787, R788
Maug: R789, R790
NW Eifuku: R791, R792, R793
Kasuga-2: R794
Daikoku: R795

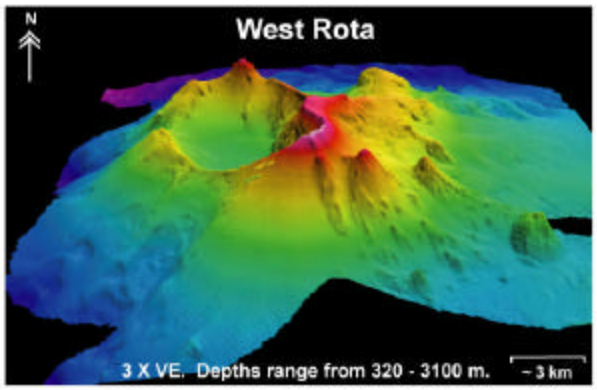


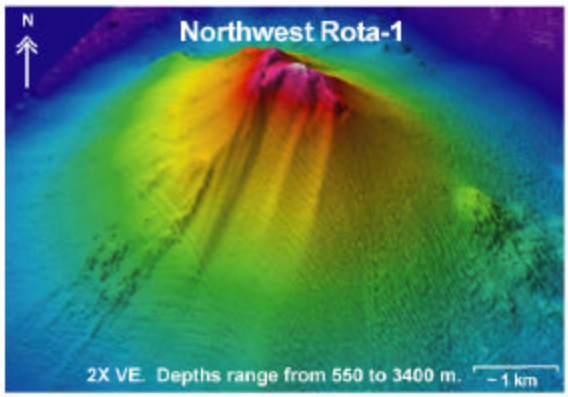




Fig. 5

Figure 5 back

## 1.2 OPERATIONS LOG - Cruise TN167 (March 27 – April 17, 2004)

**Log times are UTC (GMT), which are 10 hours behind local Mariana time and 7 hours ahead of Pacific Standard Time.**

| Date | JD | Time UTC | Comments | Event | Cast | Lat N deg | Lat N min | Long E deg | Long E min |
|---|---|---|---|---|---|---|---|---|---|
| 27-Mar | 87 | 1000 | Depart Apra Harbor Guam. 2000 Local Time, March 27, 2004. **UTC (GMT) is 10 hours behind local Mariana time.** | | | | | | |
| | | 1035 | Start EM300 survey of Mariana Arc Volcanoes - begin with transit to calibration site. | | | | | | |
| | | 2114 | End EM300 logging. | | | | | | |
| | | 2154 | Begin USBL calibration north of Rota Island. | | | 14 | 11.507 | 145 | 10.856 |
| 28-Mar | 88 | 0812 | EM300 of transit to NW Rota1. [0812 - 1224] | | | | | | |
| | | 1305 | CTD vertical cast at NW Rota 1. [1305 - 1348] | V04B-01 | 1 | 14 | 36.100 | 144 | 46.560 |
| | | 1415 | Begin dive R782 at NW Rota 1. | | | | | | |
| 29-Mar | 89 | 0121 | End dive R782 at NW Rota 1. | | | | | | |
| | | 0154 | Start CTD tow -yo at NW Rota1. | T04B-01 | 2 | 14 | 35.770 | 144 | 42.290 |
| | | 0434 | End CTD tow -yo at NW Rota 1. | | | 14 | 37.330 | 144 | 47.650 |
| | | 0525 | Plankton tow at NW Rota 1. Doing two replicate tows from 0-150m. [0525 - 0555] | SROF1 | 2 | 14 | 36.070 | 144 | 46.540 |
| | | 0708 | Start EM300 survey of NW Rota 1. | | | | | | |
| | | 0926 | End EM300 survey of NW Rota 1. | | | | | | |
| | | 0955 | Plankton tow at NW Rota 1. Doing two replicate tows from 0-150m. [0955 - 1030] | SROF2 | 4 | 14 | 36.060 | 144 | 46.530 |
| | | 1117 | Start dive R783 at NW Rota 1. | | | | | | |
| 30-Mar | 90 | 0634 | End dive R783 at NW Rota 1. | | | | | | |
| | | 0741 | Start CTD tow -yo at NW Rota1. | T04B-02 | 3 | 14 | 34.540 | 144 | 47.860 |
| | | 1131 | End CTD tow -yo at NW Rota 1. | | | 14 | 37.480 | 144 | 45.160 |
| | | 1312 | Start dive R784 at NW Rota 1. | | | | | | |
| 31-Mar | 91 | 0106 | End dive R784 at NW Rota 1. | | | | | | |
| | | 0142 | EM300 survey of transit from NW Rota 1 to W Rota. [0142 - 0230] | | | | | | |
| | | 0255 | CTD vertical cast in-between NW Rota 1 and W Rota. [0255-0434] | V04B-02 | 4 | 14 | 32.130 | 144 | 51.780 |
| | | 0443 | Resume EM300 survey of transit from NW Rota 1 to W Rota. [0443 - 0658] | | | | | | |
| | | 0725 | CTD vertical cast at W Rota. [0725 - 0841] | V04B-03 | 5 | 14 | 18.300 | 144 | 50.000 |
| | | 0900 | Plankton tow at W Rota. Doing two vertical tows from 0-150m. [0900 - 0925] | SROF3 | 6 | 14 | 18.300 | 144 | 50.000 |
| | | 1007 | Start dive R785 at W Rota. | | | | | | |
| | | 2237 | End dive R785 at W Rota. | | | | | | |
| | | 2316 | EM300 survey of transit from W Rota to NW Rota 1. [2316 - 0233 (JD 92)]] | | | | | | |
| 1-Apr | 92 | 0328 | Start CTD tow -yo at NW Rota1. | T04B-03 | 6 | 14 | 36.050 | 144 | 46.520 |
| | | 0552 | End CTD tow -yo at NW Rota 1. | | | 14 | 37.900 | 144 | 48.340 |
| | | 0705 | Start dive R786 at NW Rota 1. | | | | | | |
| 2-Apr | 93 | 0230 | End dive R786 at NW Rota 1. | | | | | | |
| | | 0331 | Start EM300 survey of NW Rota 1 for comparison with 2003 data. | | | | | | |
| | | 0558 | End Em300 comparison survey of NW Rota 1. | | | | | | |
| | | 0600 | EM300 survey of transit from NW Rota 1 to Ruby Volcano. [0600 - 1942] | | | | | | |
| 4/3?? | | 2000 | Plankton tow at Ruby. [2000 - 2022] | SROF4 | 7 | 15 | 57.200 | 145 | 43.810 |
| | | 2030 | EM300 survey of transit from Ruby to E Diamante. [2030 - 2140] | | | | | | |
| | | 2317 | Start CTD tow -yo at E Diamante. | T04B-04 | 7 | 15 | 54.370 | 145 | 39.090 |
| 3-Apr | 94 | 0232 | End CTD tow -yo at E Diamante. | | | 15 | 56.800 | 145 | 41.060 |

| Date | JD | Time UTC | Comments | Event | Cast | Lat N deg | Lat N min | Long E deg | Long E min |
|---|---|---|---|---|---|---|---|---|---|
| | | 0415 | CTD vertical cast at E Diamante. [0415 - 0443] | V04B-04 | 8 | 15 | 56.010 | 145 | 39.950 |
| | | 0732 | Start dive R787 at E Diamante. | | | | | | |
| 4-Apr | 95 | 0034 | End dive R787 at E Diamante. | | | | | | |
| | | 0119 | CTD vertical cast at E Diamante. [0119 - 0140] | V04B-05 | 9 | 15 | 56.560 | 145 | 40.880 |
| | | 0227 | CTD vertical cast at E Diamante. [0227 - 0250] | V04B-06 | 10 | 15 | 56.500 | 145 | 41.000 |
| | | 0348 | CTD vertical cast at E Diamante - Aquarium site. [0348 - 0408] | V04B-07 | 11 | 15 | 56.320 | 145 | 40.450 |
| | | 0430 | Plankton tows at E Diamante. Two replicate tows from 0-160m. [0430 - 0445] | SROF5 | 9 | | | | |
| | | 0600 | CTD vertical cast at E Diamante. [0600 - 0630] | V04B-08 | 12 | 15 | 57.200 | 145 | 42.300 |
| | | 0755 | Start CTD tow -yo at E Diamante. | T04B-05 | 13 | 15 | 55.250 | 145 | 41.650 |
| | | 1040 | End CTD tow -yo at E Diamante. | | | 15 | 56.570 | 145 | 39.350 |
| | | 1115 | Plankton tows at E Diamante. Two vertical casts from 0-150m. [1115 - 1145] | SROF6 | 11 | 15 | 56.610 | 145 | 40.970 |
| | | 1201 | Start dive R788 at E Diamante. | | | | | | |
| 5-Apr | 96 | 0424 | End dive R789 at E Diamante. | | | | | | |
| | | 0520 | CTD vertical cast at E Diamante. [0520 - 0547] | V04B-09 | 14 | 15 | 56.710 | 145 | 40.200 |
| | | 0625 | Start EM300 survey of E Diamante. | | | | | | |
| | | 1226 | End EM300 survey of E Diamante. | | | | | | |
| | | 1313 | EM300 survey of transit from E Diamante to Maug. [1313 - 1405] | | | | | | |
| | | 1420 | CTD vertical cast between E Diamante and Anatahan Island. [1420 - 1445] | V04B-10 | 15 | 16 | 8.560 | 145 | 42.250 |
| | | 1508 | Resume EM300 survey of transit from E Diamante to Maug. [1508 - 1822] | | | | | | |
| | | 1822 | Stopped for potential dive on Anatahan but conditions weren't calm enough for a dive. | | | | | | |
| | | 2119 | Resume EM300 survey of transit from E Diamante to Maug. [2119 - 0431 (JD 98)] | | | | | | |
| 7-Apr | 98 | 0527 | Start EM300 survey of Maug. | | | | | | |
| | | 0605 | End EM300 survey of Maug. | | | | | | |
| | | 0641 | CTD vertical cast at Maug. [0641 - 0703] | V04B-11 | 16 | 20 | 1.417 | 145 | 13.117 |
| | | 0737 | Start dive R789 at Maug. | | | | | | |
| | | 2206 | End dive R789 at Maug. | | | | | | |
| | | 2251 | CTD vertical cast at Maug. [2251 - 2319] | V04B-12 | 17 | 20 | 1.480 | 145 | 13.380 |
| 8-Apr | 99 | 0033 | CTD vertical cast at Maug. [0033 - 0057] | V04B-13 | 18 | 20 | 1.250 | 145 | 13.470 |
| | | 0143 | CTD vertical cast at Maug. [0143 - 0206] | V04B-14 | 19 | 20 | 1.190 | 145 | 13.140 |
| | | 0250 | Plankton tows at Maug. Two vertical tows from 0-150m. [0250 - 0315] | SROF7 | 13 | 20 | 1.480 | 145 | 13.380 |
| | | 0316 | Start dive R790 at Maug. | | | | | | |
| | | 0733 | End dive R790 at Maug. | | | | | | |
| | | 0833 | EM300 survey of transit from Maug to NW Eifuku. [0833 - 2207] | | | | | | |
| | | 2256 | Start CTD tow -yo at NW Eifuku. | T04B-07 | 20 | 21 | 29.640 | 144 | 2.700 |
| 9-Apr | 100 | 0050 | End CTD tow -yo at NW Eifuku. | | | 21 | 29.640 | 144 | 1.970 |
| | | 0216 | Start dive R791 at NW Eifuku. | | | | | | |
| | | 2207 | End dive R791 at NW Eifuku. | | | | | | |
| | | 2257 | Start CTD tow -yo at NW Eifuku. | T04B-08 | 21 | 21 | 29.213 | 144 | 2.462 |
| 10-Apr | 101 | 0135 | End CTD tow -yo at NW Eifuku. | | | 21 | 29.350 | 144 | 2.650 |
| | | 0130 | Plankton tow at NW Eifuku. Two vertical tows from 0-150m. [0130-0145] | SROF8 | 15 | 21 | 29.189 | 144 | 2.751 |
| | | 0145 | Plankton tow at NW Eifuku. Two vertical tows from 0-150m. [0130 - 0215] | SROF9 | 17 | 21 | 29.213 | 144 | 2.401 |
| | | 0334 | Start dive R792 at NW Eifuku. | | | | | | |
| | | 1550 | End dive R792 at NW Eifuku. | | | | | | |
| | | 1636 | Plankton tow at NW Eifuku. Two vertical tows from 0-150m. [1636 - 1704] | SROF10 | 19 | 21 | 29.616 | 144 | 2.690 |

| Date | JD | Time UTC | Comments | Event | Cast | Lat N deg | Lat N min | Long E deg | Long E min |
|---|---|---|---|---|---|---|---|---|---|
| | | 1811 | EM300 survey from NW Eifuku south to fill in missing data from 2003 survey. [1811 - 2109] | | | | | | |
| | | 2109 | Begin transit back to dive site at NW Eifuku. | | | | | | |
| 11-Apr | 102 | 0253 | Start dive R793 at NW Eifuku. | | | | | | |
| 12-Apr | 103 | 0009 | End dive R793 at NW Eifuku. | | | | | | |
| | | 0150 | Plankton tows 9NM SW of NW Eifuku. Two vertical casts from 0-150m. [0150 -- 0215] | SROF11 | 21 | 21 | 20.886 | 143 | 58.182 |
| | | 0210 | EM300 survey of transit from NW Eifuku to Kasuga 2. [0210 - 0643] | | | | | | |
| | | 0708 | Start CTD tow -yo at Kasuga 2. | T04B-09 | 22 | 21 | 36.350 | 143 | 38.730 |
| | | 0917 | End CTD tow -yo at Kasuga 2. | | | 21 | 36.940 | 143 | 37.930 |
| | | 0930 | Plankton tows at Kasuga 2. Two vertical casts from 0-150m. [0930 - 0945] | SROF12 | 23 | 21 | 36.940 | 143 | 37.930 |
| | | 1042 | Start dive R794 at Kasuga 2. | | | | | | |
| 13-Apr | 104 | 0132 | End dive R794 at Kasuga 2. | | | | | | |
| | | 0304 | Em300 survey of transit from Kasuga 2 to Daikoku. [0304 - 0717] | | | | | | |
| | | 0741 | Start CTD tow -yo at Daikoku. | T04B-10 | 23 | 21 | 19.000 | 144 | 11.210 |
| | | 0915 | End CTD tow -yo at Daikoku. | | | 21 | 19.850 | 144 | 12.020 |
| | | 0945 | Plankton tows at Daikoku. Two vertical casts 0-150m. | SROF13 | 25 | 21 | 19.290 | 144 | 11.381 |
| | | 1050 | Start CTD tow -yo at Daikoku. | T04B-11 | 24 | 21 | 19.800 | 144 | 11.400 |
| | | 1218 | End CTD tow -yo at Daikoku. | | | 21 | 18.880 | 144 | 12.330 |
| | | 1259 | Start dive R795 at Daikoku. | | | | | | |
| | | 1832 | End dive R795 at Daikoku. | | | | | | |
| | | 1840 | Begin transit to Yokahama, Japan. | | | | | | |
| 17-Apr | | ~1100 | Arrival at Yokahama, Japan | | | | | | |

# 2.0 CRUISE PARTICIPANTS

## 2.1 PARTICIPATING ORGANIZATIONS

| |
|---|
| NOAA Pacific Marine Environmental Lab (PMEL), Seattle and Newport, USA |
| Oregon State University/ Cooperative Institute for Marine Research & Science (OSU/CIMRS), USA |
| University of Washington (UW), USA |
| University of Washington/Joint Institute for Science of the Atmosphere and Ocean (UW/JISAO), USA |
| Western Washington University (WWU), USA |
| University of Victoria (UVIC), Canada |
| University of Quebec at Montreal (UQAM), Canada |
| Dalhousie University (DU), Canada |
| University of Texas at Dallas (UT), USA |
| Canadian Scientific Submersible Facility (CSSF), Canada |
| United States Geological Survey (USGS), Menlo Park CA, USA |
| Institute of Geological & Nuclear Sciences (GNS), New Zealand |
| Okayama University (OU), Japan |
| National Institute of Advanced Science and Technology (NIAST), Japan |

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## 2.3 *R/V THOMAS G. THOMPSON* PERSONNEL

| Name | Position |
|---|---|
| Michael Alderucci | Second Cook |
| Andrew Bartell | 3rd Assistant Engineer |
| Hasheem Bell | Mess Attendant |
| Larry Branovitch | AB |
| Brian Clampitt | AB |
| John Downey | 1st Assistant Engineer |
| Jan Gawel | Oiler |
| Raymond Gideons | Chief Steward |
| Rob Hagg | Marine Technician |
| Eric Haroldson | 2nd Mate |
| Michael Henderson | Oiler |
| Logan Johnsen | 3rd Mate |
| Kelly Landen | AB |
| Steven Layn | 2nd Assistant Engineer |
| Bill Martin | Lead Marine Technician |
| Anthony Monocandilos | AB |
| Charles Ormiston | Chief Engineer |
| J. Adam Parsons | Master |
| Jim Rose | AB |
| Russell Rowley | Oiler |
| Frank Spetla, Jr | AB |
| Colin Street | Oiler |
| John Wilson | Chief Mate |

# 3.0 SUBMARINE RING OF FIRE (SROF) 2004 DISCIPLINE SUMMARIES

# 3.1 HYDROTHERMAL PLUME STUDIES

## 3.1.1 2004 Mariana Arc SROF Hydrothermal Plume Studies

*Ed Baker*

**CTD operations**

The 2004 Submarine Ring of Fire (SROF) cruise conducted 14 CTD vertical casts and 11 tow-yos at a total of seven volcanoes: NW Rota-1, W Rota, E Diamante, Maug, NW Eifuku, Kasuga-2, and Daikoku (see accompanying Cast Summary table). Standard sensors on each cast, in addition to CTD sensors, included optical backscattering, oxygen, Eh, and a particle-sizing device (LSST). Occasional sensors included a transmissometer and a PAR sensor. We collected a total of 1070 samples (not including duplicates) for the following analyses: pH (253 samples), helium (176), CH4 (165), H2 (131), CO2 (65), total dissolvable metals (140), dissolved metals (24), x-ray fluorescence (79), and scanning electron microscope (37). All analyses but pH will be performed on shore. In the following paragraphs we summarize the plume distribution at each volcano as visualized by the optical backscattering sensor.

**Northwest Rota-1**

The 2003 SROF survey of hydrothermal plumes over NW Rota-1 found plumes more intense than on any of the other Mariana volcanoes (Fig. 1a). Multiple plume layers extending from just below the summit (~700 m) up to ~435 m indicated sources of differing buoyancy and/or differing depths. The 2004 survey found even more interesting results (Fig. 1b). Plumes from summit sources were again highly concentrated, with ?NTU values exceeding 3.0 in the main plume layer centered at ~490 m. While still intense, maximum plume rise height was reduced by ~50 m since 2003, assuming that the source depth has not changed. pH levels in water samples from this plume showed a reduction of 2 pH units from the ambient level of ~7.6. This reduction is perhaps unique for a neutrally buoyant plume and predicted much lower pH levels in the source fluid. This prediction was proven correct when seafloor fluids of pH ~2 were later sampled.

Another remarkable discovery was the presence of a thick and intense particle cloud surrounding the entire volcano from a depth of ~700 m (~150 m below the summit) to seafloor depths exceeding 2000 m. This cloud was present on both tow T04B01, crossing the volcano from SW to NE, and tow T04B02, crossing from SE to NW. The cloud was extensively layered, with individual plumes as thin as 20 m found several kilometers from the flanks. The depth of the upper boundary of the cloud was similar all around the volcano. The only result comparable to this was a similar particle cloud surrounding Kavachi in May 2000, a very shallow volcano (<10 m) in the Solomon Islands that was undergoing eruption. In both cases, earthquake shaking is thought to have mechanically resuspended fine particles from the volcano flanks, creating a massive halo of volcanic debris.

**East Diamante**

East Diamante, one of the few calderas along the Mariana Arc, is heavily eroded, but from the center rises a resurgent dome with several individual cones. In 2003 we found multiple plumes layered around this dome area, extending from ~400 m to above 200 m (Fig. 2). This plume structure was strongly indicative of several distinct sources. A 2004 tow roughly parallel to the 2003 tow again mapped a strong plume around the dome area (Fig.2b). This year, however, we found only a single strong particle plume layer centered around 300 m, plus a weaker and more spatially restricted layer as shallow as ~200 m over the summit. The 300 m layer almost certainly originates from the field of sulfide chimneys named “Black Forest” discovered at a depth of about 345 m on one of the central cones. Absent in 2004 was the deep layer between 300 and 400 m, evidence that a deep source discharging in 2003 is now extinct. The origin of the wispy plume extending to the SW of the dome at a depth of 525 m is unknown, as no samples were collected from it. It may indicate a weak hydrothermal source, or simply resuspension from a terrace on the southwest flank of the dome. No pH anomalies were present in samples from East Diamante.

**Maug**
Maug is a shallow caldera with a central cone that rises to a depth of ~30 m. CTD work in Maug consisted of four vertical casts near the cone in the NW, NE, SE, and SW quadrants of the caldera. The only definitive hydrothermal signal from the real-time CTD data was a distinct Eh peak near 145 m in the NE quadrant. This depth corresponds to the isobath on the NE flank of the cone at which low-temperature discharge was discovered.

**Northwest Eifuku**
NW Eifuku is the deepest hydrothermally active volcano in the Mariana Arc, with the summit at ~1550 m. In 2003 we found an optically weak plume surrounding the summit (Fig. 3a). In 2004 our first tow again found a weak optical plume and thus confirmed that the summit source was still active (Fig. 3b). Following this tow and the discovery of a vent field at the summit we conducted a second tow directly through the vent field. Here we found plume waters with ?NTU values exceeding 0.4 (about 100x greater than on the first tow), strongly indicative of high concentrations of elemental sulfur. Samples from this tow also had pH values ~0.8 units lower than ambient.

**Kasuga-2**
In 2003 we mapped plumes from two vent fields on Kasuga 2, one at the summit and another in a shallow crater about 200 m below (Fig. 4a). The same two plume layers were again present in 2004 (Fig. 4b). In 2004, however, we mapped only a very weak plume at the summit, perhaps because the combination of current flow and our tow path prevented us from intercepting the core of the plume. The deep plume was equally as intense as in 2003, and water samples found a pH deficit of ~0.2 pH units.

**Daikoku**
Daikoku is another shallow cone volcano, from which we found a weak plume at the summit in 2003 (Fig. 5a). The same plume layer was present in the same depth interval in 2004, but this year exhibited much more intense scattering (Fig. 5b). We conducted two tows roughly orthogonal to each other; the one shown in Fig. 5b crossed the summit roughly perpendicular to the current flow as indicated by the ADCP. This tow was designed to map the plume in detail in order to combine with the current data and yield an estimate of flux from the vent field. This mapping revealed an intense but thin optical plume at a level of ~350 m, and a deeper, thicker plume just below 400 m. These plumes had a pH deficit of up to 0.5 units.

Back of text

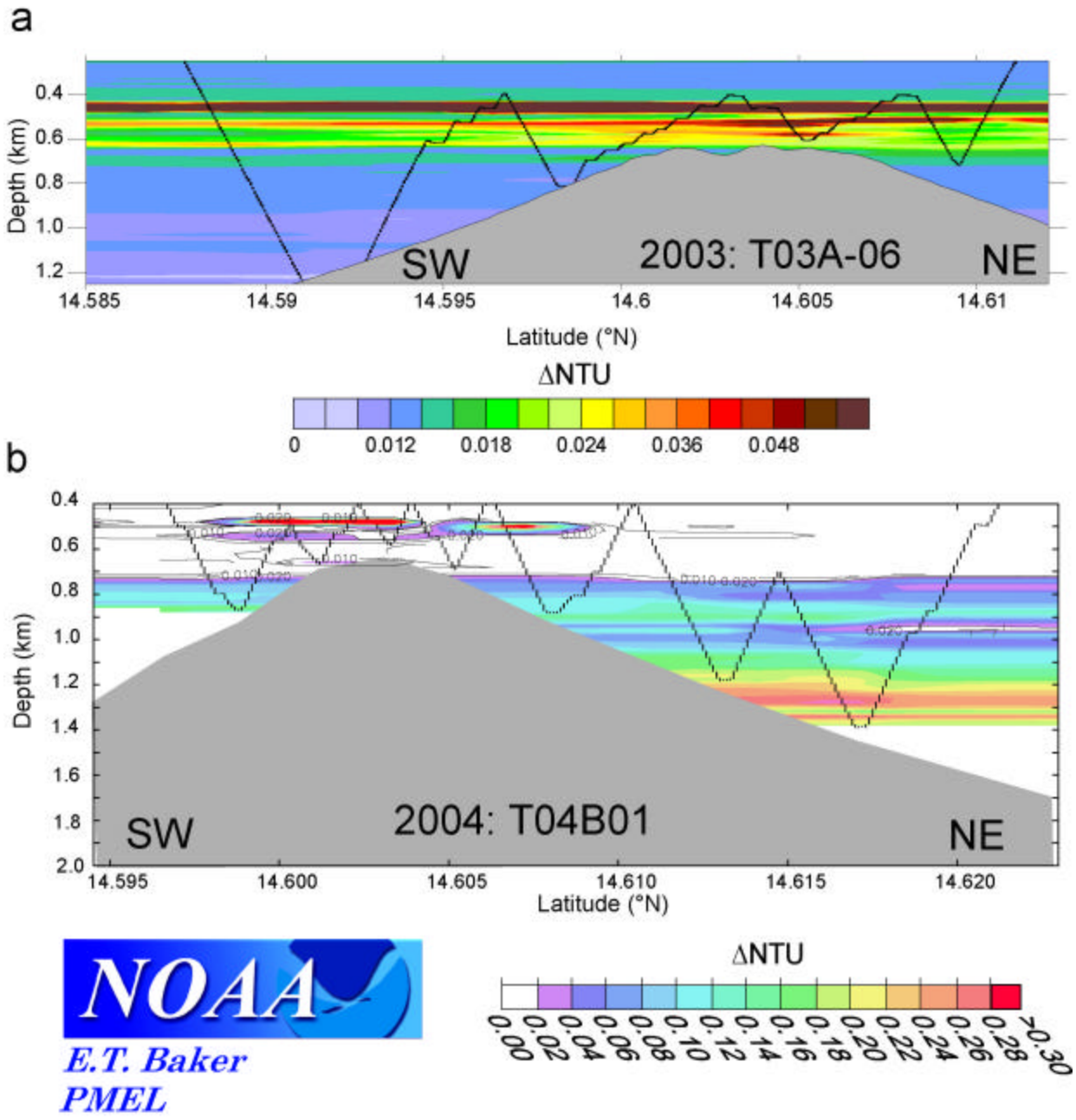



Figure 1. Plume transects across NW Rota #1 from (a) 2003 and (b) 2004. The deep (>700 m) plume layer was not observed in 2003. Note that the contouring program used for these preliminary data was different in 2003 and 2004.

back of fig1-ed

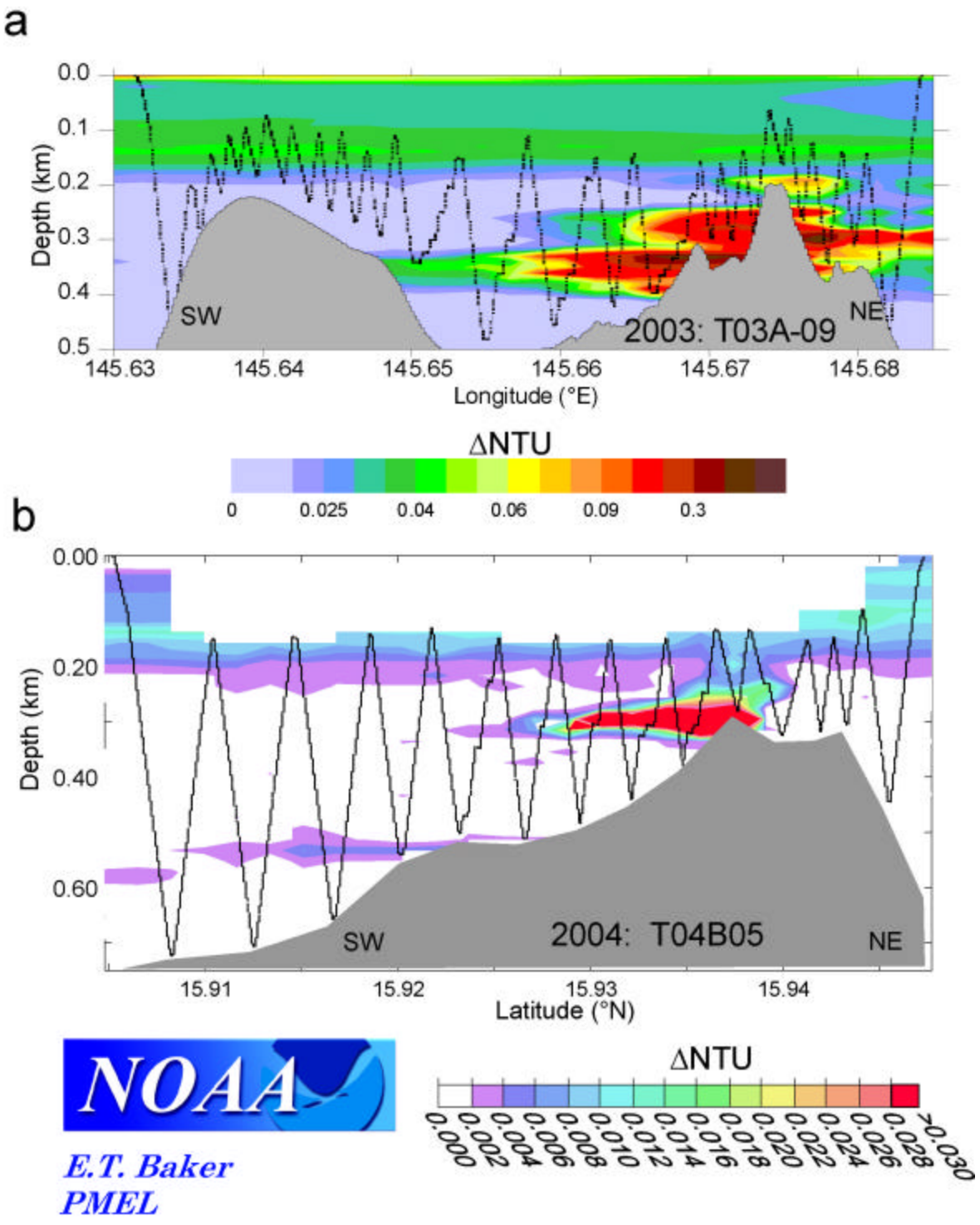



Figure 2. Plume transects across E. Diamante from (a) 2003 and (b) 2004. The observed plume layer was thinner in 2004 than in 2003. Note that the contouring program used for these preliminary data was different in 2003 and 2004.

back of fig2-ed

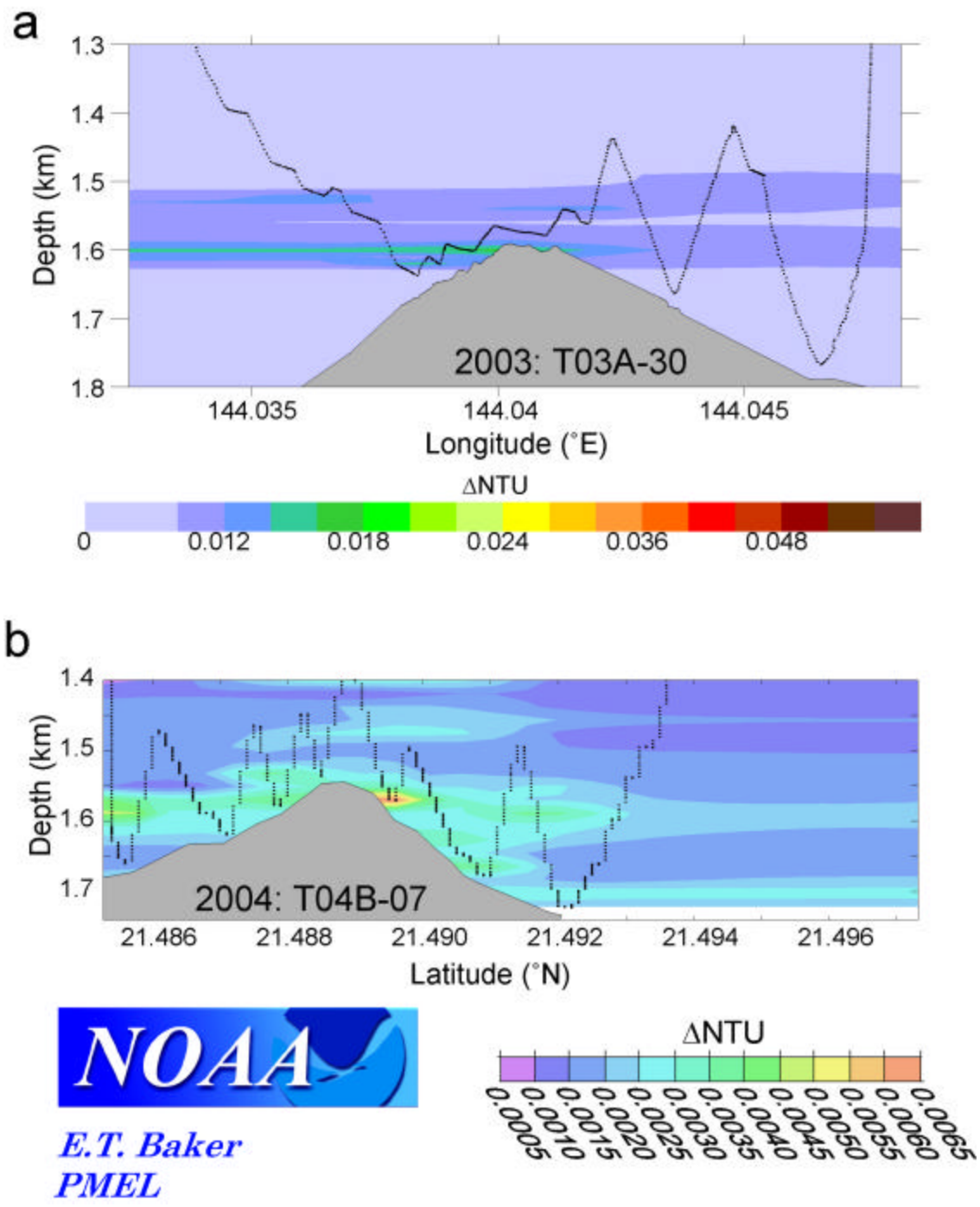



Figure 3. Plume transects across NW Eifuku from (a) 2003 and (b) 2004. Note that the contouring program used for these preliminary data was different in 2003 and 2004.

back of fig3-ed

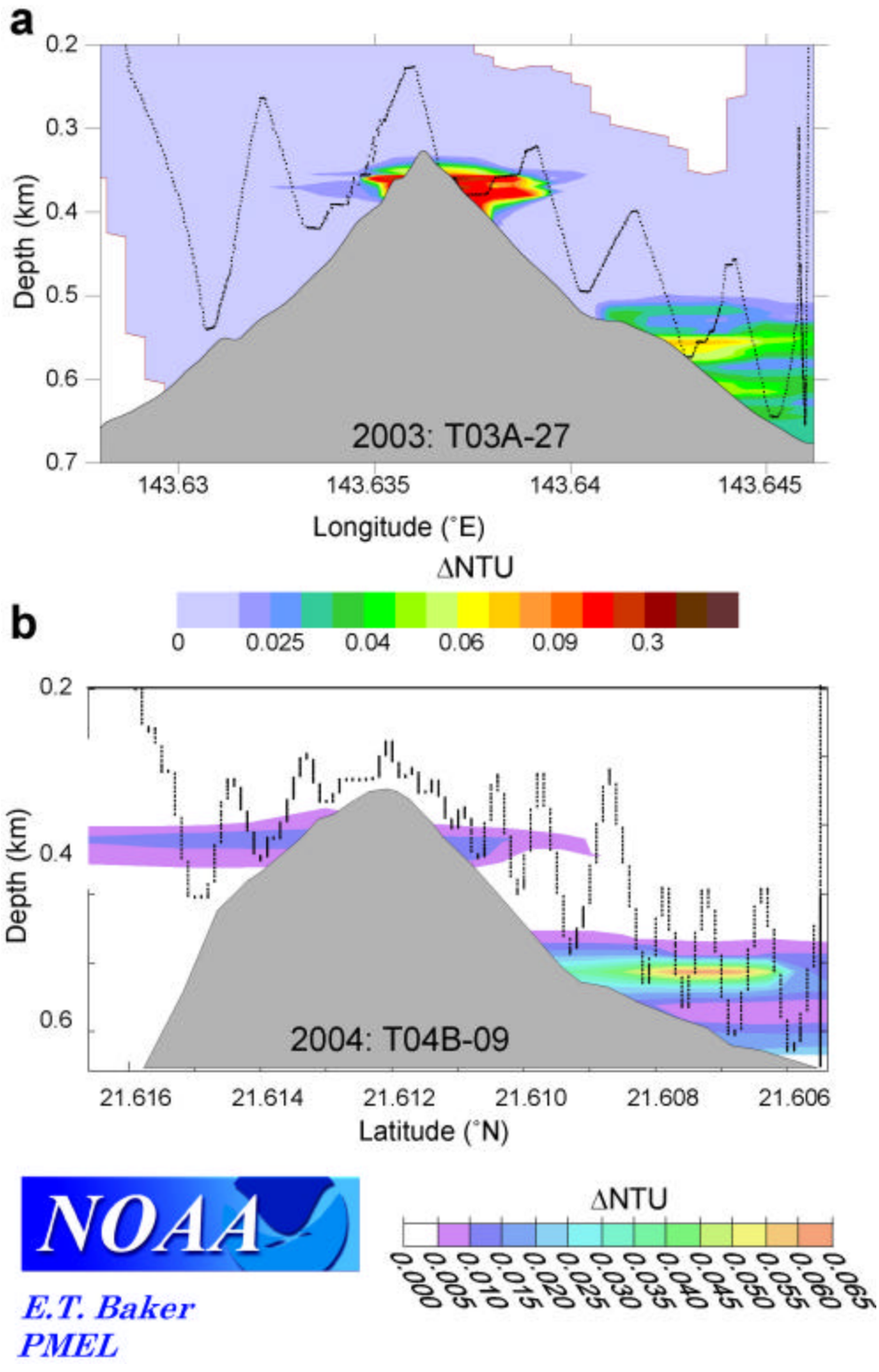



Figure 4. Plume transects across Kasuga 2 from (a) 2003 and (b) 2004. Note that the contouring program used for these preliminary data was different in 2003 and 2004.

Back of fig4-ed

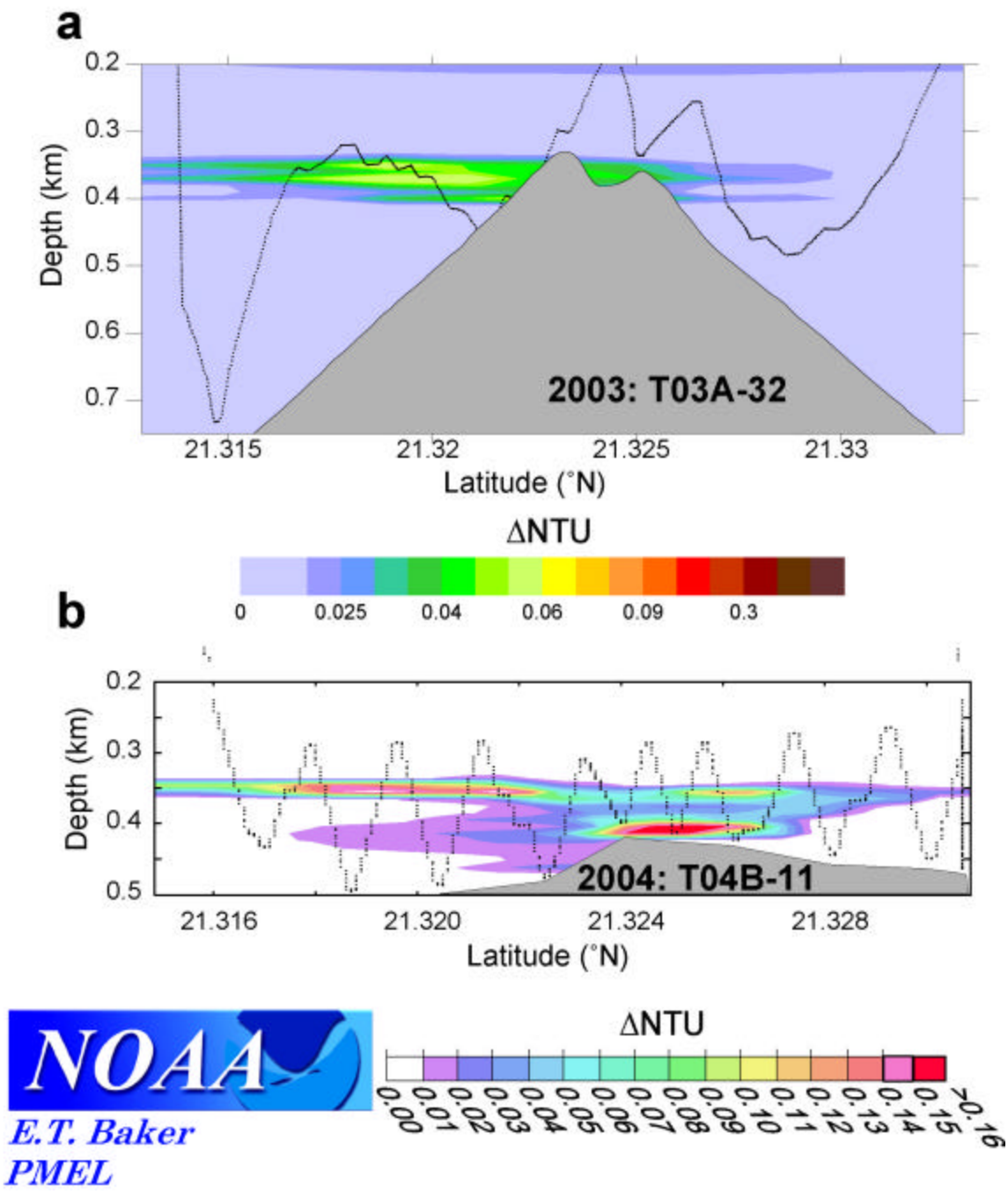



Figure 5. Plume transects across Daikoku from (a) 2003 and (b) 2004. We intercepted a much stronger plume in 2004 than in 2003. Note that the contouring program used for these preliminary data was different in 2003 and 2004.

Back of fig5-ed

## 3.1.1a CTD Sample Descriptions

| Sample Type | # of samples | CTD Sample Description |
|---|---|---|
| pH | 253 | A measure of acidity of a solution. Changes in pH are caused by volcanic gasses like carbon dioxide and sulfur dioxide. |
| $^3He$ | 176 | The helium isotope is a hydrothermal tracer signal, which is introduced into the ocean by seafloor volcanic activity. |
| $CH_4$ | 165 | Methane is another common hydrothermal tracer. Methane is also a food source and a by-product for/of microbes in hydrothermal environments. |
| $H_2$ | 131 | Dissolved hydrogen. |
| $CO_2$ | 65 | Carbon dioxide is the most abundant volcanic gas in submarine volcanoes. It dissolves in water to form carbonic acid, which lowers the pH of the water. |
| TDM | 140 | Total dissolved metals - the total amount of metals (dissolved plus particulate) in the sample. Acid is added to the sample, which causes particulate metals to dissolve before analysis. |
| DM | 24 | Dissolved metals - the amount of dissolved metals. The sample is first passed through a filter to remove the particulate metals before analysis. |
| XRF | 79 | X-ray fluorescence determines the chemical makeup of particles found in the water column above an active volcano. |
| SEM | 37 | Scanning electron microscopy allows one to look at the particles to identify their characteristic sizes, morphology (shape) and chemistry. |
| **Total Samples** | 1070 | |

## 3.1.1b Vertical Casts and Tow-yos - SROF 2004

| Cast | Station | Lat d N | Lat m N | Lon d E | Lon m E | pH | 3He | CH4 | H2 | CO2 | TDM | DM | XRF | SEM | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | V04B-01 | 14 | 36.10 | 144 | 46.56 | 13 | 7 | 0 | 0 | 6 | 7 | 3 | 8 | 3 | NW Rota #1 |
| 2 | T04B-01(start) | 14 | 35.77 | 144 | 46.29 | | | | | | | | | | NW Rota #1, SW to NE tow down flank |
| | T04B-01(end) | 14 | 37.33 | 144 | 47.65 | 23 | 15 | 20 | 20 | 0 | 14 | 0 | 8 | 2 | |
| 3 | T04B-02(start) | 14 | 34.54 | 144 | 47.86 | | | | | | | | | | NW Rota #1, SE to NW tow down flank |
| | T04B-02(end) | 14 | 37.48 | 144 | 45.16 | 12 | 8 | 19 | 18 | 0 | 8 | 5 | 4 | 4 | |
| 4 | V04B-02 | 14 | 32.13 | 144 | 51.78 | 14 | 14 | 7 | 0 | 0 | 14 | 0 | 0 | 0 | Between NW Rota #1 and W Rota |
| 5 | V04B-03 | 14 | 18.31 | 144 | 50.00 | 6 | 6 | 9 | 0 | 0 | 6 | 0 | 0 | 0 | W Rota, S end of caldera |
| 6 | T04B-03(start) | 14 | 36.05 | 144 | 46.52 | | | | | | | | | | NW Rota #1, SW to NE tow down flank, repeat of T04B01 |
| | T04B-03(end) | 14 | 37.90 | 144 | 48.34 | 15 | 9 | 7 | 9 | 0 | 8 | 0 | 8 | 7 | |
| 7 | T04B-04(start) | 15 | 54.39 | 145 | 39.09 | | | | | | | | | | E Diamante, SW to NE; aborted due to altimeter problems |
| | T04B-04(end) | 15 | 54.39 | 145 | 39.09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8 | T04B-05(start) | 15 | 54.37 | 145 | 39.90 | | | | | | | | | | E Diamante, SW to NE |
| | T04B-05(end) | 15 | 56.80 | 145 | 41.06 | 17 | 11 | 11 | 9 | 6 | 11 | 0 | 6 | 5 | |
| 9 | V04B-04 | 15 | 56.01 | 145 | 39.95 | 12 | 6 | 0 | 0 | 1 | 6 | 3 | 6 | 1 | E Diamante summit |
| 10 | V04B-05 | 15 | 56.57 | 145 | 40.89 | 5 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | E Diamante Black Forest field |
| 11 | V04B-06 | 15 | 56.50 | 145 | 41.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | E Diamante Black Forest field |
| 12 | V04B-07 | 15 | 56.32 | 145 | 40.46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | E Diamante shallow |
| 13 | V04B-08 | 15 | 57.20 | 145 | 42.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | E Diamante bkg in the caldera |
| 14 | T04B-06(start) | 15 | 56.00 | 145 | 41.65 | | | | | | | | | | E Diamante SE to NW |

| Cast | Station | Lat d N | Lat m N | Lon d E | Lon m E | pH | 3He | CH4 | H2 | CO2 | TDM | DM | XRF | SEM | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T04B-06(end) | 15 | 56.57 | 145 | 39.35 | 15 | 8 | 3 | 3 | 7 | 8 | 2 | 7 | 3 | |
| 15 | V04B-09 | 15 | 56.71 | 145 | 40.19 | 10 | 10 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | E Diamante |
| 16 | V04B-10 | 16 | 8.56 | 145 | 42.25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Between E Diamante and Anatahan |
| 17 | V04B-11 | 20 | 1.42 | 145 | 13.12 | 14 | 8 | 8 | 8 | 7 | 7 | 3 | 6 | 4 | Maug-NW crater |
| 18 | V04B-12 | 20 | 1.48 | 145 | 13.38 | 13 | 7 | 7 | 7 | 7 | 7 | 2 | 6 | 0 | Maug-NE |
| 19 | V04B-13 | 20 | 1.25 | 145 | 13.47 | 7 | 7 | 7 | 7 | 0 | 7 | 0 | 0 | 0 | Maug--SE |
| 20 | V04B-14 | 20 | 1.19 | 145 | 13.14 | 8 | 8 | 12 | 0 | 9 | 3 | 0 | 0 | 0 | Maug--SW |
| 21 | T04B-07(start) | 21 | 29.10 | 144 | 2.70 | | | | | | | | | | NW Eifuku |
| | T04B-07(end) | 21 | 29.64 | 144 | 1.97 | 15 | 11 | 11 | 10 | 0 | 0 | 0 | 0 | 0 | |
| 22 | T04B-08(start) | 21 | 29.21 | 144 | 2.46 | | | | | | | | | | NW Eifuku |
| | T04B-08(end) | 21 | 29.35 | 144 | 2.65 | 18 | 10 | 10 | 10 | 8 | 10 | 3 | 8 | 4 | |
| 23 | T04B-09(start) | 21 | 36.36 | 143 | 38.73 | | | | | | | | | | Kasuga-2 |
| | T04B-09(end) | 21 | 36.94 | 143 | 37.93 | 19 | 11 | 9 | 9 | 9 | 9 | 3 | 9 | 3 | |
| 24 | T04B-10(start) | 21 | 19.00 | 144 | 11.21 | | | | | | | | | | Daikoku SW to NE |
| | T04B-10(end) | 21 | 19.85 | 144 | 12.02 | 20 | 12 | 9 | 9 | 9 | 12 | 3 | 7 | 4 | |
| 25 | T04B-11(start) | 21 | 19.84 | 144 | 11.41 | | | | | | | | | | Daikoku NW to SE |
| | T04B-11(end) | 21 | 18.88 | 144 | 12.33 | 10 | 10 | 12 | 12 | 2 | 5 | 0 | 4 | 0 | |

# 3.2 MACROBIOLOGY

## 3.2.1 Macrofauna Summary

***Verena Tunnicliffe***

Information on the communities visited on this cruise will derive from collected material and photographs. The DSC camera has proven particularly effective at documenting species identity and range. Collating the story on the vent communities of the Mariana seamounts is a challenge. The major feature is the variation encountered. No assemblage was repeated on another seamount and the assemblages varied among sites on one seamount. Posing the reasons for the mosaic pattern will wait until more information from the biological data is available in conjunction with interpretations from physical, chemical and geological settings.

Collections:
Macrofaunal collections were made with the claw and suction sampler. We tried to hit "representative" collection sites for each volcano. The sampling is not extensive and it is easy to miss important community components (in sediments or mobile animals). Table 1 lists the collections from which organisms were preserved. Collections will be used in many ways.

### 3.2.1a Table 1: Macrofaunal Collections

| Sample # | Type | Location | Subsamples |
|---|---|---|---|
| R782-SS-J1-04 | Suction | Shimmering Shrimp - NW Rota | 5 shrimp to Kim Juniper |
| R782-Bio-09 | Grab | Shimmering Shrimp - NW Rota | Portion of 2 crabs to Kim Juniper |
| R782-RK-18 | Rock | Scarp Top - NW Rota | 4 Scale Worms to Kim Juniper |
| R784-SS-J2-02 | Suction | Cnidaria Ridge - NW Rota | |
| R786-026,029,031 | | Shrimp Fault - NW Rota | |

| Sample # | Type | Location | Subsamples |
|---|---|---|---|
| R787-RK-10 | Rock | East Diamante | |
| R787-RK-3,4,5,6 -10 | Rock | Barnacle Beach, East Diamante | |
| R787-14 | Grab | Diamante Forest, East Diamante | |
| R787-26 | Suction | Central Cone, East Diamante | |
| R787-27 | Suction | Central Cone, East Diamante | |
| R787-28 | Rock | Summit of Central, East Diamante | |
| R788-SS-025 | Suction | | * |
| R788-SS-026 | Suction | Intense Flow, East Diamante | |
| R788-RK-027 | Rock | FlocStorm, East Diamante | |
| R788-SS-028 | Suction | FlocStorm, East Diamante | |
| R788-Bio-31 | Trap | Barnacle Beach, East Diamante | |
| R788-SS-29 | Suction | Central Cone, East Diamante | |
| R791-J8 | Suction | NW Eifuku | |
| R791-Bio-06 | Grab | More Mussels, NW Eifuku | |
| R791-1-11 | Suction | Top Towers, NW Eifuku | |
| R791-2-24 | Suction | Champagne, NE Eifuku | |
| R791-3-25 | Suction | Champagne, NE Eifuku | |
| R791-Bio-26 | Grab | Champagne, NE Eifuku | |
| R792-Bio-08 | Grab | Near Fouling, NW Eifuku | |
| R792-SS-J1-09 | Suction | Near Fouling, NW Eifuku | |
| R792-SS-J3-10 | Suction | Near Fouling, NW Eifuku | |
| R793-SS-J2-06 | Suction | Fouling Heights, NW Eifuku | |
| R793-Bio-33 | Grab | Sulphur Spicules, NW Eifuku | |
| R793-36 | Trap | Champagne, NE Eifuku | |
| R793-SS-J8-37 | Suction | Champagne, NE Eifuku | |
| R794-SS-J1-004 | Suction | Barnacle Boulders, Kasuga - 2 | |
| R794-SS-J2-005 | Suction | Barnacle Boulders, Kasuga - 2 | |
| R794-SS-J3-006 | Suction | Mat Ridge, Kasuga - 2 | |
| R795-SS-J2-02 | Suction | Fish Spa, Daikoku | |
| R795-SS-J3-03 | Suction | Fish Spa, Daikoku | |
| R795-RK-06 | Rock | Fish Spa, Daikoku | |

*Taxonomy* – All identifications made on the ship are tentative and require verification by experts. Several new species are likely present. Initial contact has been made with Anders Waren, Swedish National Museum, to process all the gastropods and with Rick Webber (New Zealand National Museum) to examine the shrimp. Experts for other taxa will be sought. Total taxa recognized during the cruise numbered 31 (apparent vent obligates only).

*Functional Morphology* – One way to interpret the role of an animal in the ecosystem is to examine their "tools". Their specific adaptations to the habitat reflect the niche they occupy. For example, the types of claws on the crabs and shrimp will help define feeding techniques. We suspect that the large limpets from NW Eifuku may have symbionts (size, flow proximity are indicators); the gills will be examined.

*Population Characters* – In a few cases, we retrieved enough specimens to detail the biology of the species; the mussel from NW Eifuku will constitute such a study. We are examining gut contents, gill adaptations, recruitment, size structure and parasites. Coupled with work from isotopes, egg development, and water chemistry, we can construct a reasonable hypothesis to explain the unusual abundances on this volcano.

*Distributional Analyses* – One of the major questions we had coming to the Arc was whether the seamount setting would influence the distribution patterns of vent organisms. On ridge crests, the same community types re-occur over 1-2000km.

An initial assessment indicates that the Mariana volcanoes host a large range of community types. Table 2 is a first assessment of species distributions. We will be expanding this record and examining causes.

Imagery:
*Additional faunal records:* imagery will be examined for species not represented in collections.
*Behaviour* – We have video footage of shrimp, crabs and fish; studies will includes feeding behaviour, mobility and interaction behaviour. Dispersion of shrimp on mats will also be examined.
Size structure and density – Enough images of shrimp, limpets and mussels were collected to assemble information on sizes and densities of organisms.

## 3.2.1b Table 2: Species List: ** Signify Faunal Dominants of Different Volcanoes

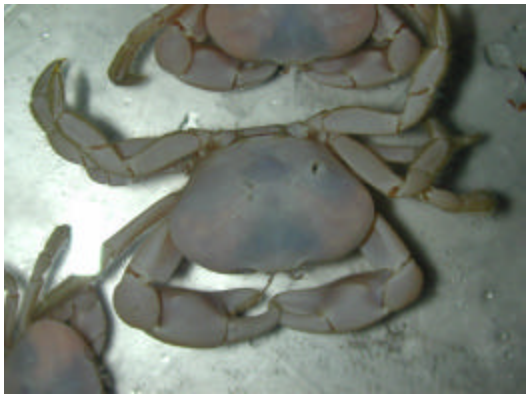
| Taxon | Species | NW Rota | East Diam | Maug | NW Eifuku | Kasuga | Daikoku | In-Situ Image |
|---|---|---|---|---|---|---|---|---|
| Dorvilleidae | unk | ? | | | x | x | x | na |
| Ampharetidae | unk | | | | x | | | na |
| Maldanadae | unk (to Kim) | x | | | | | | na |
| Polynoidae | *Branchinotogluma* sp | x | x | | | x | | R793-1887 |
| Polynoidae | cf *Levensteiniella* sp | | | | x | | | na |
| Polynoidae | (small red) | | | | x | | | na |
| Cirratulidae? | unk | | x | | | | | na |
| Protodrilidae? | unk | | | | | x | x | na |
| Vestimentifera | cf *Lamellibrachia* sp ** | | | | ? | x | x ** | R795-2185 |
| Alvinocarididae | *Alvinocaris* cf *brevitelsonis* ** | x ** | ? | | | | | R786 -369 |
| Alvinocarididae | *Alvinocaris sp.* | | | | x | | | |
| Alvinocarididae | cf *Opaepele sp* ** | x ** | ? | | ? | | | R786-327 |
| Bythograeidae | *Austinograea yunohana* ** | x | x | | | x ** | x | R794-2077 |
| cf Bythograeidae | *unk* | | | | x | | | R793-1921 |
| Decapoda | hairy crab sp | | x | | | | | R788-610 |
| Galatheidae | *Munidopsis sp* | | ? | | x | | | R791-1274 |
| Neoverrucidae | *Neoverruca sp* ** | | x ** | | | x | | R788-427 |
| Mytilidae | *Bathymodiolus* ** | | | | x ** | | | R791-1554 |
| Vesicomyidae | *unk* | | | | 1 | | | na |
| Phenacolepadidae | *Shinkailepas kaikatensis* ** | x | x ** | | | | | R788-603 |
| Phenacolepadidae | Shinkailepas nr *tufari* | | | | x | | | R791-1451 |
| Lepetodrilacea | *Lepetodrilus* nr *schrolli* | | | | x | | | R793-1901 |
| Clypeosectidae | nr *Pseudorimula* | | | | x | | | na |
| Provannidae | *Alviniconcha* nr. *hessleri* | | x | | | | | R788-451 |
| Provannidae | *Provanna* nr *japonicus* | | | | x | | | R793-1876 |
| Provannidae | *Provanna* nr *nassariaeformis* | | | | x | | | R791-1516 |
| Provannidae | *Desbruyeresia sp* | | x | | | | | |
| Elachisnidae | *Laeviphitus japonicus* | | x | x | | x | | na |
| Trochidae | *Monodonta sp* | | x | | | v | | R788-510 |
| Turridad | Oenopota cf ogasawarana ** | | | | | | x ** | R795-2232 |
| Solenogastre | *unk* | | | | x | | | na |
| Anemone | | | | | | | x | R795-2132 |
| Pisces | Symphurus sp. ** | | | | | x ** | x ** | R795-2219 |

## 3.2.1c Bestiary of Animals Collected on Mariana Arc Submarine Ring of Fire Cruise

**IDENTIFICATIONS ARE NOT CONFIRMED**
"nr" means 'near this species' – it could be different.
"sp." means I can't put a species name on it and it may be new.

Shrimp: *Alvinocaris* nr *brevitelsoni*
NW Rota-1

Shrimp *: Opaepele* nr *loihi*
NW Rota-1

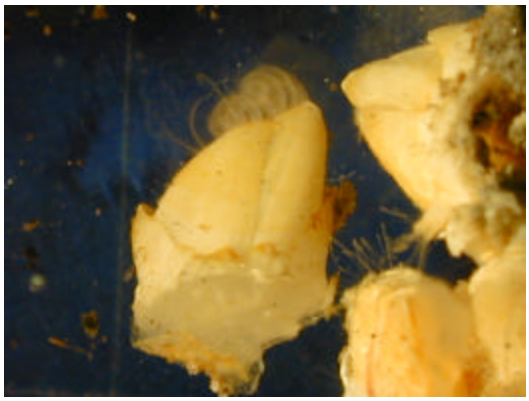


Arc Crab: *Austinograea yunohana*
E Diamante

No identification on this crab
NW Rota-1; E Diamante

.Squat lobster: *Munidopsis* sp
NW Eifuku

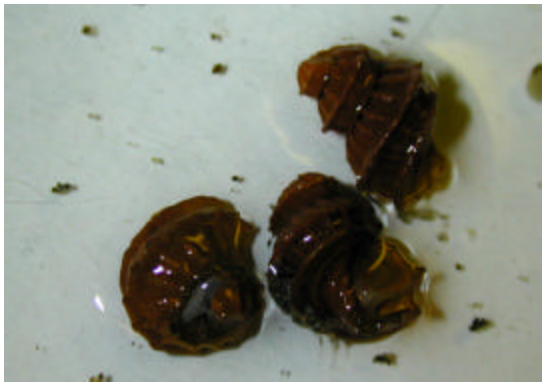
Ropos crab: nr *Austinograea*
NW Eifuku



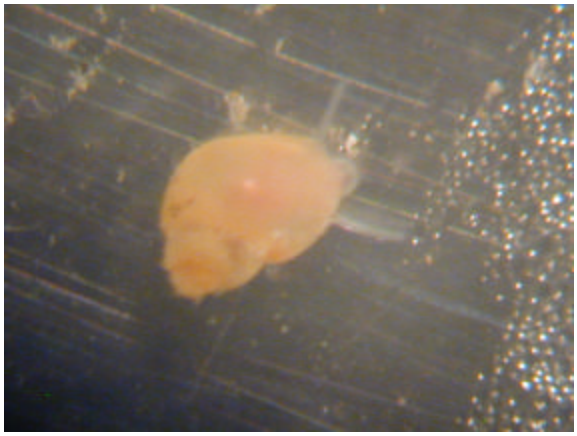
Barnacle: *Neoverruca* sp
E Diamante

Provannid snail nr *Desbruyeresia*
E Diamante

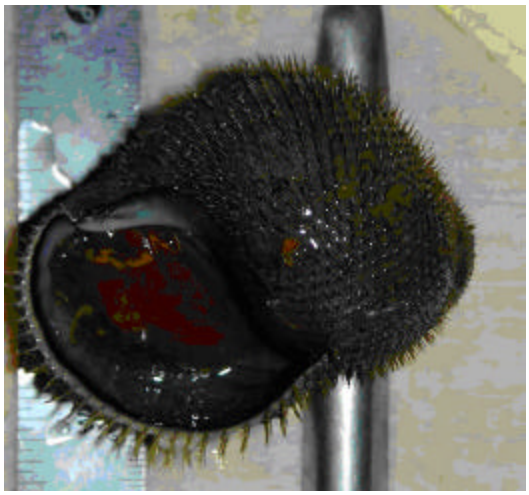
Bumpy snail: Provanna nr nassariaeformis
NW Eifuku



Sculptured snail: *Provanna* nr *japonicus*
NW Eifuku



Tiny pink snail: nr. *Laeviphitus japonicus.*
E Diamante

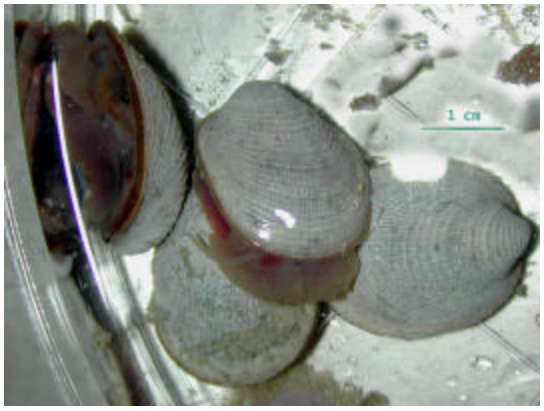


Big hairy Snail: *Alviniconcha* nr. *hessleri*.
E Diamante

Trochid snail #1; nr. *Monodonta*
E Diamante

Dumpling snail: *Oenopota ogasawarana*
Daikoku

Conical limpet: *Shinkailepas kaikatensis*.
E Diamante

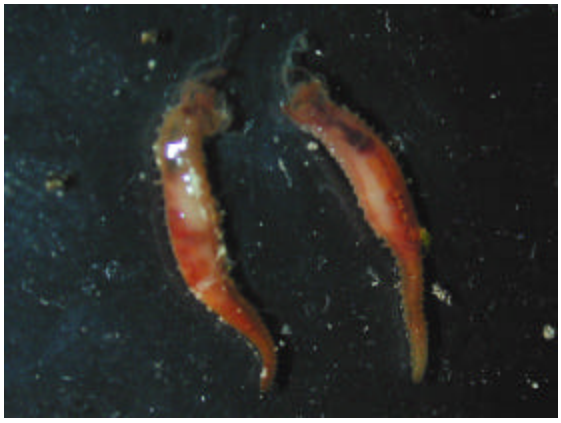



Eifuku limpet: *Shinkailepas* nr *tufari*
NW Eifuku

West Pacific limpet: *Lepetodrilus* nr *schrolli*;
NW Eifuku

Split limpet: nr *Pseudorimula*
NW Eifuku

Scaleworm: nr. *Branchinotogluma*
E Diamante



Ampharetid polychaete: Amphisamytha sp
NW Eifuku

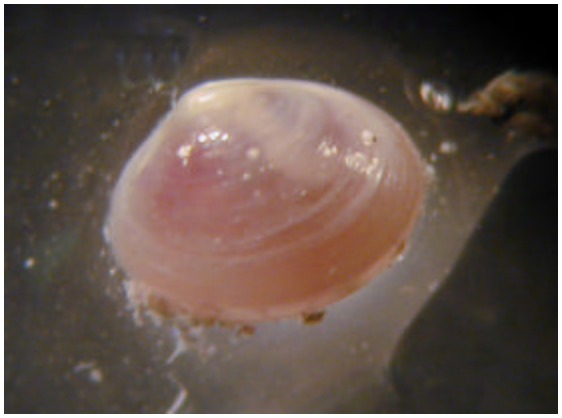
?Dorvilleid Polychaete: sp. Unknown
Kasuga-2

Hesionid polychaete: sp unknown
NW Eifuku

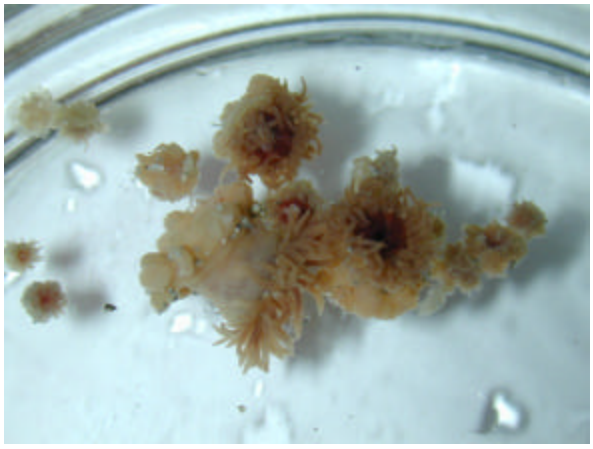
Tubeworms: *Lamellibrachia* nr *satsumi*
Kasuga-2

Aplacophoran: unknown
NW Eifuku

Mussel: *Bathymodiolus* sp. (about 20 cm long)
NW Eifuku



Vesicomyid clam: sp unknown (about 2 mm long)
NW Eifuku



Cactus anemones: sp. Unk
Daikoku

Sole: nr *Symphurus* sp.
Kasuga-2

## 3.2.2 Larval Ecology and Near-Bottom Plankton Dynamics

***Anna Metaxas***

At most vents on mid ocean ridges, the plankton immediately above the venting source include: (1) dispersing larval stages of vent organisms that are potential colonizers; and (2) planktonic invertebrates such as calanoid copepods and pelagic gastropods which may be utilizing the increased particulate concentration in the hydrothermal plume. Using plankton nets mounted on ROPOS, we did tows at different heights above the bottom to describe the plankton assemblage. The findings at the arc are interesting and quite different from what is observed at vents on ridges. West Rota had no evidence of venting and few adult benthic invertebrates. Not surprisingly, the plankton assemblage immediately above the bottom was poor. At NW Rota-1, where there was pronounced venting, we found relatively abundant planktonic invertebrates, mostly calanoid copepods, at 30-40 meters above the bottom. No plankton were found immediately above the thick plume, perhaps because the chemical composition of the plume may be too toxic for these animals and is avoided. In contrast, at E Diamante and NW Eifuku, planktonic invertebrates were enriched immediately above the chimneys and mussel beds, respectively, thus near venting, relative to 30 metres above the bottom.

The most interesting finding has been the near complete absence of larval stages of vent organisms in our near-bottom plankton samples. It is possible that most organisms on vents at these seamounts, except perhaps the initial colonizers, show limited dispersal potential and slow colonization. Aboard ship, we obtained gastropod larvae from egg cases that most likely belonged to *Shinkailepas kaikatensis*, *S.* cf *tufari* and *Oenopota ogasawarana* since they were laid on rocks with adults of these species. It appears that these larvae are quite short lived and remain near the bottom, suggesting limited dispersal potential. The absence of dispersing larvae in the water column may not be surprising if most abundant organisms at these vents have similarly short-lived larvae. The clockwise rotation of near-bottom currents that we have measured over these seamounts tends to trap plankton, and may also be enhancing the retention of these short-lived larvae.

### 3.2.2a List of Larval/Plankton Samples

R783-net-S-0001: Net tow around Shimmering Shrimp, Faulty Shrimp and Yellow Top; Z=517-572 m; H=3-5 mab (metres above bottom); speed=0.5 knot; start=11:58; end=12:30
R783-net-P-0002: Net tow around Shimmering Shrimp, Faulty Shrimp and Yellow Top; Z=517-572 m; H=3-5 mab; speed=0.5 knot; start=11:58; end=12:30
R784-net-P-0004: Net tow during Imagenex; Z=537-665 m; H=30 mab; speed=0.5 knot; start=16:18; end=21:13
R784-net-S-0008: Net tow during Imagenex; Z=537-665 m; H=30 mab; speed=0.5 knot; start=16:18; end=21:13
R785-net-P-0011: Net tow over summit; Z=388-437 m; H=30 mab; speed=0.5 knot; start=18:35; end=19:50
R785-net-S-0012: Net tow over summit; Z=388-437 m; H=30 mab; speed=0.5 knot; start=18:35; end=19:50
R786-net-P-0034: Net tow over Brimstone Pit; Z=527 m; H=15-32 mab; speed=0.5 knot; start=20:51; end=21:25
R786-net-P-0035: Net tow over Brimstone Pit; Z=527 m; H=15-32 mab; speed=0.5 knot; start=20:51; end=21:25
R787-net-P-0024: Net tow over Diamante Forest; Z=320 m; H=35 mab; speed=0.5 knot; start=19:35; end=20:12
R787-net-S-0031: Net tow over Diamante Forest; Z=320 m; H=35 mab; speed=0.5 knot; start=19:35; end=20:12
R788-net-P-0023: Net tow over Black Forest; Z=340 m; H=2-3 above chimney tops; speed=0.75 knot; start=19:50; end=20:20
R788-net-S-0024: Net tow over Black Forest; Z=340 m; H=2-3 above chimney tops; speed=0.75 knot; start=19:50; end=20:20
R791-net-P-0036: Net tow over Mussel Mound and Mussel Cliff; Z=1575-1609 m; H=3-6 mab; speed=0.5 knot; start=18:39; end=19:19
R791-net-S-0037: Net tow over Mussel Mound and Mussel Cliff; Z=1575-1609 m; H=3-6 mab; speed=0.5 knot; start=18:39; end=19:19
R791-net-P-0036: Net tow over Mussel Mound and Mussel Cliff; Z=1575-1609 m; H=3-6 mab; speed=0.5 knot; start=18:39; end=19:19
R792-SS-J1-0009: Suction sample of fauna in a “typical” mussel assemblage.
R793-net-P-0034: Net tow during Imagenex; Z=1538-1710 m; H=30 mab; speed=0.5 knot; start=16:59; end=20:27
R793-net-S-0035: Net tow during Imagenex; Z=1538-1710 m; H=30 mab; speed=0.5 knot; start=16:59; end=20:27

## 3.2.3 Mesozooplankton Collections

***John Dower***

**Methods:** Thirteen pairs of mesozooplankton samples were collected during the SROF-2004 cruise. Samples were collected using a 236um SCOR-type net, towed vertically from 150m to the surface at a speed of 0.75m/s (45m per minute), and equipped with a TSK flow-meter. One tow from each pair was sieved and preserved in buffered 5% seawater formalin. The other tow from each pair was frozen at -80° C for biomass determination. Although the goal was to collect all samples at night, the unpredictable nature of the ROPOS dive schedule necessitated a more opportunistic approach to sample collection. Sampling generally took place immediately before or after a CTD cast.

**Summary:** Although samples have yet to be processed, the general trend was for mesozooplankton biomass to increase as we moved northward. Zooplankton biomass was higher at night than during the day. Samples were dominated by small calanoid and cyclopoid copepods. Larval fish became increasingly common as we moved northward.

Zooplankton biomass over NW Eifuku, Kasuga-2 and Daikoku was much higher than over NW Rota-1, W Rota, E Diamante and Maug. Given that the ship's flow-through fluorometer and transmissometer both showed major shifts around the same time, it seems likely that we crossed into a more productive water mass as we steamed north between E Diamante (about 16°N) and NW Eifuku (about 21.5°N).

### 3.2.3a List of Mesozooplankton Samples

(Note: Grey-shaded entries were collected at night, others were collected during daylight)

| Station | Location | Latitude | Longitude | Date | Local time | CTD cast |
|---|---|---|---|---|---|---|
| SROF1 | NW Rota 1 | 14 36.070N | 144 46.540E | 29/3/2004 | 15:25 | V04B01 |
| SROF2 | NW Rota 1 | 14 36.070N | 144 46.540E | 29/3/2004 | 19:55 | V04B01 |
| SROF3 | West Rota | 14 18.300N | 144 50.000E | 31/3/2004 | 19:00 | V04B03 |
| SROF4 | East Diamante | 15 56.200N | 145 43.810E | 3/4/2004 | 6:00 | T04B04 |
| SROF5 | East Diamante | 15 56.320N | 145 40.450E | 4/4/2004 | 14:20 | V04B07 |
| SROF6 | East Diamante | 15 56 .610N | 145 40.970E | 4/42004 | 21:15 | T04B06 |
| SROF7 | Maug | 20 01.480N | 145 13/38E | 8/4/2004 | 12:50 | V04B12 |
| SROF8 | NW Eifuku | 21 29.100N | 144 02.700E | 9/4/2004 | 11:30 | T04B07 |
| SROF9 | NW Eifuku | 21 29.213N | 144 02.462E | 10/4/2004 | 11:45 | T04B08 |
| SROF10 | NW Eifuku | 21 29.616N | 144 02.691E | 11/4/2004 | 4:30 | None |
| SROF11 | 10nm SW of Eifuku | 21 20.886N | 143 58.182E | 12/4/2004 | 11:50 | None |
| SROF12 | Kasuga-2 | 21 36.940N | 143 37.930E | 12/4/2004 | 19:30 | T04B09 |
| SROF13 | Daikoku | 21 19.290N | 144 11.381E | 13/4/2004 | 19:45 | T04B10 |

## 3.2.4 Organization of Hydrothermal Vent Food Webs

***Initial report from Kim Juniper laboratory***

The primary goal of the participation of my laboratory in the cruise was to study the organization of hydrothermal vent food webs in the various submarine volcanic settings that we would be encountering during the cruise. The variety of subsea volcanoes to be visited provided a unique opportunity to examine the effect of various physical factors on the organization of vent food webs. Initial questions included the effects of depth, substratum and habitat stability on food web structure. The principal tool to be used for identification of trophic relationships and food sources will be the analysis of carbon and nitrogen stable isotope ratios in samples of faunal tissues and particulate organic material collected from the different vent sites.

Samples were successfully collected from the Northwest Rota-1, East Dimante, Maug, Northwest Eifuku, Kasuga-2 and Daikoku volcanoes. Several projects are in the planning stages to exploit this sample collection, including:

**Northwest Rota-1**: The site provides an opportunity to continue studies of food web structure in a highly active volcanic-hydrothermal system, carrying on from the PhD project of Christian Levesque on Axial Volcano, on the Juan de Fuca Ridge. We will begin by testing some of the hypothesis generated from the Axial work, about the properties of pioneering food webs, such as early uniformity of carbon sources and narrow trophic height. We will also examine how species composition and trophic structure vary between sites on the NW Rota-1 volcano, in order to elucidate local effects of substratum, fluid flux and stability.

**East Diamante**: The apparent chemosynthetic/photosynthetic transition at the Aquarium site will be the focus of an interdisciplinary effort. The most interesting food web question is the possible contribution of chemosynthetic food sources to the diet of filter feeding invertebrates at the summit of the cone, and to the adjacent particulate food supply in the water column. We will first need to reconstruct light and redox profiles in the adjacent water column from CTD/Eh/$O_2$/PAR sensor data in order to better define the transition zone between photosynthetic and chemosynthetic conditions. Near-bottom redox conditions up the slope of the central cone will be reconstructed from dives where the Eh probe was mounted on the submersible. In parallel, plankton and particulate samples from the photic zone and deep water column will be analyzed for stable isotope ratios to characterize photosynthetic and chemosynthetic food source signatures. Benthic fauna

and deposited particulates from the chemosynthetic and photic zones of the cone will also be analyzed for stable isotope ratios.

Another interesting food web question from the East Diamante site involves contrasting the structure of food webs in the remnant, probably older hydrothermal communities of the chimney field and diffuse vents of the east cone, with those of the pioneering communities on the central cone.

**Maug Volcano**: A single sample from the only active hydrothermal zone on the submerged cone of Maug Volcano contained an apparently iron-precipitating microbial mat and specimens of a tiny snail that colonized the mat and adjacent rocks. Stable isotope analysis will be conducted to determine if there is a trophic link between the snail and the mat material, and the extent to which photosynthetic carbon has accumulated within the mat.

**Northwest Eifuku**: There is an interesting opportunity for a comparative study of two apparently distinct food webs found on the submerged slopes of NW Eifuku volcano. The extensive mussel beds were characterized by very weak hydrothermal flow and visible signs of chemosynthetic microbial growth were few. Are the galatheid crabs, scale worms and shrimp in the mussel beds primarily fed by organic detritus produced by the mussels? In contrast, the seafloor surrounding the white smoker chimneys had intensive diffuse hydrothermal flow, occasionally thick microbial mats and a simpler fauna consisting of galatheid crabs and shrimp. Are consumers at this site relying more on direct grazing of microbial mats? Are there other, smaller organisms living within the microbial mats? These relationships should be apparent in the stable isotope data

**Kasuga-2 and Daikoku**: Substratum controls on food web structure will be the principal themes of studies on samples from these two sites. Both are habitats where widespread diffuse venting through porous volcanoclastic sands apparently supports a shrimp and flatfish community (plus the dumpling snail at Daikoku) whereas nearby rocky outcrops are colonized by barnacles, Lamellibrachia tubeworms, snails and sponges. The possible importance of sediment meiofauna for the abundant flatfish will also be investigated. Stable isotope analyses of faunal, sediment and microbial mat samples will be used to identify food sources and trophic links.

For further information - contact Kim Juniper at juniper.kim.uqam.ca

# 3.3 MICROBIOLOGY

## 3.3.1 Microbial Mat Microbiology

***Craig L. Moyer***

***Methodology and Experimental Design*** – The goals for the microbial mat sampling for this cruise were to focus exclusively on suction sampling and to then combine both molecular microbial ecology with classical microscopy studies in terms the overall experimental design. After microbial mat samples were successfully collected using the suction sampler on ROPOS, they were partitioned using four different protocols. The first was to quick freeze the majority of the microbial mat material so that high molecular weight genomic DNA (HMW gDNA) can then be extracted upon return to the laboratory. These extractions with then be analyzed initially using terminal-restriction length fragment polymorphism or T-RFLP of the PCR amplified small-subunit ribosomal DNAs (SSU rDNAs) products generated from the bacterial community contained within each microbial mat sample. This is an efficacious molecular biological screening technique as it allows for cursory estimates for both the level of diversity among microbial populations from within the community and provides for putative identification of the populations using a high-throughput format. Once these data have been analyzed, selected clone libraries of SSU rDNAs can be made so that nearly complete SSU genes can then be sequenced and phylogenetic trees can be constructed to better describe the relatedness of the newly discovered bacterial populations. I plan to complete these assays myself later this summer once the samples have made it back to my lab. The second protocol used aboard ship was the preservation of microbial mat subsamples for scanning electron microscopy (SEM). Western Washington University recently upgraded their SEM facility and I plan to turn this into either an undergraduate research project or part of a Master's Thesis project next fall. The third protocol used was to cryo-preserve microbial mat subsamples so that attempts can be made for targeted culturing of any of the novel bacterial populations discovered after the T-RFLP and phylogenetic analyses have been completed. Finally, the fourth protocol used on these mat subsamples was the initial processing required for fluorescent *in situ* hybridization (FISH) of group specific oligonucleotide probes. I have

recently designed oligo probes targeting gamma-*Proteobacteria* neutrophilic iron-oxidizers most closely related to *Lysobacter* spp. I am also in the process of preparing an array of oligo probes for the different groups of known epsilon-*Proteobacteria* that across several hydrothermal vent systems. My approach will be to both target and quantify these populations from the subsamples collected and prepared for FISH using epifluorescence microscopy.

***Initial Observations*** – By far the most extensive microbial mats discovered during our cruise has been those found at NW Eifuku Volcano. These microbial mats were easily distinguished into two general categories. The first and most often seen are the yellow and orange "fluffy" microbial mats occurring at many of the diffuse flow venting sites, which generally have only moderate increases (~2 to 10ºC) over the ambient temperature, while also demonstrating extremely reducing conditions (as measured by Eh). These mats can also be recognized by their ability to form "bacteria balls" that can be seen slowly rolling down slope after their production in heavily laden mat fields like Yellow Top or they can be extruded from the nearby cracks and fissures from especially steep areas of diffuse venting. This "ball effect" is a common characteristic of bacteria that produce mucopolysaccharides (a complex sugar polymer made with sulfuric acid). These particular bacteria use mucopolysaccharides to help capture the reduced iron and sulfur compounds found in the vent fluid. These mucopolysaccharides also help slow the spontaneous oxidation of vent derived compounds by maintaining a low oxygen concentration in the vicinity the bacterial cells. This allows the bacterial cells to optimize the amount of free energy that they can extract from their chemosynthetic metabolic pathways. Sometimes these types of mats can also form large mounds covered with a thin crust and small chimneys generated from the extensive buildup of the bacterial mediated oxidation products. This thin crust then acts much like a thermal blanket retaining heat along with additional vent fluid compounds, working much like a large microbial incubator. Similar types of microbial mats have also been identified at Loihi Volcano, Hawaii where they were dominated by neutrophilic iron-oxidizing bacteria.

The second category of microbial mats seen at NW Eifuku are the white “flocculent” mats that are present in and around the high temperature and extremely gas rich vents, such as the Champagne Vent Site (Max temp ~103ºC). These white mats also occur under extremely low Eh or under highly reducing conditions and are most likely dominated by sulfur-cycling bacteria. Due to the extreme nature of their habitat, many of these bacteria often grow where no macrofauna are present. However, on the edges of these sites, once sufficient mixing has taken place, abundant macrofauna can be seen vigorously feeding upon these microbial mats. This further demonstrates the transfer of chemosynthetically-derived energy up the food chain supporting large communities of macrofauna. White floc mats were also seen on this cruise at NW Rota-1, at the Iceberg Vent Site (Max temp ~58ºC). Similar types of microbial mats have been observed at Axial Volcano on the Juan de Fuca Ridge, where they were dominated by a diverse community of epsilon-*Proteobacteria* known to both oxidize and reduce multiple sulfur compounds.

The remaining locations sampled, including NW Rota-1, East Diamante, Maug and Daikoku all exhibited locations with relatively thin coatings of white and/or light yellow filamentous bacteria superficially resembling long strands characteristic of *Beggiatoa* or *Thioploca* spp. In some cases, these bacteria were very difficult to suction off the rock surfaces, as they seemed to be very well attached. On one occasion, scrapping a rock with a spatula and wire bottlebrush was also attempted with little additional success for sample recovery. In the future, microbial growth chambers would seem to be the best method for sampling these types of microbial mats.

## 3.3.1a Microbial Mat Microbiology Suction Sample List

**SAMPLE KEY**
**FF gDNA** = Fast Frozen samples in 50ml centrifuge tubes for direct gDNA extraction. Stored in white poly sample bags at -80ºC.
**Glut** = Fixed in 2.5% Glutaraldehyde for SEM analysis. Stored in 1.0ml cryovials at 4ºC.
**Cryo** = Fast Frozen in ~30% Glycerol as preservation for culturing. Stored in 2.0ml cryovials at -80ºC.
**FISH** = Microscopic analysis using fluorescent *in situ* hybridization with group specific oligonucleotide probes. Stored in 2.0ml screw-cap tubes at -20ºC.

**NW Rota-1** – Dive #R782
Bottle 5: Yellow Filamentous Mats at Summit Site
1 FF gDNA only, minimal sample.
Bottle 7: White Filamentous Mats and Floc at Base of Shrimp Mound near Summit Site
2 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

**NW Rota-1** – Dive #R783

Bottle 5&6: White Filamentous Mat at Iceburg Site
8 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

**NW Rota-1** – Dive #R786
Bottle 5,6,7: White Mat Filamentous at Fault Shrimp near Summit Site
8 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

**E Diamante** – Dive #R787
Bottle 6&7: White Filamentous Mat at Barnacle Beach Site
3 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

**E Diamante** – Dive #R788
Bottle 5: White Filamentous Mat at Flank of Five Towers Site
2+2 FF gDNA tubes (2 tubes of chimney chunks)
2x Cryo, 2x Glut, 2x FISH
Bottle 6: Yellow/Orange Ooze Mat at Base of Five Towers Site
4 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH
Bottle 7: White Filamentous Mat at Mat City Site near Aquarium Transition Zone
6 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

**Maug Crater** – Dive #R789
Bottle 5: Yellow Filamentous Mat at Egg Drop Soup Site
3 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

**Maug Crater** – Dive #R790
Bottle 5&6: White Filamentous Mat at Cave Vent Site
3 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

**NW Eifuku** – Dive #R791
Bottle 5&6: Yellow & Orange Fluffy Mats at BactoBalls Site
11+4 FF gDNA tubes (Four 125ml Nalgene Bottles)
2x Cryo, 2x Glut, 2x FISH
Bottle 7: Yellow & Orange Fluffy Mats at Yellow Top Site
20 FF gDNA tubes (NB This is by far the best sample recovered in a single bottle!)
2x Cryo, 2x Glut, 2x FISH

**NW Eifuku** – Dive #R792
Bottle 5,6,7: White Fluffy Mats at Champagne Vents Site
11+2 FF gDNA tubes (2 tubes of chimney chunks)
2x Cryo, 2x Glut, 2x FISH

**NW Eifuku** – Dive #R793
Bottle 5,6,7: Yellow & Orange Fluffy Mats at Yellow Top Site
18 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH
Bottle 1: Yellow & Orange Crustier Mats at Yellow Cone Site
8 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

**Daikoku** – Dive #R795
Bottle 5&6: White Filamentous covered sediments from Fish Spa Site
6 FF gDNA tubes
2x Cryo, 2x Glut, 2x FISH

## 3.3.2 Hydrothermal Fluid Microbiology

***Sheryl Bolton***

The primary objective of fluid microbiological studies was in-situ filtering of diffuse fluids for microscopic and molecular analyses to characterize and quantify the associated microbial communities. An additional objective was the enrichment culturing of mesophilic, thermophilic and hyperthermophilic anaerobes from the fluids as a comparison to what we typically isolate from mid-ocean ridge hydrothermal sites. Several high quality samples were collected using Dave Butterfield's Hot Fluid Sampler (HFS) as well as a few water column samples from CTD casts to be used for background comparisons.

The HFS was used to filter diffuse fluids through Sterivex filters for DNA extraction, 47mm mixed cellulose ester filters for RNA extraction, and 47mm polycarbonate filters for Fluorescence In-Situ Hybridization (FISH). Filters were generally taken in parallel with samples for chemical analysis in order to examine relationships between the microbiological findings and the chemical environment. Extracted DNA will be used to create clone libraries of the 16S rRNA gene to identify the microbial diversity in the fluids. RNA filters were frozen in an RNA preservative and will be used to look for the expression of specific metabolic functional genes. FISH filters will be used to quantify relative abundances of archaea and bacteria as a fraction of total cell numbers (determined by microscopic counts of preserved fluids).

Fluids from 17 different sites ranging in temperature from 14-239º C were used for culturing at 50, 70 and 90º C. There was a relatively low yield of cultured hyperthermophiles (90º C) from any of these sites, but a slightly higher proportion of positive thermophilic (70º C) and mesophilic (50º C) enrichments in both heterotrophic and autotrophic media. Low pH fluids from "Brimstone Pit" and "Shimmering Sands" at NW Rota-1 were preserved in 15% glycerol and frozen for further shore-based culturing in acidophilic media. Growth of cultures will be confirmed microscopically and positive enrichments will be purified and partially DNA sequenced to determine their relation to isolates from other hydrothermal environments.

### 3.3.2a Fluid Microbiology Sample List and Analysis Overview

| Dive/CTD # | Log Sample # | Description | Culturing | DNA | RNA | FISH | Counts |
|---|---|---|---|---|---|---|---|
| R783 | R783-HFS-13-0004 | HFS Sterivex filter #13- NW Rota-1 at Fault Shrimp (Tmax=23.1) | | X | | | |
| R783 | R783-HFS-7-0006 | HFS FISH filter #7- NW Rota-1 at Fault Shrimp (Tmax=23.1) | | | | X | |
| R783 | R783-HFS-5-0007 | HFS piston #5- NW Rota-1 at Fault Shrimp (Tmax=23.1) | X | | | | X |
| R783 | R783-HFS-8-0010 | HFS bag #8- NW Rota-1 at Scarp Top (Tmax=39.9) | X | | | | X |
| R783 | R783-HFS-3-0013 | HFS Sterivex filter #3- NW Rota-1 at Scarp Top (Tmax=39.9) | | X | | | |
| R783 | R783-HFS-10-0014 | HFS RNA filter #10- NW Rota-1 at Scarp Top (Tmax=39.9) | | | X | | |
| R783 | R783-HFS-12-0019 | HFS RNA filter #12- NW Rota-1 at Iceberg (Tmax=52.3) | | | X | | |
| R783 | R783-HFS-21-0021 | HFS Sterivex filter #21- NW Rota-1 at Iceberg (Tmax=52.3) | | X | | | |
| R783 | R783-HFS-22-0022 | HFS piston #22- NW Rota-1 at Iceberg (Tmax=52.3) | X | | | | X |
| R783 | R783-HFS-2-0023 | HFS FISH filter #2- NW Rota-1 at Iceberg (Tmax=52.3) | | | | X | |
| R783 | R783-HFS-24-0025 | HFS piston #24- NW Rota-1 at Iceberg site 2 (Tmax=57.1) | X | | | | X |
| R783 | R783-HFS-19-0031 | HFS bag #19- NW Rota-1 at High Flow (Tmax=37.0) | X | | | X | X |
| T04B-02 | N/A | CTD bottle 1 at 580m - background near NW Rota | | X | | | |
| V04B-02 | N/A | CTD bottle 8 at 750m- background near NW Rota | | | X | | |
| R786 | R786-HFS-2-0002 | HFS FISH filter #2- NW Rota-1 at Brimstone Pit (Tmax=32.6) | | | | X | |
| R786 | R786-HFS-3-0003 | HFS Sterivex filter #3- NW Rota-1 at Brimstone Pit (Tmax=32.6) | | X | | | |

| Dive/CTD # | Log Sample # | Description | Culturing | DNA | RNA | FISH | Counts |
|---|---|---|---|---|---|---|---|
| R786 | R786-HFS-8-0006 | HFS bag #8- NW Rota-1 at Brimstone Pit (Tmax=32.6) | X | | | | X |
| R786 | R786-HFS-9-0011 | HFS bag #9- NW Rota-1 at Shimmering Sands-rock (Tmax=20.8) | X | | | | X |
| R786 | R786-HFS-13-0013 | HFS Sterivex filter #13- NW Rota-1 at Shimmering Sands (Tmax=75.4) | | X | | | |
| R786 | R786-HFS-12-0015 | HFS RNA filter #12- NW Rota-1 at Shimmering Sands (Tmax=75.4) | | | X | | |
| R786 | R786-HFS-7-0016 | HFS FISH filter #7- NW Rota-1 at Shimmering Sands (Tmax=75.4) | | | | X | |
| R786 | R786-HFS-19-0017 | HFS bag 19#- NW Rota-1 at Shimmering Sands (Tmax=75.4) | X | | | | X |
| R786 | R786-HFS-21-0036 | HFS Sterivex filter #21- NW Rota-1- bkgd. plume near Brimstone Pit | | X | | | |
| R786 | R786-HFS-10-0039 | HFS RNA filter #10- NW Rota-1- bkgd. plume near Brimstone Pit | | | X | | |
| R788 | R788-HFS-2-0002 | HFS FISH filter #2- E Diamante at Barnacle Beach (Tmax=13.8) | | | | X | |
| R788 | R788-HFS-4-0003 | HFS piston #4- E Diamante at Barnacle Beach (Tmax=13.8) | X | | | X | X |
| R788 | R788-HFS-3-0004 | HFS Sterivex filter #3- E Diamante at Barnacle Beach (Tmax=13.8) | | X | | | |
| R788 | R788-HFS-10-0006 | HFS RNA filter #10- E Diamante at Barnacle Beach (Tmax=13.8) | | | X | | |
| R788 | R788-HFS-8-0007 | HFS bag #8- E Diamante at Five Towers (Tmax=223.5) | X | | | X | X |
| R788 | R788-HFS-9-0015 | HFS bag #9- E Diamante at Black Diamante (Tmax=239.4) | | | | | X |
| R788 | R788-HFS-24-0020 | HFS piston #24- E Diamante at Black Diamante (Tmax=239.4) | X | | | X | X |
| R790 | R790-HFS-8-0001 | HFS bag #8- Maug at Egg Foo Young (Tmax=24.4) | X | | | | X |
| R790 | R790-HFS-9-0003 | HFS bag #9- Maug at Cave (Tmax=27.4) | X | | | | X |
| R790 | R790-HFS-13-0008 | HFS Sterivex filter #13- Maug at Cave (Tmax=27.4) | | X | | | |
| R790 | R790-HFS-7-0009 | HFS FISH filter #7- Maug at Cave (Tmax=27.4) | | | | X | |
| R790 | R790-HFS-19-0010 | HFS bag #19- Maug at Cave (Tmax=27.4) | | | | | X |
| R790 | R790-HFS-12-0012 | HFS RNA filter #12- Maug at Cave (Tmax=27.4) | | | X | | |
| R791 | R791-HFS-3-0009 | HFS Sterivex filter #3- NW Eifuku at Ice Fall (Tmax=15.0) | | X | | | |
| R791 | R791-HFS-13-0020 | HFS Sterivex filter #13- NW Eifuku at Champagne (Tmax=103.5) | | X | | | |
| R791 | R791-HFS-7-0021 | HFS FISH filter #7- NW Eifuku at Champagne (Tmax=103.5) | | | | X | |
| R791 | R791-HFS-21-0033 | HFS Sterivex filter #21- NW Eifuku at Cliff House (Tmax=79.4) | | X | | | |
| R791 | R791-HFS-2-0034 | HFS FISH filter #2- NW Eifuku at Cliff House (Tmax=79.4) | | | | X | |
| R791 | R791-HFS-10-0035 | HFS RNA filter #10- NW Eifuku at Cliff House (Tmax=79.4) | | | X | | |
| R793 | R793-HFS-8-0004 | HFS bag #8- NW Eifuku at Fouling Vent (Tmax=2.5, ambientT=2.0) | | | | | X |
| R793 | R793-HFS-5-0013 | HFS piston #5- NW Eifuku at Champagne (Tmax=76.6) | X | | | | X |
| R793 | R793-HFS-3-0015 | HFS Sterivex filter #3- NW Eifuku at Sulfur Dendrite (Tmax=55.7) | | X | | | |
| R793 | R793-HFS-2-0017 | HFS FISH filter #2- NW Eifuku at Sulfur Dendrite (Tmax=55.7) | | | | X | |
| R793 | R793-HFS-24-0019 | HFS piston #24- NW Eifuku at Sulfur Dendrite (Tmax=55.7) | X | | | | X |
| R793 | R793-HFS-12-0020 | HFS RNA filter #12- NW Eifuku at Sulfur Dendrite (Tmax=55.7) | | | X | | |
| R793 | R793-HFS-23-0023 | HFS piston #23- NW Eifuku at Cliff House (Tmax=69.7) | X | | | | X |

| Dive/CTD # | Log Sample # | Description | Culturing | DNA | RNA | FISH | Counts |
|---|---|---|---|---|---|---|---|
| R793 | R793-HFS-10-0028 | HFS RNA filter #10- NW Eifuku at Cliff House (Tmax=69.7) | | | X | | |
| R793 | R793-HFS-7-0029 | HFS FISH filter #7- NW Eifuku at Cliff House (Tmax=69.7) | | | | X | |
| R793 | R793-HFS-13-0030 | HFS Sterivex filter #13- NW Eifuku at Cliff House (Tmax=69.7) | | X | | | |
| R794 | R794-HFS-8-0008 | HFS bag #8- Kasuga-2 at Cracked Vent (Tmax=26.9) | | | | | X |
| R794 | R794-HFS-9-0009 | HFS bag #9- Kasuga-2 at Cracked Vent (Tmax=26.9) | | | | | X |
| R794 | R794-HFS-5-0012 | HFS piston #5- Kasuga-2 at Cracked Vent (Tmax=26.9) | X | | | X | X |
| R794 | R794-HFS-13-0014 | HFS Sterivex filter #13- Kasuga-2 at Cracked Vent (Tmax=26.9) | | X | | | |

# 3.4 CHEMISTRY

## 3.4.1 Vent Fluid Chemistry

***David A. Butterfield***

**Chemical Highlights from the Expedition**

- Collected the first set of vent fluids from a survey of a volcanic arc.
- Collected fluids and particles directly from a volcanic eruptive vent.
- Collected liquid $CO_2$ bubbles and $CO_2$-rich fluids for chemical analysis.
- Initial results confirm the connection between the plume characteristics and venting fluids and explain some anomalies in plume chemistry.
- Detailed analysis on shore will provide new understanding of chemical impact of volcanic arcs on ocean chemistry.
- Overall, diffuse flow systems were the predominant form of venting. Direct evidence of boiling fluids was found only at East Diamante, where black smoker chimneys are forming.
- Deep degassing at Eifuku is dominated by $CO_2$ and shallower degassing at NW Rota is dominated by $SO_2$, as predicted by gas solubility in magma as a function of pressure. The differences in fluid chemistry between the sites are large.

Methods

As in many previous expeditions, we used the Hydrothermal Fluid and Particle Sampler (HFPS) to collect fluid and particles from various hydrothermal environments. We made several modifications to the intake nozzle during the cruise in order to improve the sampling in different types of vents. In the coarse sand environment at NW Rota-1, we used a titanium cylinder attachment to seal over the sand while keeping the intake point out of the sand to avoid clogging. At the Brimstone Pit, we added approximately 3 meters of ½" Teflon tubing to the intake nozzle in order to reach down into the corrosive environment of the pit crater to sample fluids. At NW Eifuku, we changed the piston sampler orientation and check valve placement to relieve high gas pressure from CO2-rich vents. The gas was allowed to escape out of the top of the pistons to avoid destroying the pistons and losing the water. HFPS worked well throughout the cruise. However, we are treating the early piston samples with caution because the piston seals leaked in some cases during sample extraction in the lab. As a result, some samples were diluted with distilled water during extraction. This problem only affects pistons (not bags) on the first 3 dives.

We performed shipboard analysis of pH, alkalinity, H2S, and dissolved silica. Kevin Roe performed most of the shipboard chemical analysis. Samples were frozen for nutrient analysis on shore. Ben Larson analyzed methane and hydrogen on board by gas chromatography.

Northwest Rota-1

Our first target for exploration was NW Rota-1 submarine volcano. Plume studies indicated a highly acidic fluid with abundant particulate sulfur emanating from near the summit of the volcanic cone. Reconnaissance turned up numerous vents along faults cutting the volcanic edifice, but all of them were completely clear and could not account for the extremely heavy particulate signal seen in the previous year and in our water column work during this cruise. A heavy particulate plume was observed with the ROV also. Finally, on dive 783, while looking over the area dubbed Shimmering Sands, we found the source of the particulate plume. It was a pit crater with billowing clouds of white and yellow particulate, immediately interpreted as particulate sulfur. The pit has all the characteristics of a volcanic vent rather than a strictly hydrothermal feature. This vent is clearly a source of coarse volcanic sand and particulate sulfur (ranging up to spheroids several millimeters in diameter) that must continually rain down on the summit to provide material for the often-observed slides of dark sand down the steep sides of the volcano near the summit.

Active hydrothermal vents were found between 590 and 530 meters depth on the summit of the volcano. As mentioned, all of the vents have extremely clear fluids with the exception of those venting from the pit crater. The pit crater fluids have an extremely high content of particulate sulfur. This will be quantified back at the lab by weighing filters taken in-situ with the HFPS. The fluids from the pit crater were extremely acidic, with pH around 2.0. This certainly points to magmatic degassing of $SO_2$ and disproportionation into elemental sulfur and sulfuric acid. The $SO_2$ disproportionation reaction produces sulfuric acid and either hydrogen sulfide or elemental sulfur:

$3SO_2 + 2H_2O = S + 4H^+ + 2SO_4^{--}$

$4SO_2 + 4\ H_2O = H_2S + 6H+ + 3SO_4^{--}$

The fluids we sampled were only up to 30 degrees C, and much hotter fluids must be present at the bottom of the pit where vigorous mixing with seawater occurs. We were sampling approximately 10-15 meters above the bottom of the pit as determined by pencil-beam sonar (Imagenex). The lower gas content of the pit fluids could also be due to more extensive dilution of the primary fluid upstream of our sampling site. We expect to find excess sulfate in the fluids when we analyze them on shore, and the trends of excess sulfate with temperature and chemical tracers will give us an estimate of the high-temperature end-member fluid at this vent.

The other vents have a conspicuous lack of particulate sulfur, and also have higher gas content. We can speculate that the same source fluid might supply these vents, but that mixing conditions favor the disproportionation of SO2 into H2S and sulfuric acid. Some of these fluids (20 to 90 degrees C) have high total gas content and high H2S content. Several of the samples recovered had 50-60% gas by volume after expansion to atmospheric pressure. Methane and hydrogen are too low in concentration to make up a significant portion of the exsolved gas present in these samples. We do not yet know the CO2 content of the fluids. It is possible, though not likely, that H2S might make up most of the gas content. The clear diffuse vents are in very close proximity to the pit crater vent, suggesting that they might share a common source. However, it is also possible that the pit crater is predominantly a volcanic gas vent, and that the other vents are due to seawater-derived hydrothermal fluid circulation through the volcanic edifice. Detailed chemical analysis back in the lab should allow us to distinguish between these two hypotheses.

Northwest Eifuku

NW Eifuku had an unusual plume signature with a large pH anomaly and high Fe/Mn ratio, plus all Fe and Mn dissolved. There was also significant particulate sulfur. We found numerous vent sites with white staining and sulfur deposits. One set of vents was emitting an intense white smoke, definitely sulfur, with temperatures of 80 to 115C. Surrounding these vents, there were incredibly vigorous sources of bubbles/droplets. The bubbles were aspherical, and were not as buoyant as gas bubbles would be. They stuck to surfaces of the submersible. After looking at the phase diagram for CO2, it became clear that these bubbles must be liquid CO2 with a layer of hydrate on them. This would certainly explain unusual plume chemistry. These bubble vents represent a huge local flux of CO2 to the water column. We did not determine the fate of the bubbles as they rose through the water, i.e. whether they ultimately dissolved or made it all the way to the surface. The pH of fluids from Champagne vent was near 3.5 to 4. This is close to what would be expected for a solution of pure CO2. The fluids had some alkalinity, i.e. no excess acid, so they were not dominated by the SO2 chemistry seen at NW Rota-1. In this case, CO2 is the source of acidity and is a weak acid. However, it is still capable of acid attack on volcanic rock, especially glass, and there is abundant volcaniclastic sand throughout the volcano. Fluids venting at Cliff House, higher up

above the Champagne site, had much higher alkalinity. This sort of phenomenon has been seen at Loihi seamount and to a lesser extent at Axial Volcano on Juan de Fuca ridge. We are most likely witnessing here a primary magmatic gas component delivering CO2 to a hydrothermal system and also seeing the effects of reaction of these fluids with the volcanic edifice.

East Diamante

At this site, we found smoker chimneys with fluids at the boiling point for the ambient conditions (240° C at 345 meters). Some bubbles were visible at this site, but they were extremely small. Attempts to collect them were abandoned due to the very low flux. These may have been vapor bubbles. We collected fluids from the tops of the chimney structures. These had relatively low levels of H2S and slightly higher Cl than seawater, probably due to some vapor loss after boiling. This is one of the shallowest open-ocean sites where sulfide chimneys are known to form.

Maug Caldera

An extensive search within Maug caldera found only very low-level hydrothermal venting marked by bacterial mats. Fluids collected from one area had low levels of sulfide and enriched silica relative to bottom water. Temperatures were approximately 4° C above background. The low level of venting here would probably result in no detectable plume if it were not in an enclosed basin where flushing is limited.

Kasuga-2

At Kasuga-2 volcano, we had one short dive and were able to sample one diffuse flow area at 385m depth. The vent was a vertical crack, with fluid temperatures 15 to 20 ° C above background, and with elevated H2S and silica. There were many sites with low level diffuse venting, microbial mats, and vent fauna, but not enough time to investigate thoroughly.

Daikoku

Although we saw several sites with diffuse venting, including clouds of probable particulate sulfur hugging the seafloor near the summit of the volcano, we were unable to sample fluids on the single short dive at this site.

## 3.4.1a Mariana Arc Vent Fluid Chemistry Sample List

| Sample# | hfs # | type | Site | filter | start | end | T max | T1 avg | T1 stdev | T2 avg | vol (ml) | Z (m) | hdg | S isotope |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| **Volumes (ml) are reported - actual sample volume may be less due to loss of sample on the way to the surface. Temperatures are in degrees Celsius. Times are UTC. Depths are meters.** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Dive R783 NW Rota-1. 3/29 - 3/30 2004** | | | | | | | | | | | | | | |
| **R783HFS-F2** | 2 | filter | Iceberg | FISH | 18:47:00 | 18:48:00 | 51.7 | 51.5 | | 32 | 250 | | | |
| Iceberg" vent 15m ESE of White Mat/Gastro site. Strong flow at base of white rock with black sediment onlapping. | | | | | | | | | | | | | | |
| **R783HFS-F3** | 3 | filter | Scarp Top | Sterivex | 15:45:00 | 15:58:00 | 39.9 | 38.7 | | 26 | 1201 | | | |
| Scarp top. Relatively strong flow on hydrothermal mound with shrimp, crabs and bac mats. Sulfur deposits nearby. | | | | | | | | | | | | | | |
| **R783HFS-P4** | 4 | piston | Scarp Top | none | 16:16:00 | 16:22:00 | 39 | 38.4 | 0.3 | 26 | 789 | 563.9 | 211 | SO4,H2S |
| Scarp top. Relatively strong flow on hydrothermal mound with shrimp, crabs and bac mats. Sulfur deposits nearby. | | | | | | | | | | | | | | |
| **R783HFS-P5** | 5 | piston | Fault Shrimp | none | 13:38:00 | 13:43:00 | 22.2 | 20.7 | 1 | 16 | 687 | 582.8 | 110 | SO4,H2S |
| Taken at base of altered rock face where dark sediment accumulates. this is 10m from fault shrimp nav marker | | | | | | | | | | | | | | |
| **R783HFS-F7** | 7 | filter | Fault Shrimp | FISH | 13:34:00 | 13:35:00 | 21 | 20.6 | | 16 | 203 | | | |
| **R783HFS-B8** | 8 | bag | Scarp Top | none | 15:29:00 | 15:34:00 | 39.7 | 39 | 0.43 | 27 | 625 | 563.8 | 209 | SO4 |
| Scarp top. Relatively strong flow on hydrothermal mound with shrimp, crabs and bac mats. Sulfur deposits nearby. | | | | | | | | | | | | | | |
| **R783HFS-B9** | 9 | bag | Scarp Top | none | 15:35:00 | 15:41:00 | 39.5 | 39.2 | 0.5 | 27 | 625 | 563.8 | 209 | SO4,H2S |
| Scarp top. Relatively strong flow on hydrothermal mound with shrimp, crabs and bac mats. Sulfur deposits nearby. | | | | | | | | | | | | | | |
| **R783HFS-F10** | 10 | filter | Scarp Top | rna | 16:00:00 | 16:15:00 | 39.1 | 38.4 | 0.5 | 26 | 1016 | 563.9 | 211 | |
| Scarp top. Relatively strong flow on hydrothermal mound with shrimp, crabs and bac mats. Sulfur deposits nearby. | | | | | | | | | | | | | | |
| **R783HFS-B11** | 11 | bag | Fault Shrimp | gff | 13:12:00 | 13:17:00 | 23.1 | 22.1 | 0.5 | 17 | 650 | 582.8 | 110 | SO4 |
| Taken at base of altered rock face where dark sediment accumulates. this is 10m from fault shrimp nav marker | | | | | | | | | | | | | | |
| **R783HFS-F12** | 12 | filter | Iceberg | rna | 18:09:00 | | | | | | | | | |
| **R783HFS-F13** | 13 | filter | Fault Shrimp | Sterivex | 13:19:00 | 13:32:00 | 22.6 | 20.1 | | 16 | 1204 | 582.8 | 110 | |
| Taken at base of altered rock face where dark sediment accumulates. this is 10m from fault shrimp nav marker | | | | | | | | | | | | | | |
| **R783HFS-B14** | 14 | bag | Iceberg | gff | 18:02:00 | 18:07:00 | 46.1 | 45 | 1 | 29 | 662 | 530.0 | 327 | SO4,H2S |

| Sample# | hfs # | type | Site | filter | start | end | T max | T1 avg | T1 stdev | T2 avg | vol (ml) | Z (m) | hdg | S isotope |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Iceberg" vent 15m ESE of White Mat/Gastro site. Strong flow at base of white rock with black sediment onlapping. | | | | | | | | | | | | | | |
| **R783HFS-B16** | 16 | bag | High Flow | none | 22:13:00 | 22:18:00 | 37 | 35.5 | | | 603 | | | SO4,H2S |
| High flow site, 20 cm to the left of pf 23 | | | | | | | | | | | | | | |
| **R783HFS-B17** | 17 | bag | **Inside Pit Crater** | gff | 04:37:00 | 04:41:00 | 29.8 | 25.8 | 2.5 | 26 | 483 | 570.0 | ? | SO4 |
| inside pit crater in smoke plume hovering 1-4m off bottom | | | | | | | | | | | | | | |
| **R783HFS-B18** | 18 | bag | Iceberg in crack | gff | 19:34:00 | 19:40:00 | 57.2 | 56.7 | 1 | 37 | 651 | 529.2 | 262 | SO4,H2S |
| Same as Iceberg site near white mat site, in crack in rock above level of sand. Lots of shrimp but not right in flow | | | | | | | | | | | | | | |
| **R783HFS-B19** | 19 | bag | High Flow | none | 22:06:00 | 22:12:00 | 36.8 | 35.6 | | | 659 | | | SO4,H2S |
| High flow site, 20 cm to the left of pf 23 | | | | | | | | | | | | | | |
| **R783HFS-P20** | 20 | piston | Pit Crater Rim | none | 05:22:00 | 05:26:00 | 16.7 | 12.8 | | 12 | 712 | 550.0 | | SO4 |
| On edge of pit crater holding intake in smoke, billowing | | | | | | | | | | | | | | |
| **R783HFS-F21** | 21 | filter | Iceberg | Sterivex | 18:25:00 | 18:36:00 | 52.3 | 51.7 | | 32 | 1025 | 530.0 | 327 | SO4 |
| 15m ESE of White Mat/Gastro site. Strong flow at base of white rock with black sediment onlapping. | | | | | | | | | | | | | | |
| **R783HFS-P22** | 22 | piston | Iceberg | none | 18:38:00 | 18:44:00 | 51.9 | 49.5 | 1 | 30 | 701 | 530.0 | 327 | SO4,H2S |
| 15m ESE of White Mat/Gastro site. Strong flow at base of white rock with black sediment onlapping. | | | | | | | | | | | | | | |
| **R783HFS-P23** | 23 | piston | High Flow | gff | 21:53:00 | 22:01:00 | 30.2 | 26.7 | | | 701 | | | |
| First sample at High Flow site, repositioned 20 cm to the left after this sample | | | | | | | | | | | | | | |
| **R783HFS-P24** | 24 | piston | Iceberg in crack | none | 19:24:00 | 19:32:00 | 57.1 | 57 | 0.1 | 37 | 614 | 529.2 | 262 | SO4,H2S |
| Same as Iceberg site near white mat site, in crack in rock above level of sand. Lots of shrimp but not right in flow | | | | | | | | | | | | | | |
| **R783GT1** | gt1 | gastight | | | 13:21:00 | | 21.5 | | | 17 | | | | |
| **R783GT2** | gt2 | gastight | | | 15:43:00 | | 39.8 | | | 27 | | | | |
| Scarp top. Relatively strong flow on hydrothermal mound with shrimp, crabs and bac mats. Sulfur deposits nearby. | | | | | | | | | | | | | | |
| **R783GT3** | gt3 | gastight | | | 18:21:00 | | 45 | | | 29 | | | | |
| Iceberg" vent 15m ESE of White Mat/Gastro site. strong flow at base of white rock with black sediment onlapping. | | | | | | | | | | | | | | |
| **R783GT4** | gt4 | gastight | | | 22:20:00 | | 37 | | | | | | | |
| High flow site, 20 cm to the left of pf 23 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

**Dive R786 NW Rota-1. 4/1/ - 4/2 2004.**

**Second HFS dive at NW Rota-1. R786 fluid sampler setup: T max, T avg, std, T2.**

| Sample# | hfs# | type | Site | filter | start | end | T max | T avg | stdev | T2 | vol reported | Z (m) | hdg | S isotope |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R786HFS-F1** | 1 | filter | pit | polycarb over gff | 08:20:00 | 08:27:00 | 33.8 | 24.1 | 2 | 20 | 504 | 560.9 | 312 | |
| pipe extended down at 70deg and to the right in smoke | | | | | | | | | | | | | | |
| **R786HFS-F2** | 2 | filter | pit | FISH | 08:28:00 | 08:30:00 | 32.6 | 30.3 | | 24 | 252 | 560.9 | 312 | |
| pipe extended down at 70deg and to the right in smoke | | | | | | | | | | | | | | |
| **R786HFS-F3** | 3 | filter | pit | Sterivex | 08:31:00 | 09:15:00 | 29.5 | 14.9 | | 17 | 1279 | 560.9 | 312 | |
| pipe extended down at 70deg and to the right in smoke | | | | | | | | | | | | | | |
| **R786HFS-P4** | 4 | piston | pit | none | 08:44:00 | 08:47:00 | 26.1 | 23.6 | 1.2 | 18 | 390 | 560.9 | 312 | SO4 |
| pipe extended down at 70deg and to the right in smoke | | | | | | | | | | | | | | |
| **R786HFS-P5** | 5 | piston | pit | none | 09:07:00 | 09:12:00 | 29.4 | 22.6 | 2.9 | 18 | 518 | 560.9 | 312 | |
| pipe extended down at 70deg and to the right in smoke | | | | | | | | | | | | | | |
| **R786HFS-F7** | 7 | filter | sand1 | FISH | 11:40:00 | 11:44:00 | 66.8 | 65.4 | 0.9 | 40 | 401 | 539.0 | 344 | |
| Sand 1 site in shimmering black sand | | | | | | | | | | | | | | |
| **R786HFS-B8** | 8 | bag | pit | none | 08:49:00 | 08:53:00 | 27.1 | 23.3 | 1.6 | 18 | 471 | 560.9 | 312 | SO4 |
| pipe extended down at 70deg and to the right in smoke | | | | | | | | | | | | | | |
| **R786HFS-B9** | 9 | bag | whiterock | none | 10:25:00 | 10:29:00 | 20.8 | 18.9 | 1.5 | 14 | 512 | 541.1 | 276 | SO4,H2S |
| On top of white rock at shimmering sands. Hard to tell if water is coming around the rock or through it. | | | | | | | | | | | | | | |
| **R786HFS-F10** | 10 | filter | sand1b | rna | 11:56:00 | 00:27:00 | 7 | 6.7 | | | 2635 | | | |
| rna background seawater sample | | | | | | | | | | | | | | |
| **R786HFS-B11** | 11 | bag | pit | gff | 08:54:00 | 08:58:00 | | | | 21 | 476 | 560.9 | 312 | SO4 |
| pipe extended down at 70deg and to the right in smoke | | | | | | | | | | | | | | |
| **R786HFS-F12** | 12 | filter | sand1 | rna | 11:30:00 | 11:38:00 | 66.6 | 65.1 | 0.8 | 41 | 1100 | 538.8 | 335 | |
| Sand 1 site, sample nozzle 1to2 inches in black sand | | | | | | | | | | | | | | |
| **R786HFS-F13** | 13 | filter | sand1 | Sterivex | 11:16:00 | 11:29:00 | 69.1 | 65.4 | 1.8 | 45 | 1647 | 539.0 | 344 | |
| Sand 1 site in shimmering black sand | | | | | | | | | | | | | | |
| **R786HFS-B14** | 14 | bag | pit | No sample | 08:59:00 | 09:02:00 | 29.5 | 25.5 | 2 | 20 | | 560.9 | 312 | |
| pipe extended down at 70deg and to the right in smoke | | | | | | | | | | | | | | |
| **R786HFS-F15** | 15 | filter | Plume | polycarb over gff | 23:07:00 | 11:14:00 | 7.7 | 7.4 | | | 722 | 517.0 | 106 | |
| Plume during Imagenex survey, lineQR, some thick smoke going through summit plume | | | | | | | | | | | | | | |
| **R786HFS-B16** | 16 | bag | sand1 | No sample | 11:10:00 | 11:14:00 | 75.3 | 71 | 2.4 | 45 | 469 | 539.0 | 344 | |
| Sand 1 site in shimmering black sand | | | | | | | | | | | | | | |
| **R786HFS-B17** | 17 | bag | Plume | gff | 23:17:00 | 23:22:00 | 7.4 | 7.1 | | | 626 | 520.0 | variable | SO4 |
| Plume during Imagenex survey | | | | | | | | | | | | | | |
| **R786HFS-B18** | 18 | bag | sand1b | gff | 12:10:00 | 12:15:00 | 75.1 | 73.7 | 0.8 | 51 | 594 | | | SO4,H2S |
| **R786HFS-B19** | 19 | bag | sand1 | none | 11:45:00 | 11:49:00 | 71.1 | 67.5 | 2.8 | 45 | 476 | | | SO4,H2S |

| Sample# | hfs # | type | Site | filter | start | end | T max | T1 avg | T1 stdev | T2 avg | vol (ml) | Z (m) | hdg | S isotope |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R786HFS-P20** | 20 | piston | sand1b | gff | 11:57:00 | 12:02:00 | 86 | 79.7 | 4 | 47 | 739 | 539.0 | 344 | SO4,H2S |
| 1 meter to the W of sand1 site. sub did not move in between | | | | | | | | | | | | | | |
| **R786HFS-F21** | 21 | filter | Plume | Sterivex | 22:37:00 | 23:05:00 | 7 | | | | | 556.0 | 285 | |
| plume sample during Imagenex survey at 30m alt on lineOP | | | | | | | | | | | | | | |
| **R786HFS-P22** | 22 | piston | sand1b | probable leaky seal, do not trust | 12:04:00 | 12:09:00 | 75.4 | 74.4 | 0.7 | 50 | 548 | 539.0 | | SO4,H2S |
| The piston did not move very far on this. Looked like 200 ml at most, but more water kept coming out. | | | | | | | | | | | | | | |
| **R786GT1** | gt1 | gastight | pit | | | 08:33:00 | 27.4 | 27.4 | | | | 561.0 | | |
| **R786GT2** | gt2 | gastight | pit | | | 08:49:00 | 26 | 26 | | | | 561.0 | | |
| **R786GT3** | gt3 | gastight | sand1 | | | 11:25:00 | 62 | 62 | | | | 539.0 | | |
| **R786GT4** | gt4 | gastight | sand1b | | | 11:57:00 | 75 | 75 | | | | 539.0 | | |
| Lost sit camera just as we arrived near the bottom, 575 meters. The sand 1 site is in the shimmering black sands area. Lots of white material also in this area, including surface layers of white coating and sulfur marbles. Sand1b is 1 meter to port (W) of sand1, in whitish sulfur marble material with lots of shimmering. Whiterock was taken directly on top of a white stained rock protruding from the black sand. Rock was very hard, i.e. could not penetrate with the sharp cylinder attachment on nozzle. Samples 1,2,3,4,5,8,11,14 all taken inside the pit at 561 meters heading 312. The temperature varied a lot due to billowing and changing outflow patterns. Changing the angle and position of the pipe/tube had very little effect on the temperature. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Dive R788 E Diamante. 4/4 - 4/5 2004** | | | | | | | | | | | | | | |
| **R788HFS-F1** | 1 | filter | barnacle beach | polycarb w drain | 13:17:56 | 13:22:25 | 13.7 | 13.6 | 0.08 | 12 | 528.0 | 456.5 | 245 | |
| slightly cloudy water flowing out of depression lined with barnacles and a few limpets | | | | | | | | | | | | | | |
| **R788HFS-F2** | 2 | filter | barnacle beach | FISH | 13:23:15 | 13:25:44 | 13.8 | 13.8 | | | 300.0 | 456.5 | 245 | |
| slightly cloudy water flowing out of depression lined with barnacles and a few limpets | | | | | | | | | | | | | | |
| **R788HFS-F3** | 3 | filter | barnacle beach | Sterivex | 13:33:09 | 13:45:00 | 13.7 | 13.6 | | | 1604.0 | 456.5 | 245 | |
| slightly cloudy water flowing out of depression lined with barnacles and a few limpets | | | | | | | | | | | | | | |
| **R788HFS-P4** | 4 | piston | barnacle beach | none | 13:27:06 | 13:32:18 | 13.8 | 13.8 | | | 704.0 | 456.5 | 245 | SO4 |
| slightly cloudy water flowing out of depression lined with barnacles and a few limpets | | | | | | | | | | | | | | |
| **R788HFS-F7** | 7 | filter | Black Diamante | FISH | | | | | | | | | | |
| **R788HFS-B8** | 8 | bag | 5 towers | none | 15:39:40 | 15:43:15 | 223.5 | 220.6 | | | 481.0 | | | SO4 |
| **R788HFS-F10** | 10 | filter | barnacle beach | rna | 13:56:33 | 14:09:17 | 13.6 | 12.6 | | | 1744.0 | 456.5 | 245 | |
| slightly cloudy water flowing out of depression lined with barnacles and a few limpets | | | | | | | | | | | | | | |
| **R788HFS-B11** | 11 | bag | barnacle beach | gff | 13:47:05 | 13:52:11 | 13.7 | 13.7 | | | 693.0 | 456.5 | 245 | SO4 |
| slightly cloudy water flowing out of depression lined with barnacles and a few limpets | | | | | | | | | | | | | | |
| **R788HFS-B14** | 14 | bag | 5 towers | gff | 15:51:26 | 15:56:20 | 223.5 | 222.0 | | | 663.0 | 345.0 | 50 | SO4 |
| Near top of 5 towers chimney with beehive structures. | | | | | | | | | | | | | | |
| **R788HFS-F15** | 15 | filter | bkgrnd blank end | gff | end of dive | | | | | | | | | |
| **R788HFS-B16** | 16 | bag | Black Diamante | polycarb w drain | 18:25:38 | 18:28:57 | 238.9 | 238.8 | | | 461.0 | | | SO4 |
| **R788HFS-B17** | 17 | bag | Black Diamante | gff | 18:29:48 | 18:33:23 | 239.4 | 239.1 | | | 484.0 | | | SO4 |
| **R788HFS-B18** | 18 | bag | 5 towers | gff | 15:58:09 | 16:09:46 | 220.0 | 215.4 | | | 505.0 | | | SO4 |
| **R788HFS-F21** | 21 | filter | bkgrnd blank end | Sterivex | end of dive | | | | | | | 315 - 215 | | |
| **R788HFS-P22** | 22 | piston | 5 towers | none | 16:12:17 | 16:16:24 | 201.8 | 196.8 | | | 557.0 | | | |
| **R788HFS-P24** | 24 | piston | Black Diamante | none | 18:37:11 | 18:40:52 | 239.4 | 231.6 | | | 495.0 | | | SO4 |
| **R788GT1** | gt1 | gastight | 5 towers | | 15:42:00 | | 223 | | | | | | | |
| **R788GT2** | gt2 | gastight | 5 towers | | 15:53:00 | | 222 | | | | | | | |
| **R788GT3** | gt3 | gastight | Black Diamante | | | | 239 | | | | | | | |
| **R788GT4** | gt4 | gastight | Black Diamante | | | | 239 | | | | | | | |
| | | | | | | | | | | | | | | |
| **Dive R790 Maug caldera. 4/8/2004** | | | | | | | | | | | | | | |
| **R790HFS-F7** | 7 | filter | Cave | FISH | 05:18:42 | 05:20:52 | broken | broken | | 26 | 290.0 | 144.0 | | |
| background temp this depth is 23.2 | | | | | | | | | | | | | | |
| **R790HFS-B8** | 8 | bag | Egg Foo Yung | none | 03:59:16 | 04:04:52 | 24.4 | 24.0 | | 24 | 603.0 | 153.0 | | SO4 |
| NE side of cone, down slope from talus vents | | | | | | | | | | | | | | |
| **R790HFS-B9** | 9 | bag | Cave | none | 04:36:50 | 04:41:47 | 27.4 | 27.0 | | 26 | 672.0 | 144.5 | | SO4 |
| In vertical crack | | | | | | | | | | | | | | |
| **R790HFS-B11** | 11 | bag | Cave | gff | 04:42:43 | 04:46:52 | broken | broken | | 28 | 560.0 | 144.4 | | SO4 |
| T1 damaged after bag 9 sample | | | | | | | | | | | | | | |
| **R790HFS-F12** | 12 | filter | Cave | RNA | 05:32:53 | 05:42:18 | broken | broken | | 26 | 1201.0 | 144.5 | | |
| **R790HFS-F13** | 13 | filter | Cave | Sterivex | 05:09:59 | 05:17:20 | broken | broken | | 26 | 1001.0 | 144.0 | | |
| **R790HFS-B14** | 14 | bag | Cave | gff | 04:57:13 | 05:00:17 | broken | broken | | 26 | 410.0 | 144.0 | | SO4 |
| **R790HFS-B18** | 18 | bag | Cave | gff | 05:27:52 | 05:31:31 | broken | broken | | 26 | 667.0 | 144.5 | | SO4 |

| Sample# | hfs # | type | Site | filter | start | end | T max | T1 avg | T1 stdev | T2 avg | vol (ml) | Z (m) | hdg | S isotope |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R790HFS-B19** | 19 | bag | Cave | none | 05:22:28 | 05:27:09 | broken | broken | | 26 | 635.0 | 144.5 | | SO4 |
| | | | | | | | | | | | | | | |
| **Dive R791 NW Eifuku. 4/9/2004** | | | | | | | | | | | | | | |
| **R791HFS-F1** | | filter | Champagne | polycarb over gff | 11:54:19 | 11:57:54 | 103.7 | 102.6 | 0.5 | 25 | 366.0 | 1607.0 | | |
| **R791HFS-F2** | | filter | Cliff House | FISH | 16:43:30 | 16:47:50 | 71.8 | 71.6 | | | 476.0 | 1574.0 | | |
| **R791HFS-F3** | | filter | Ice Fall | Sterivex | 08:46:54 | 09:06:06 | 15.0 | 12.1 | 1.45 | 9 | 1809.0 | 1643.0 | | |
| **R791HFS-P4** | | piston | Champagne | none | 11:50:24 | 11:52:26 | 103.9 | 102.8 | 0.8 | 49 | 230.0 | 1607.0 | | SO4,H2S |
| **R791HFS-F7** | | filter | Champagne | FISH | 11:46:56 | 11:49:10 | 103.5 | 103.0 | 0.3 | 57 | 249.0 | 1607.0 | | |
| **R791HFS-B8** | | bag | Ice Fall | none | 08:25:44 | 08:45:17 | 13.5 | 10.6 | 0.7 | 8 | 642.0 | 1643.0 | | SO4,H2S |
| **R791HFS-B9** | broken | bag | Champagne | none | 11:17:08 | 11:19:01 | 88.0 | 83.5 | 6 | 10 | 205.0 | 1607.0 | | |
| **R791HFS-F10** | | filter | Cliff House | RNA | 16:49:38 | 16:59:16 | 71.8 | 71.5 | | 43 | 1006.0 | 1574.0 | | |
| **R791HFS-B11** | broken | bag | Champagne | gff | 11:20:45 | 11:22:41 | 101.3 | 99.7 | 0.9 | 59 | 209.0 | 1607.0 | | |
| **R791HFS-F13** | | filter | Champagne | Sterivex | 11:37:11 | 11:45:42 | 103.0 | 102.0 | 0.6 | 59 | 1000.0 | 1607.0 | | |
| **R791HFS-B14** | broken | bag | Champagne | gff | 11:24:53 | 11:26:54 | 101.3 | 100.7 | 0.45 | 59 | 221.0 | 1607.0 | | |
| **R791HFS-F15** | | filter | Champagne | polycarb w drain | 11:31:47 | 11:36:18 | 105.9 | 103.1 | 1 | 58 | 442.0 | 1607.0 | | |
| **R791HFS-B17** | | bag | Champagne | gff | 16:18:08 | 16:21:43 | 71.3 | 70.4 | 0.75 | | 367.0 | 1574.5 | | SO4,H2S |
| **R791HFS-B18** | broken | bag | Cliff House | polycarb w drain | 16:06:45 | 16:10:20 | 71.5 | 71.4 | | | 361.0 | | | H2S |
| **R791HFS-B19** | bad | bad sample | Cliff House | none | 16:01:09 | 16:05:25 | 71.4 | 71.4 | 0.6 | 42 | 351.0 | 1574.0 | | |
| **R791HFS-P20** | | piston | Champagne | gff | 11:28:21 | 11:30:38 | 104.0 | 103.5 | 0.4 | 59 | 254.0 | | | |
| **R791HFS-F21** | | filter | Cliff House | Sterivex | 16:22:57 | 16:41:48 | 71.7 | 70.8 | 0.8 | | 2032.0 | | | |
| **R791HFS-P22** | | piston | Cliff House | none | 16:12:12 | 16:16:06 | 71.7 | 71.5 | 0.15 | 43 | 398.0 | 1574.5 | | H2S |
| **R791HFS-P23** | | piston | Seawater | gff | 21:15:17 | 21:22:44 | 15.2 | 13.0 | | | 842.0 | ascent | | SO4 |
| **R791HFS-P24** | | piston | Champagne | none | 14:40:34 | 14:42:46 | 88.8 | 76.5 | | 30 | 227.0 | 1607.0 | | SO4,H2S |
| | | | | | | | | | | | | | | |
| **Dive R793 NW Eifuku. 4/11/2004** | | | | | | | | | | | | | | |
| **R793HFS-F1** | 1 | filter | Champagne | polycarb w drain | 11:33:16 | 11:37:52 | 67.8 | 63.4 | | | 619.0 | 1607.0 | | |
| **R793HFS-F2** | 2 | filter | Sulfur Dendrite | FISH | 12:32:17 | 12:34:15 | 54.4 | 53.0 | | | 301.0 | | | |
| **R793HFS-F3** | 3 | filter | Sulfur Dendrite | Sterivex | 12:17:14 | 12:30:54 | 55.3 | 41.4 | | | 1201.0 | | | |
| **R793HFS-P4** | 4 | piston | Champagne | none | 11:07:55 | 11:16:22 | 76.6 | 71.9 | | | 194.0 | 1607.0 | | SO4,H2S |
| **R793HFS-P5** | 5 | piston | Champagne | none | 11:19:33 | 11:31:41 | 74.2 | 64.5 | | | 657.0 | 1607.0 | | SO4,H2S |
| **R793HFS-F7** | 7 | filter | Cliff House | FISH | 14:46:08 | 14:47:45 | 69.4 | 69.0 | | | 310.0 | 1573.0 | | |
| **R793HFS-B8** | 8 | bag | Mussel Mound | none | 07:07:48 | 07:13:12 | 2.5 | 2.4 | | | 711.0 | 1573.0 | | SO4 |
| **R793HFS-B9** | 9 | bag | Mussel Mound Fissure | none | 07:49:50 | 07:52:10 | 19.9 | 17.9 | | | 410.0 | | | |
| **R793HFS-F10** | 10 | filter | Cliff House | RNA | 14:34:53 | 14:44:44 | 69.4 | 68.9 | | | 1143.0 | 1573.0 | | |
| **R793HFS-B11** | 11 | bag | Yellow Cone | gff | 08:57:31 | 09:00:56 | 6.3 | 4.2 | | | 592.0 | 1588.0 | | SO4 |
| **R793HFS-F12** | 12 | filter | Sulfur Dendrite | RNA | 12:53:30 | 13:08:06 | 55.4 | 44.5 | | | 1268.0 | | | |
| **R793HFS-F13** | 13 | filter | Cliff House | Sterivex | 14:49:00 | 15:03:07 | 69.6 | 69.0 | | | 1753.0 | 1573.0 | | |
| **R793HFS-F15** | 15 | filter | Cliff House | gff | 14:29:11 | 14:33:41 | 69.5 | 69.0 | | | 651.0 | 1573.0 | | |
| **R793HFS-B16** | 16 | bag | Sulfur Spicule | polycarb w drain | 15:58:26 | 16:01:35 | 3.7 | 3.3 | | | 500.0 | | | SO4 |
| **R793HFS-B18** | 18 | bag | Yellow Cone | polycarb w drain | 12:36:59 | 12:38:16 | 54.7 | 54.1 | | | 174.0 | 1588.0 | | |
| **R793HFS-B19** | 19 | bag | Cliff House | none | 09:07:59 | 09:13:23 | 11.4 | 8.1 | | | 702.0 | 1573.0 | | SO4 |
| **R793HFS-P20** | 20 | piston | Cliff House | gff | 14:20:02 | 14:27:44 | 69.4 | 68.8 | | | 308.0 | 1573.0 | | SO4,H2S |
| **R793HFS-P23** | 23 | piston | Cliff House | gff | 14:04:24 | 14:17:18 | 69.7 | 69.0 | | | 201.0 | 1573.0 | | SO4,H2S |
| **R793HFS-P24** | 24 | piston | Sulfur Dendrite | none | 12:54:44 | 12:50:58 | 55.7 | 54.7 | | | 161.0 | | | SO4,H2S |
| | | | | | | | | | | | | | | |
| **R793GT1** | gt1 | | Champagne | | | | | | | | | | | |
| **R793GT2** | gt2 | | Sulfur Dendrite | | | | | | | | | | | |
| **R793GT3** | gt3 | | Cliff House | | | | | | | | | | | |
| **R793GT4** | gt4 | | | | | | | | | | | | | |
| accidental trip at unknown time, sample allowed to escape on way to surface | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Dive R794 Kasuga-2. 4/12 - 4/13 /2004** | | | | | | | | | | | | | | |

| Sample# | hfs # | type | Site | filter | start | end | T max | T1 avg | T1 stdev | T2 avg | vol (ml) | Z (m) | hdg | S isotope |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R794HFS-P5** | 5 | piston | Crack | none | 23:46:00 | 23:51:00 | 26.5 | 24,8 | | | 500 | 385.0 | 250 | SO4,H2S |
| barnacles and shrimp on near vertical face with vertical crack | | | | | | | | | | | | | | |
| **R794HFS-B8** | 8 | bag | Crack | none | 23:35:00 | 23:39:00 | 24.3 | 21.4 | | | 572 | 385.0 | 250 | SO4 |
| barnacles and shrimp on near vertical face with vertical crack | | | | | | | | | | | | | | |
| **R794HFS-B9** | 9 | bag | Crack | none | 23:39:00 | 23:43:00 | 26.9 | 22 | | | 660 | 385.0 | 250 | SO4 |
| barnacles and shrimp on near vertical face with vertical crack | | | | | | | | | | | | | | |
| **R794HFS-B11** | 11 | bag | Crack | gff | 23:52:00 | 23:56:00 | 27 | 25.3 | | | 763 | 385.0 | 250 | SO4,H2S |
| barnacles and shrimp on near vertical face with vertical crack | | | | | | | | | | | | | | |
| **R794HFS-B13** | 13 | filter | Crack | Sterivex | 23:57:00 | 00:05:00 | 27 | 25.3 | | | 1312 | 385.0 | 250 | |
| barnacles and shrimp on near vertical face with vertical crack | | | | | | | | | | | | | | |

## 3.4.2 Shipboard Measurements of Dissolved Hydrogen and Methane
***Ben Larson***

**Sample Collection:**
Samples were collected from nearly all the bags and pistons on Dave Butterfield's fluid sampler, and analyzed on a gas chromatograph for dissolved hydrogen and methane. For a complete list of samples, consult Dave Butterfield's sample log (above) for the number and location of the bags and pistons taken at each site.

In addition to the fluid samples described above, samples were also taken from a selection of the CTD hydrocasts. The casts which were sampled are listed below. The fluid in the Nisken bottles from the casts was also analyzed for hydrogen and methane.

| CTD Cast ID | Location |
|---|---|
| T04B03 | Summit of NW Rota-1 |
| T04B05 | E. Diamante, SW to NE |
| T04B06 | E. Diamante, SE to NW |
| V04B11 | Maug Caldera |
| V04B12 | Maug Caldera |
| V04B13 | Maug Caldera |
| T04B07 | NW Eifuku |
| T04B08 | NW Eifuku |
| T04B09 | Kasuga-2 |
| T04B10 | Daikoku |

**Results:**
*NW Rota-1*: The fluids sampled from Brimstone pit at this site were highly enriched in dissolved hydrogen, but had very low dissolved methane. The elevated level of hydrogen in the Brimstone fluid is consistent with magmatic input to the overlying hydrothermal system. The fluids sampled at Scarp Top exhibited low concentrations of hydrogen but fairly high concentrations of methane, higher than at any other site. The concentrations of hydrogen in the water column above the summit of NW Rota-1 were also elevated, in some cases up to 5% of the hydrogen concentration in the fluids sampled just above the Brimstone crater. Such high levels of hydrogen in the water column are relatively rare, and suggest a rather extensive plume.

*E Diamante*: Several locations were sampled from this site with temperatures ranging up to 240 ºC. Samples collected from the high temperature sites had relatively low methane and only slightly higher concentrations of hydrogen. Conversely, the low temperature sites (~13 ºC) had higher concentrations of methane than hydrogen, with the methane concentrations several times higher than the hydrogen concentrations at the high temperature vents. These elevated levels of methane at the low temperature sites could be the result of microbial methane production, which would also result in the depletion of hydrogen. The concentrations of both methane and hydrogen in the water column were only very slightly elevated above background.

*Maug*: Very little venting was discovered at Maug, but the low temperature venting that was sampled exhibited fairly low concentrations of hydrogen and moderately high concentrations of methane that fell in the middle of the range for the five volcanoes. Three vertical CTD casts in this area show fairly similar gas profiles. Water column methane concentrations were higher than at any other site, but still less than 2003 values for Maug. No hydrogen signal was detected in the water

column. Evidence for active venting is minimal at Maug, and the elevated water column signals may be due to very slow flushing of the caldera below the sill depth.

*NW Eifuku*: Measurements of dissolved volatiles at this site were made very difficult by the gassy nature of the fluid, which prohibited Dave Butterfield's fluid sampler from retrieving fluids without the loss of gas during ascent. However, a few samples from Champagne were brought to the surface without the loss of dissolved constituents and some gas was sampled from one of John Lupton's gas tights fired at Champagne. These samples had high methane concentrations, the highest of any of the fluids except for Scarp Top at NW Rota-1. Hydrogen concentrations for the gas tight sample were the highest of any vent except Brimstone Pit at NW Rota-1. Sulfur Dendrite also exhibited moderately high methane comparable to that observed at Maug. Although methane concentrations here were relatively high compared with the other volcanoes, they constituted a relatively low proportion of the dissolved constituents in the Champagne fluids, which were incredibly gassy (cf. Lupton's data). Water column concentrations of methane were comparable to those observed at Maug. No hydrogen signal was detected in the water column.

*Kasuga-2*: As with Maug, not much venting was observed. However, the low temperature venting that was observed at this site had methane concentrations that were higher than any other site except Scarp Top at NW Rota-1 and Champagne at NW Eifuku, both of which had higher temperatures than the site at Kasuga-2. Methane in the water column was only slightly elevated, but lower than at Maug and NW Eifuku. One interesting feature in the water column data was that methane anomalies were detected at two separate depths about 300m apart. No significant hydrogen was detected in the water column.

### 3.4.3 Vent Fluid Sampling for Dissolved Gases
***John Lupton***

Vent fluid samples for the analysis of dissolved gases were collected using gas-tight titanium bottles specially designed for this purpose. On dives in which ROPOS was configured for fluid sampling, 4 of these gas-tight bottles were mounted on top of the hydrothermal fluid sampler (HFS) with the inlet of each gas-tight bottle connected to the HFS with Peek tubing. The 150cc internal volume of each gas-tight bottle was evacuated to a high vacuum prior to each dive. The sampling procedure consisted of first using the HFS flushing pump to purge the inlet lines and record an accurate vent fluid temperature. Then the appropriate gas-tight bottle was triggered with a hydraulic actuator, causing the fluid to be rapidly drawn into the evacuated bottle.

After each dive the samples were processed on a seagoing high vacuum line. The sample, consisting of a mixture of fluid and gas, was dropped into an evacuated chamber, and then a hand-operated bellows pump was used to pump the gases through a drying trap held at -60ºC. The dry gases were pumped into a calibrated volume, and the pressure accurately measured using a capacitance manometer. Then splits of the extracted gases were sealed into glass ampoules for later analysis either by gas chromatography or mass spectrometry. The gas species to be analyzed in shore-based laboratories include helium and helium isotopes, neon, argon, nitrogen, carbon dioxide, methane, hydrogen, and hydrogen sulfide.

A total of 26 vent fluid samples were collected using the gas-tight bottles during the expedition. In addition, we also collected one sample of seawater at 66 meters depth as a background check. Although we were not able to measure actual gas compositions at sea, the capacitance manometer measurements on the seagoing vacuum line did give us an indication of the total gas content of the samples. Of the samples collected, the fluids from the Champagne site on NW Eifuku had some of the highest gas concentrations ever measured in hydrothermal fluids. The Champagne site was also unique in that buoyant bubbles of globs of what we think is liquid carbon dioxide were coming out of the sediments at the base of the vent fluid chimneys. On dive R792, we modified a push core sampler so that it could be used to collect these liquid carbon dioxide bubbles. A length of Peek tubing was routed into the push core, the other end inserted into the inlet of a gas-tight bottle. When about 1/2 liter volume of these bubbles had been collected in the push core, the gas-tight bottle was triggered and some of the "fluid" was collected in the bottle. Since we had calculated that the gas-tight bottles could not withstand the pressure of 150 cc of liquid carbon dioxide being converted into gas as the submarine ascended, we triggered the gas-tight bottle repeatedly during the ascent in order to relieve the internal pressure in the bottle. This procedure seemed to work well, since we recovered 1270 cc STP of gas from sample R792 GT12. Thus even with our efforts to relieve the pressure in the gas-tight bottle, the 150 cc bottle still contained over 8 atmospheres of gas pressure when it reached the

surface. Although we are convinced these bubbles consist mainly of carbon dioxide, detailed analysis of this sample will be necessary to confirm this and to determine which if any other gas species are present.

### 3.4.3a Gas-Tight Samples

| Bottle # | Volcano | Vent | T deg C | Comments |
|---|---|---|---|---|
| R783 gt9 | NW Rota-1 | Scarp Top | 39 | |
| R783 gt11 | NW Rota-1 | Fault Shrimp | 21.5 | high gas content |
| R783 gt7 | NW Rota-1 | Iceberg | 45 | |
| R783 gt2 | NW Rota-1 | High Flow | 36.5 | |
| R783 Bag 17 | NW Rota-1 | Plume above Pit | ~30 | |
| R783 Bag 18 | NW Rota-1 | Shim Sands headspace | 75 | |
| R786 gt9 | NW Rota-1 | Brimstone pit | 26 | |
| R786 gt11 | NW Rota-1 | Shim Sands | 62 | |
| R788 gt9 | E Diamante | Five Towers | 223 | |
| R788 gt12 | E Diamante | Five Towers | 222 | |
| R788 gt2 | E Diamante | Chimney sample site | 239 | |
| R788 gt7 | E Diamante | Chimney sample site | 239 | |
| R788 Bag 11 | E Diamante | Barnacle site | 13 | |
| R790 gt9 | Maug | Talus (Maug) | 23.7 | |
| R790 gt5 | Maug | Cave (Maug) | 27.4 | |
| R790 gt11 | Maug | Cave (Maug) | 26(T2) | |
| R790 gt12 | Maug | 66 meter SW | 24.1 | background seawater sample |
| R791 gt11 | NW Eifuku | Champagne Fluid | 103 | extremely high gas content |
| R791 gt7 | NW Eifuku | Champagne Fluid | 103 | extremely high gas content |
| R791 gt2 | NW Eifuku | diffuse site | 10.9 | |
| R791 gt9 | NW Eifuku | Champagne Fluid | 103 | extremely high gas content |
| R792 gt12 | NW Eifuku | Champagne Globs | SCF | sample of liquid CO2 globs |
| R793 gt5 | NW Eifuku | Champagne | 68 | extremely high gas content |
| R793 gt11 | NW Eifuku | Sulfur Dendrite | 48 | extremely high gas content |
| R793 gt7 | NW Eifuku | Cliff House | 69 | extremely high gas content |
| R794 gt9 | Kasuga-2 | Cracked | 24.5 | high gas content |
| R794 gt12 | Kasuga-2 | Cracked | 24 | high gas content |

## 3.4.4 Water-Column Sampling for Helium Isotopes

***John Lupton***

A total of 168 discrete water-column samples were collected for the analysis of helium isotopes. Almost every hydrocast was sampled: out of a total of 24 casts, 19 were sampled for helium isotopes. The sampling procedure involved hermetically sealing the water samples into lengths of copper tubing. After the rosette was returned to the ship, the water sample was flushed through lengths of copper tubing attached to each Nisken bottle using tygon tubing. Pinch clamps were used to temporarily seal off the tygon, and then the copper tubing was sealed at each end using a high-pressure hydraulic crimper that produces a vacuum-tight cold weld in the tubing. After the water samples have been sealed in this way, they can be stored for several years without loss of sample integrity.

The copper tubing samples have returned to the NOAA helium laboratory in Newport, Oregon for mass spectrometer analysis of the $^3He/^4He$ ratio and helium concentration. The $^3He/^4He$ ratio is a sensitive tracer for hydrothermal activity since hydrothermal and volcanic fluids are highly enriched in $^3He$. Furthermore, the $^3He/^4He$ ratio is a fairly unambiguous tracer for hydrothermal input, since the only other oceanic $^3He$ source is the decay of tritium, which is only significant in certain areas. The Newport mass spectrometer is capable of detecting changes as small as 0.2% in the $^3He/^4He$ ratio, while enrichments as high as 300% in the $^3He/^4He$ ratio have been observed in hydrothermal plumes.

## 3.4.5 Sample List for Sulfur Stable Isotope Analyses

***Shunsuke Miyabe***

Mr. Miyabe collected samples for analyses of sulfur isotopes. These analyses will be used for his thesis studies at Okayama University, in collaboration with Dr. Dave Butterfield (PMEL/UW).

| Dive | Site | Sample type | Sample Name | SO4 | H2S |
|---|---|---|---|---|---|
| R782 | NW Rota | Rock | R782RK-0006 | | |
| | | Rock | R782RK-0017 | | |
| | | Rock | R782RK-0018 | | |
| R783 | NW Rota | HFS | R783HFS-P4 | o | o |
| | | HFS | R783HFS-P5 | o | o |
| | | HFS | R783HFS-B8 | o | |
| | | HFS | R783HFS-B9 | o | o |
| | | HFS | R783HFS-B11 | o | |
| | | HFS | R783HFS-B14 | o | o |
| | | HFS | R783HFS-B16 | o | o |
| | | HFS | R783HFS-B17 | o | |
| | | HFS | R783HFS-B18 | o | o |
| | | HFS | R783HFS-B19 | o | o |
| | | HFS | R783HFS-P20 | o | |
| | | HFS | R783HFS-P22 | o | o |
| | | HFS | R783HFS-P24 | o | o |
| | | | | | |
| | | Rock | R783RK-0017 | | |
| | | particles | sulfur ball | | |
| R784 | NW Rota | particles | sulfur ball | | |
| | | particles | sulfur ball | | |
| | | | | | |
| | | Rock | R784RK-0006 | | |
| R785 | NW Rota | Rock | R785RK-0004 | | |
| | | Rock | R785RK-0005 | | |
| | | Rock | R785RK-0007 | | |
| | | Rock | R785RK-0008 | | |
| | | Rock | R785RK-0009 | | |
| | | Rock | R785RK-0010 | | |
| R786 | NW Rota | HFS | R786HFS-P4 | o | |
| | | HFS | R786HFS-B8 | o | |
| | | HFS | R786HFS-B9 | o | o |
| | | HFS | R786HFS-B11 | o | |
| | | HFS | R786HFS-B17 | o | |
| | | HFS | R786HFS-B18 | o | o |
| | | HFS | R786HFS-B19 | o | o |
| | | HFS | R786HFS-P20 | o | o |
| | | HFS | R786HFS-P22 | o | o |
| | | | | | |
| | | Rock | R786RK-0001 | | |
| | | Rock | R786RK-0033 | | |
| | | Sediment? | R786SS-1-Geo-0032 | | |
| | | | | | |
| | | filter | R786HFS-B8-filter | | |
| | | | | | |
| | | particles | sulfur ball | | |
| R787 | E. Diamante | Rock | R787RK-0011 | | |
| | | Rock | R787RK-0013 | | |
| | | Rock | R787RK-0013 | | |
| | | Rock | R787RK-0013 | | |
| | | Rock | R787RK-0030 | | |
| R788 | E. Diamante | HFS | R788HFS-P4 | o | |
| | | HFS | R788HFS-B8 | o | |
| | | HFS | R788HFS-B9 | o | |
| | | HFS | R788HFS-B11 | o | |
| | | HFS | R788HFS-B14 | o | |
| | | HFS | R788HFS-B16 | o | |
| | | HFS | R788HFS-B17 | o | |
| | | HFS | R788HFS-B18 | o | |
| | | HFS | R788HFS-P24 | o | |
| | | | | | |
| | | filter | R788HFS-B14-filter | | |
| | | | | | |
| | | Rock | R788SF-2-0022 | | |

| Dive | Site | Sample type | Sample Name | SO4 | H2S |
|---|---|---|---|---|---|
| R789 | Maug | Rock | R789RK-0006 | | |
| | | Rock | R789RK-0007 | | |
| R790 | Maug | HFS | R790HFS-B8 | o | |
| | | HFS | R790HFS-B9 | o | |
| | | HFS | R790HFS-B11 | o | |
| | | HFS | R790HFS-B14 | o | |
| | | HFS | R790HFS-B18 | o | |
| | | HFS | R790HFS-B19 | o | |
| | | | | | |
| | | Rock | R790RK-1-0013 | | |
| R791 | NW Eifuku | HFS | R791HFS-P4 | o | o |
| | | HFS | R791HFS-B8 | o | o |
| | | HFS | R791HFS-B17 | o | o |
| | | HFS | R791HFS-B18 | | o |
| | | HFS | R791HFS-P22 | | o |
| | | HFS | R791HFS-P23 | o | |
| | | HFS | R791HFS-P24 | o | o |
| | | | | | |
| | | Rock | R791RK-0001 | | |
| | | Rock | R791RK-0010 | | |
| | | | | | |
| | | filter | R791HFS-B14-filter | | |
| | | | | | |
| | | particles | R791SS-1-0011 | | |
| R792 | NW Eifuku | Rock | R792RK-0014 | | |
| | | particles | R792SS-J2-15 | | |
| R793 | NW Eifuku | HFS | R793HFS-P4 | o | o |
| | | HFS | R793HFS-P5 | o | o |
| | | HFS | R793HFS-B8 | o | |
| | | HFS | R793HFS-B11 | o | |
| | | HFS | R793HFS-B16 | o | |
| | | HFS | R793HFS-B19 | o | |
| | | HFS | R793HFS-P20 | o | o |
| | | HFS | R793HFS-P23 | o | o |
| | | HFS | R793HFS-P24 | o | o |
| | | | | | |
| | | Rock | R793RK-2-0022 | | |
| | | particles | R793bio/geo-0033 | | |
| R794 | Kasuga 2 | HFS | R794HFS-P5 | o | o |
| | | HFS | R794HFS-B8 | o | |
| | | HFS | R794HFS-B9 | o | |
| | | HFS | R794HFS-B11 | o | o |
| | | | | | |
| | | Rock | R794RK-0001 | | |
| | | Rock | R794RK-2-0002 | | |

## 3.4.6 Redox Potential (Eh) Measurements

***Ko-ichi Nakamura***

**Sensors on the CTD**

1) Redox potential (Eh)

The redox potential of seawater was measured by an electrode set connected to a transformer, which sent redox values converted to acceptable voltages via a SeaBird auxilary channel. The transformer output was logged through the SeaBird 9+ CTD system. The electrode set consisted of an inert Pt electrode and a reference electrode. The reference electrode was a Ag-AgCl (Silver-Silver Chloride) electrode settled in saturated KCl (Potassium Chloride) solution. A zirconia plug acted as the electric connection between the Ag-AgCl electrode and seawater. The redox potential measured by this electrode set was Eh against Ag-AgCl electrode in saturated KCl solution. The transformer converted the redox potential between -500 mV and +500 mv to voltages between 0 and +5V. It also electrically isolated the CTD system from seawater using an isolation amplifier inside.

2) LISST-Deep (Laser In-Situ Scattering and Transiometry) Particle Size Analyzer
LISST measured the particle size distribution between 1.25 and 250 microns in logarithmically placed 32 size ranges. The data was logged separately by its own data logger.

3) H2 and CH4 sensors
Both sensors were based on semi-conductor technology and manufactured by CAPSUM in Germany. A Si (Silicon) membrane passed through any kind of gas resolved in seawater to the pressure housings. The semi-conductors were H2 or CH4 sensitive by their selective heating condition. The gas concentration analog voltage output was logged by a separate data logger as well as sensor temperature and sensor humidity outputs.

4) Aanderaa optical oxygen sensor
The oxygen optode 3830 optical sensor is a product of Aanderaa in Norway. The digital output from the sensor was logged by its own separate logger.

**Sensors on the ROPOS**

During dive R786 the redox potential (Eh) of seawater was measured by a separate logger. From dive R787 to the end of the expedition Eh was measured on-line through RS-232C transmission in the ROPOS telemetry. The electrode set was the same as that on the CTD, which consisted of an innert Pt electrode and a reference electrode. The reference electrode was a Ag-AgCl electrode settled in saturated KCl solution. The electric connection between the Ag-AgCl electrode and seawater was performed by a zirconia plug. The redox potential measured by this electrode set was Eh against Ag-AgCl electrode in saturated KCl solution. The transformer sent out the Eh value in mV twice in a second. Electric isolation of the CTD system from seawater was made by an isolation amplifier inside. The data was logged by a Hyper-Termial program on a PC in the ROPOS control room

# 3.5 GEOLOGY

## 3.5.1 Geologic Summary - Mariana Arc Volcanoes, 2004

***(alphabetical order) Neil Basu, Bill Chadwick, Cornel de Ronde, Bob Embley, Jim Hein, Bob Stern***

**Goals**
The goal of the Submarine Ring of Fire 2004 geology group was to understand the fundamental magmatic, physical, and geochemical processes that govern hydrothermal systems in volcanic arcs and the mineral deposits that they produce.

**Samples**
Samples were collected at seven volcanic seamounts along the active Mariana Arc, from south to north: West Rota, Northwest Rota-1, East Diamante, Maug, Daikoku, Northwest Eifuku, and Kasuga-2. Hydrothermal activity was found at all the sites except W Rota. Samples were collected with ROPOS, using the manipulator arms to pick up samples and the suction sampler to collect sediments. One push core was taken through bacterial mat and underlying sediment.

**Magmatic Controls on the Composition of Hydrothermal Systems**
Submarine hydrothermal systems associated with convergent plate margins (arcs) differ fundamentally from the better studied systems associated with mid-ocean ridges (MOR) in three basic ways: (1) they are shallower, and therefore operate at lower boiling temperatures; (2) arc magmas are much more diverse compositionally than Mid Ocean Ridge basalts (MORB); and (3) arc magmas contain much more volatiles and consequently de-gas to a much greater extent than do MORB. MOR hydrothermal systems typically lie at depths of 2000-2500m or greater, corresponding to hydrostatic pressures of 200-250 bars, whereas the Mariana Arc hydrothermal systems lie at depths of 100 to 1600m (pressures of 10-160 bars). MORs are generally very homogeneous and variations observed between MOR hydrothermal systems can largely neglect compositional variations in the associated magmas.

In contrast, arc magmas vary tremendously in composition and contain an order of magnitude more volatiles. The composition of magmas associated with submarine arc hydrothermal systems may be an important influence on vent chemistry. For example, the three hydrothermal systems we explored at NW Rota-1, E Diamante, and NW Eifuku, are

strikingly different and each is associated with compositionally distinct lavas. NW Rota-1 consists of an older basaltic volcano that has most recently erupted andesite (~60% $SiO_2$); the present activity is probably due to the presence of a shallow andesitic magma body beneath the summit. Magmatic degassing is dominating the hydrothermal plume, evident from the large flux of sulfur from Brimstone Pit. Generally, sulfur is a relatively minor volatile component in arc magmas (typically ~0.1% by mass) compared to $H_2O$ (2-5% by mass) and $CO_2$. The NW Eifuku vents are much deeper and lie within the stability zone of liquid $CO_2$, so here we can directly observe the importance of both the $CO_2$ and sulfur fluxes from degassing arc magmas, which in this case have a basaltic composition (~50% $SiO_2$). The E Diamante hydrothermal system is a mature system and the scarcity of sulfur suggests relatively little contribution from degassing magma. We conclude that this system has evolved to a mature stage dominated by circulating seawater through hot rocks, similar to the case at MOR hydrothermal vents. The lava composition associated with the E Diamante field is dacite (~65% $SiO_2$), erupted during the late stages in the evolution of a large caldera.

**Hydrothermal Mineralization and Alteration**

The hydrothermal systems we found were all associated with volcano summits (NW Rota-1, NW Eifuku, Daikoku) or with central cones and domes inside a caldera (E Diamante, Maug). The depth range of focused and diffuse hydrothermal venting observed along the Mariana Arc was 140-1600m, although all but one of those sites is <650m (NW Eifuku). The three hydrothermal systems we spent the most time studying in the Mariana Arc have different venting styles and products, related to pressure, temperature, rock/water interaction, and the input of magmatic volatiles.

NW Rota-1 provided a dramatic display of thick, billowing, yellow plumes that ejected small rocks and molten sulfur. The eruptions from Brimstone Pit (at 550m depth) were more volcanic in character (pulsating intermittent and variable in size and intensity) than hydrothermal (typically characterized by steady-state discharge). This was the first observation of this kind of volcanic activity at a submarine arc volcano. Sulfur was the dominant hydrothermal mineral deposited around the vent and occurs as spheres in the surrounding volcaniclastic sediment, fracture fill, veins, and massive deposits.

At E Diamante a sulfide-sulfate-chimney field was found consisting of numerous tall chimneys. Phase separation was seen with both gas and liquid phases discharging from the same chimney. The measured fluid temperature of 240° C is right at the boiling point at the depth of the vents (350m). The products of this hydrothermal system include chimneys and mounds composed of varying amounts of pyrite, sphalerite, chalcopyrite, barite, and anhydrite. Hydrothermal manganese oxides occur on the surface of inactive chimneys, which outnumber the active ones. This mineralogy contrasts with the other two systems, which deposit sulfur as the dominant hydrothermal product. E Diamante mineralization is dominated by Cu-Zn-Fe-Ba and perhaps is largely controlled by water/rock interaction.

The hydrothermal system at NW Eifuku was discharging liquid $CO_2$ from focused- and diffuse-flow vents. This vent site appears to have the highest recorded flux of $CO_2$, and is the first time this phenomenon has been observed in a volcanic arc. The focused-flow vents consist of small chimneys and mounds up to a meter high that are composed of sulfur and one or more unknown minerals, but do not include sulfides. Sulfur also occurs as crusts on the surface of sediment, as fracture fill, veins, and as massive deposits. At several sites, small sulfur mounds had formed and it was clear that molten sulfur had flowed over the adjacent seafloor before solidifying into crust.

The submarine hydrothermal systems along the Mariana arc can be characterized by shallow-depths, highly permeable rocks, gas-rich ($SO_2$, $H_2S$, $CO_2$) discharge, and control by the depth-to-boiling-point curve and reflect magma compositions that are more volatile-rich and fractionated than MORB. These characteristics result in subsurface deposition of sulfide minerals, except at E Diamante. These systems provide an excellent modern analog for ancient, gold-rich, volcanic-hosted ore deposits.

**Red-Brown Iron-Oxyhydroxide Crusts**

A previously unknown mineral deposit type was found that occurs over extensive areas of NW Eifuku and Kasuga-2 seamounts. Iron-oxyhydroxide crusts occur on sediment surfaces and form in close association with bacterial mats. Actively growing bacterial mats accumulate colloidal iron compounds that color the mats red-brown (yellow in seafloor videos), which turns the water in collection jars red when the mats are sampled. When the mats are no longer actively growing, the associated iron crystallizes as oxyhydroxides to form crusts composed predominately of weakly cemented volcaniclastic sandstone and, more rarely, thin layers of pure iron oxyhydroxide. The iron probably occurs in the form of goethite or amorphous FeOOH. The crusts reach thicknesses of up to 5cm and cover areas of hundreds of square meters. The crusts likely form at redox boundaries related to contrasts between the reducing mat microenvironment versus that of the oxic/suboxic adjacent sediment. These crusts are an indirect manifestation of previous hydrothermal activity.

## 3.5.1a Geological Samples (collected with ROPOS ROV)

Description Abbreviations: OL (Olivine), CPX (Clinopyroxene), OPX (Orthopyroxene), PL ( Plagioclase), QZ (Quartz)

| ROPOS Sample # | Lat (N) | Long (E) | Z (m) | Type | Lithology | Geology Comments/Description |
|---|---|---|---|---|---|---|
| | | | | | | **R782 NW Rota 1** |
| R782-RK-0001 | 14° 35.827 | 144°46.827 | 884 | lava | Basalt | autobreccia; 40% vesicles, 10% OL+CPX, 10% PL, 40% groundmass |
| R782-RK-0002 | 14° 35.913 | 144°46.342 | 799 | lava | Basalt | 15% vesicles, 15% OL, 10% PL, 60% groundmass |
| R782-RK-0003 | 14° 35.9886 | 144°46.356 | 718 | lava | Basalt | 15% vesicles, 20% OL + CPX, 25% PL, 40% groundmass |
| R782-RK-0006 | 14° 36.0726 | 144°46.5318 | 516 | lava | Basalt | 25% vesicles, 20% OL +/- OPX, 15% PL, 40% groundmass |
| R782-SS-J5-0007 | 14° 36.072 | 144°46.5312 | 516 | sand | Volcaniclastic | hyaloclastite sand (loose) |
| R782-RK-0008 | 14° 36.0732 | 144°46.5324 | 516 | | | sample not collected |
| R782-SS-J3-0011 | 14° 36.072 | 144°46.533 | 516 | sand | Volcaniclastic | hyaloclastite sand (loose) |
| R782-SS-J4-0013 | 14° 36.0714 | 144°46.5318 | 516 | sand | Volcaniclastic | hyaloclastite sand (loose) |
| R782-SS-6/8-0014 | 14° 36.072 | 144°46.5318 | 515 | sand | Volcaniclastic | hyaloclastite sand (loose) |
| R782-RK-0016 | 14° 36.0708 | 144°46.5306 | 517 | lava | Basalt | 25% vesicles, 20% OL +/-OPX, 15% PL, 40% groundmass |
| R782-RK-0017 | 14° 36.0348 | 144°46.566 | 537 | lava | Basalt | 35% vesicles, 20% OL, 15% PL, 30% groundmass |
| R782-RK-0018 | 14° 36.0492 | 144°46.6452 | 565 | sulfur | Sulfur | vuggy, grapefruit sized chunk of elemental sulfur |
| R782-Sed-0019 | 14° 36.000 | 144°46.6 | | sand | Volcaniclastic | rock fragments, pyrite, chalcopyrite (?), sulfur, forams from boot |
| | | | | | | **R783 NW Rota 1** |
| R783-RK-0009 | 14° 36.0468 | 144°46.6392 | 583 | lava | Altered andesite | sulfur-coated; 30% vesicles, 1% CPX, 1% sulfides, 69% groundmass |
| R783-SS-J1-0016 | 14° 36.0456 | 144°46.6488 | 565 | yellow material | yellow material | some of the yellow material (sulfur) encrusting the sediments in this Scarp Top area. |
| R783-RK-2-0017 | 14° 36.0474 | 144°46.6494 | 565 | lava | Andesite | sulfur-coated; 45% vesicles, 10% microdiorite xenos, 9% PL, 1% HB, 35% dark groundmass |
| R783-RK-3-0024 | 14° 36.0468 | 144°46.575 | 530 | lava | Andesite | sulfur-coated, sulfur in vesicles. 50% vesicles, 5% OPX, 20% PL, 25% dark groundmass |
| | | | | | | **R784 NW Rota 1** |
| R784-RK-0005 | 14° 36.0396 | 144°46.5132 | 562 | lava | Altered andesite | 25% vesicles, 20% PL, 15% OPX, 40% gray groundmass |
| R784-RK-0006 | 14° 36.0504 | 144°46.5126 | 552 | lava | Andesite | 45% vesicles, 30% PL, 1% microdiorite xenos, 24% black groundmass |
| R784-SS-J5-0007 | 14° 35.7666 | 144°46.584 | 540 | sulfur globs & lapille | Fallout from eruption plume | plume fallout, suctioned from top of biobox. 3 components: 2 glassy lapilli, sulfur globs picked from front of ROPOS, hyaloclastite sand |
| | | | | | | **R785 W Rota** |
| R785-RK-0001 | 14° 20.0298 | 144°51.082 | 1217 | pumice | Dacite pumice | 75% vesicles, 1% PL+CPX, 24% light brown groundmass |
| R785-RK-0002 | 14° 20.019 | 144°51.0594 | 1217 | iron crust | Fe crust | 30mm thick layer of FeO and MnO2 impregnated pumice |
| R785-RK-0003 | 14° 20.0058 | 144°51.0906 | 1200 | pumice | Dacite pumice | 75% vesicles , 5% microdiorite xenos, 1% OPX+PL+CPX, 19% grey groundmass |
| R785-RK-0004 | 14° 19.992 | 144°51.1362 | 1160 | pumice | Dacite pumice | 70% vesicles, 5% microdiorite xenos, 1% OPX+CPX, 24% grey groundmass |
| R785-RK-0005 | 14° 20.0052 | 144°51.1548 | 1144 | lava | Andesite | 5% microdiorite xenos, 15% CPX, 15% PL, 70% grey groundmass |
| R785-RK-0006 | 14° 20.0046 | 144°51.1578 | 1144 | tuff | Altered tuff | Sticky (smectite-rich) grey mud. Altered dacitic tuff? |
| R785-RK-0007 | 14° 20.019 | 144°51.192 | 1111 | pumice | Dacite pumice | 70% vesicles, 5% xenos, 2% CPX, 2% PL, 21% glassy grey groundmass |
| R785-RK-0008 | 14° 19.8846 | 144°51.6324 | 789 | lava | Andesite | 30% PL, 15% CPX, 55% light gray groundmass |

| ROPOS Sample # | Lat (N) | Long (E) | Z (m) | Type | Lithology | Geology Comments/Description |
|---|---|---|---|---|---|---|
| R785-RK-0009 | 14° 19.878 | 144°51.640 | 779 | beach cobble | Andesite | 5% CPX, 15% PL, 80% grey groundmass |
| R785-RK-0010 | 14° 19.8792 | 144°51.6408 | 776 | clast in pyroclastic | Andesite | 20% vesicles, 15% PL, 10% CPX, 55% dark gray groundmass |
| | | | | | | **R786 NW Rota 1** |
| R786-RK-1-0022 | 14° 36.0564 | 144°46.5246 | 534 | lava | Andesite | S-coated; 20% vesicles, 25% PL, 10% CPX, 1% microdiorite xenos, 44% grey groundmass |
| R786-RK-2-0023 | 14° 36.0498 | 144°46.5258 | 540 | lava | Andesite | S-coated; 20% vesicles, 15% PL, 5% CPX, 60% grey groundmass; glassy rim |
| R786-bio/geo-0031 | 14° 36.0505 | 144°46.560 | 524 | lava | Andesite | 20% vesicles, 5% PL, 5% CPX, 70% dark gray groundmass; glassy rim |
| R786-bio/geo-0032 | 14° 36.0588 | 144°46.524 | 538 | sand | Volcaniclastic | Big bunch of black, coarse, volcaniclastic sand. |
| R786-RK-0033 | 14° 36.0522 | 144°46.5168 | 548 | lava | Andesite | S-coated; 45% vesicles, 25% PL, 10% CPX, 30% dark grey groundmass |
| | | | | | | **R787 E Diamante** |
| R787-RK-0001 | 15° 56.6046 | 145°40.9986 | 458 | lava/hypabyssal intrusion | Dacite | 1% vesicles, 50% PL, 15% QZ, 5% CPX, 29% green-grey groundmass |
| R787-bio/geo-0003 | 15° 56.5698 | 145°40.9644 | 457 | lava/hypabyssal intrusion | Dacite | 20% PL, 15% CPX, 5% QZ, 60% light grey groundmass |
| R787-bio/geo-0004 | 15° 56.5992 | 145°40.965 | 457 | lava/hypabyssal intrusion | | on-deck description is missing |
| R787-bio/geo-0005 | 15° 56.5974 | 145°40.9688 | 457 | | | on-deck description is missing |
| R787-bio/geo-0006 | 15° 56.6050 | 145°40.9990 | 457 | | | on-deck description is missing |
| R787-RK-0009 | 15° 56.4588 | 145°40.8348 | 319 | lava / hypabyssal intrusion | Dacite | 30% PL, 30% QZ, 5% CPX, 35% grey groundmass |
| R787-RK-0010 | 15° 56.5506 | 145°40.8396 | 338 | lava / hypabyssal intrusion | Dacite | 1% vesicles, 29% PL, 10% QZ, 1% CPX, 59% grey groundmass |
| R787-RK-0011 | 15° 56.5506 | 145°40.8396 | 338 | lava / hypabyssal intrusion | Dacite | 25% PL, 15% QZ, 10% CPX, 50% groundmass |
| R787-RK-0012 | 15° 56.5722 | 145°40.9026 | 379 | chimney | Sulfide chimney | piece of 7m tall chimney venting 239°C water. thin walls, outer Fe & silica, inner sulfides |
| R787-RK-0013 | 15° 56.5626 | 145°40.8822 | 344 | chimney | Sulfide chimney | piece of 2m tall chimney. boxwwork barite and Mn-Fe oxides |
| R787-RK-0022 | 15° 56.5584 | 145°40.8714 | 348 | chimney | Sulfide chimney | oxidized outer surface, silica zone, sulfides, barite |
| R787-bio/geo-0030 | 15° 56.322 | 145°40.45 | | lava / hypabyssal intrusion | Dacite | 5% vesicles, 20% PL, 5% QZ, 5% CPX, 65% dark grey groundmass |
| | | | | | | **R788 E Diamante** |
| R788-SF-0021 | 15° 56.5554 | 145°40.8834 | 344 | chimney | Sulfide chimney | chimney pieces fom 220°C vent; sulfides and barite |
| R788-SF-0022 | 15° 56.5596 | 145°40.8822 | 345 | chimney | Sulfide chimney | 9m tall chimney. Fe-oxide crust, silica patches, sulfur, sulfides |
| R788-bio/geo-0027 | 15° 56.3262 | 145°40.5462 | 274 | lava / hypabyssal intrusion | Dacite | 1% vesicles, 10% microdiorite xenos, 15% PL, 8% QZ, 2% CPX, 64% grey groundmass |
| | | | | | | **R789 Maug** |

| ROPOS Sample # | Lat (N) | Long (E) | Z (m) | Type | Lithology | Geology Comments/Description |
|---|---|---|---|---|---|---|
| R789-RK-0002 | 20° 1.3686 | 145°13.032 | 212 | lava / hypabyssal intrusion | Dacite | 25% vesicles, microphenos: 5% QZ, 5% PL, 5% amphibole?, 60% grey groundmass |
| R789-RK-0003 | 20° 1.4166 | 145°13.0884 | 194 | lava / hypabyssal intrusion | Dacite | 15% microphenos: 10% PL, 2% mafics, 3% QZ, 85% light grey groundmass |
| R789-RK-0004 | 20° 1.2804 | 145°13.0974 | 203 | lava / hypabyssal intrusion | Dacite | coral encrusted dacite |
| R789-RK-0006 | 20° 1.3962 | 145°13.3656 | 149 | lava / hypabyssal intrusion | Dacite | 15% microphenos (subequal PL and QZ), 85% dark grey groundmass |
| R789-RK-0007 | 20° 1.422 | 145°13.3188 | 143 | lava / hypabyssal intrusion | Dacite | 15% microphenos (10% PL, 5% QZ), 85% grey groundmass |
| | | | | | | **R790 Maug** |
| R790-RK-1-0013 | 20° 1.4040 | 145°13.356 | 144 | lava / hypabyssal intrusion | Dacite | 5% vesicles, 20% microphenos: 5% PL, 10% QZ, 5% mafics, 75% dark grey groundmass |
| | | | | | | **R791 NW Eifuku** |
| R791-RK-0001 | 21° 29.37 | 144°2.36 | 1702 | lava | Basalt | 40% vesicles, 15% CPX, 45% dark grey groundmass |
| R791-SS-J8-0004 | 21° 29.33 | 144°2.44 | 1715 | Fe crust | Fe crust | Fe crust on bacterial mat |
| R791-RK-0010 | 21° 29.21 | 144°2.48 | 1605 | lava | Andesite | 3% vesicles, 10% PL, 5% CPX, 82% grey groundmass; S in some vesicles |
| R791-SS-J1-0011 | 21° 29.40 | 144°2.39 | 1604 | sand and gravel | Volcaniclastic breccia | matrix holding breccia clasts of RK-0010. dark gravel group has PL & CPX phenos, light grup has PL only |
| R791-SS-J2-0024 | 21° 29.26 | 144°2.49 | 1608 | sand and gravel | Volcaniclastic | |
| | | | | | | **R792 NW Eifuku** |
| R792-RK-0002 | 21° 29.17 | 144°2.64 | 1604 | lava | Basalt | 50% vesicles, 20% phenocrysts, 30% black glassy groundmass |
| R792-Geo-0003 | 21° 29.18 | 144°2.61 | 1581 | bacterial mat | Fe crust | Fe-oxide crust and orange sediment/mat |
| R792-RK-0004 | 21° 29.24 | 144°2.56 | 1537 | lava | Basalt | 50% vesicles, 205 CPX, 30% black groundmass |
| R792-Core-0005 | 21° 29.23 | 144°2.51 | 1538 | bacterial mat | Bacterial mat | 20cm push core into fluffy yellow/orange deposit |
| R792-RK-0006 | 21° 29.26 | 144°2.51 | 1606 | lava | Andesite | 15% vesicles, 5% PL, 10% CPX, 10% disseminated sulfides, 60% grey groundmass |
| R792-RK-0012 | 21° 29.25 | 144°2.51 | 1608 | Sulfur | Sulfur | associated with Champagne chimneys |
| R792-RK-0013 | 21° 29.26 | 144°2.51 | 1608 | lava | Basalt or Dacite | altered lava: 15% CPX, 5% disseminated sulfides, 80% light grey groundmass |
| R792-RK-0014 | 21° 29.26 | 144°2.50 | 1610 | Sulfur | Sulfur | columnar sulfur from mineralized area below chimney |
| | | | | | | **R793 NW Eifuku** |
| R793-SS-J2-0006 | 21° 29.26 | 144°2.51 | 1573 | gravel | Volcaniclastic | volcanic gravel |
| R793-SS-J4-0009 | 21° 29.29 | 144°2.52 | 1587 | red mud | Red mud | suctioned a mini-chimney |
| R793-RK-0021 | 21° 29.26 | 144°2.49 | 1607 | lava | Basalt | <1% vesicles, 15% CPX, 1% disseminated sulfides, 83% dark grey groundmass |
| R793-RK-0022 | 21° 29.26 | 144°2.49 | 1607 | lava | Basalt | 1% vesicles, 5% CPX, 5% disseminated sulfides, 89% groundmass |
| R793-RK-0031 | 21° 29.27 | 144°2.50 | 1573 | lava | Basalt | 10% vesicles, 15% CPX, 10% OL, 65% groundmass |

| ROPOS Sample # | Lat (N) | Long (E) | Z (m) | Type | Lithology | Geology Comments/Description |
|---|---|---|---|---|---|---|
| R793-bio/geo-0033 | 21° 29.26 | 144°2.45 | 1573 | sulfur | Sulfur chimney | fragments of sulfur chimney |
| | | | | | | **R794 Kasuga 2** |
| R794-RK-0001 | 21° 36.44 | 143°38.66 | 625 | lava | Dacite vitrophyre | 5% vesicles, 15% microphenos (subequal PL, QZ), 80% black glass |
| R794-RK-0002 | 21° 36.50 | 143°38.57 | 563 | dike | Basalt or dacite | 20% vesicles, microphenos: 5% CPX, 10% QZ or OL, 60% grey groundmass |
| R794-SS-J8-0003 | 21° 36.74 | 143°38.28 | 346 | bacterial mat | bacterial mat and sand | yellow bacterial mat crust with volcanic sand |
| R794-S-J3-0006 | 21° 36.51 | 143°38.18 | 387 | volcaniclastic fragments | Dacite | grey to black fragments, PL + CPX |
| R794-bio/geo-0007 | 21° 36.51 | 143°38.17 | 390 | lava | Mineralized dacite | 5% vesicles, microphenos: 10% CPX, 25% QZ, 2% disseminated sulfides, 54% grey groundmass |
| | | | | | | **R795 Daikoku** |
| R795-bio/geo-0006 | 21° 19.48 | 144°11.54 | 378 | altered lava | Andesite | 1% vesicles, 20% PL, 5% sulfur, 10% disseminated sulfides, 64% light grey groundmass |

### 3.5.2 Mapping with the Imagenex Sonar Profiling System

***Bob Embley and Bill Chadwick***

Data collected with the hull-mounted EM300 multibeam system on the *T. G. Thompson* were used to construct basemaps for the dives. However, even at the shallower depths where the system attains its best resolution, the maximum resolution that the data can be gridded at is about 20 metes. This resolution does not resolve many of the smaller geologic features like small ridge spurs, craters and mounds that the ROV commonly encounters and is viewed by its cameras. In order to bridge this resolution gap, an Imagenex scanning sonar mounted on ROPOS was used to collect detailed bathymetry. This system transmits a tight "pencil beam" acoustic pulse (675 kHz) that scans back and forth in the vertical plane transverse to the direction of the heading of the ROV. Imagenex data can be gridded at about an order of magnitude finer resolution than ship-based bathymetry (2m vs. 20m), and consequently reveal much more detail. The optimal altitude, track spacing and survey speed used were respectively, 25-30 meters, 50-60 meters, and 0.5 knot. The steep slopes on the Mariana volcanoes required tighter trackline spacing than is possible in flatter terrain.

Imagenex surveys were conducted over the summit areas of NW Rota-1 and NW Eifuku volcanoes during dives R784, R786, R792 and R793. The areas surveyed are identified on the respective dive maps for the two sites but were approximately 800 x 400 meters for NW Rota-1 and 400 x 400 meters for NW Eifuku. The USBL (Ultra Short BaseLine) navigation was sufficiently accurate to make useable 2 meter grids after smoothing. The resulting maps show features such as the circular Brimstone Pit (~ 20 m across) and the small ridge spurs on the summit of NW Eifuku volcano.

# 4.0 PUBLIC OUTREACH

## 4.1 Ocean Explorations Submarine Ring of Fire Website

***Susan Merle, Kyle Carothers, Bill Chadwick, Brian Johnson, Davida Remer, and Shannon Ristau***

**http://oceanexplorer.noaa.gov/explorations/04fire/**

The Submarine Ring of Fire 2004 website is the product of a colloborative effort between the NOAA Office of Ocean Exploration and the NOAA Vents Program. Susan Merle (NOAA/OSU - Newport, Oregon) acted as the Web coordinator, serving as the central conduit for all content submissions to the web site precruise, at sea, and postcruise. Kyle Carothers (NOAA/NOS - Silver Spring, Maryland) acted as the Webmaster, the main point of contact for the web coordinator. Kyle was responsible for building and maintaining the web offering. Bill Chadwick (NOAA/OSU) provided the site with video

clips, essays, computer animations of the seafloor and some log entries, both pre-cruise and while at sea. Shannon Ristau (NOAA) assisted with log edits and image selection.

The website foundation was created before departing for sea, based on the Submarine Ring of Fire 2003 site (http://oceanexplorer.noaa.gov/explorations/03fire). A series of background essays and materials were provided by several principal investigators before the cruise. While at sea, fourteen log entries (written by several principal investigators) and accompanying images were sent from the ship to the OE team on shore (Kyle Carothers, Davida Remer and Brian Johnson). High resolution video clips and web images can now be downloaded from the site.

# 5.0 NAVIGATION

## 5.1 ROPOS Navigation Summary

***Jim Illman and Sebastien Durand***

The submarine "Ring Of Fire" expedition, TN-167B, utilized Ultra-Short BaseLine (USBL) navigation for all ROPOS dives between 100 and 2000 meters ocean depth. Canadian Scientific Submersible Facility (CSSF) chose Sonardyne's 7707 USBL system and mounted its transducer on the Thompson's stem. All wiring was routed to the ROPOS lab (Hydrolab) where the 7707's controller and secondary VRU were located along with navigation computers and data acquisition systems. USBL navigation was chosen since it didn't require the use of bottom transponders, as is the case for Long BaseLine (LBL) navigation, and because LBL was inappropriate for navigating around mountain peaks. USBL's range - bearing technique, which is produced by using multiple piezo-electric sensors in a single head, was excellent for the work performed around the volcanoes visited on this expedition.

Interfaced to SeaScape navigation software, we found the Sonardyne system to be excellent for navigation of both ROPOS and its Cage to a depth of 500 meters and rated it good between 500 and 1500 meters. For depths beyond 1500 meters, the fix uncertainty became unacceptable (15-30 meters) except when used with software averaging techniques. When ROPOS was on the move exploring a volcano at over 1500 meters, we would observe the moving distribution of fixes (the infamous "snail trail") and often supplement it by placing a "trackline" along the center of the fixes. When ROPOS was stationary while sampling at these depths, a running fix average was adequate to mark the location.

The use of USBL systems requires an extensive attitudinal calibration of the transducer mount, which was only partially performed prior to actual navigation. Ideally, it is best performed in a calm harbor so that pitch and roll errors can be computed without accelerations and their corrections entered into the system. In our case, only a yaw correction was performed (-11.0 degrees) to correct for actual transducer mounting alignment and this was observed to be quite adequate. The overall pitch / roll corrections were not made and the system was observed to produce some ship-heading-dependent shifts in position at depths over 500 meters. So a full pitch-roll-yaw calibration is recommended the next time such a system is used.

The larger, seemingly random fix errors that increased with depth are caused not by improper transducer calibration but by a whole host of other reasons: differential acceleration affects between the stem VRU and ship-mounted VRU, phase resolution errors in the receiver electronics, non-simultaneous pitch / roll / yaw inputs (the "simultaneity" problem in USBL systems), etc. This depth-dependent error (even assuming a perfect static calibration) is the reason USBL systems of medium frequency are not relied upon for accurate, instantaneous geodetic results in deep water.

But in our case, we were mostly diving in the 300-700 meter range, the system is just what we needed to navigate Mariana arc volcanoes. CSSF had hoped to supplement the USBL system with its new RDI Doppler Velocity Log (DVL) that is able to compute displacements as ROPOS maneuvers along the bottom. The DVL mounting location, however, proved troublesome as the sub's motor and transformer produced interfering electromagnetic fields, which caused the DVL's internal magnetic compass to oscillate. In normal practice, the DVL fix would occasionally be "homed" to an average fix position (supplied by USBL or LBL) and then relied upon for some maximum distance traveled before the next re-homing. CSSF looks forward to solving the DVL compass problem and making productive use of it on future cruises.

During each dive, we navigated both the Cage and ROPOS by mounting rechargable transponders on each. The transponders were reportedly capable of about 17,000 pings, assuming they had full-capacity (i.e., non-degraded) battery

packs. At first, we used five-second ping intervals and discovered that the battery packs weren't capable of that many pings. Subsequently, we managed the ping rate on the USBL controller to guarantee that we wouldn't run out of battery power on ROPOS during a long dive. Twenty to 30 seconds worked well while stationary, five seconds was adequate during Imagenex sonar surveys and rapid exploration.

All of the volcanoes visited presented large currents that affected the Cage position quite a bit. We noted also that the current would generally follow the curvature of the mountain up to a point around the down-stream backside where unpredictable eddies became apparent. Proper Cage positioning (and thus ship positioning) was vital to each dive's many sites of interest. And since we did so many approaches up slope from deep starting positions (and visa versa), Cage depth changes were also critical. Thus, good Cage navigation was as vital to the success of each dive as good ROPOS navigation.

The navigation team made use of the bathymetric information provided by the NOAA Vents Program from prior *R/V Thompson* EM-300 surveys in the area during 2003. We used SeaScape's contour generation facility to build volcano contours displayed on all navigation stations. So ROV pilots and chief scientists were better able to relate navigation fixes to general features on each mountain. The resolution of the bathymetry was 35 meters so it represented averaged topography. Very often (like almost always!) ROPOS encountered structures that were not (and could not) be represented on our contour map. Still, the presence of contours helped out notably in decision making, particularly in constant depth navigation techniques, which were often employed to find new vents.

## 5.2 MARIANA ARC DIVE TARGETS

### 5.2.1 NW Rota-1 Dive Targets

| Long (E) | Lat (N) | Z (m) | NW Rota-1 (Targets) |
|---|---|---|---|
| 144.77532 | 14.60081 | 565 | Brimstone Pit |
| 144.77336 | 14.60491 | 0 | Cnidaria Area |
| 144.77262 | 14.60073 | 599 | Dark Sands |
| 144.77717 | 14.60075 | 580 | Eastern Fault |
| 144.77726 | 14.60081 | 580 | Fault Shrimp |
| 144.79683 | 14.59567 | 0 | Flank Vent |
| 144.77598 | 14.60083 | 528 | Gastros |
| 144.77549 | 14.60112 | 515 | High Flow -1 |
| 144.77559 | 14.60096 | 521 | High Flow - 2 |
| 144.77627 | 14.60076 | 529 | Iceberg |
| 144.77309 | 14.60100 | 562 | Loose sands |
| 144.77540 | 14.60094 | 536 | Marker-75 |
| 144.77526 | 14.60075 | 554 | Pit Edge-1 |
| 144.77525 | 14.60077 | 550 | Pit Edge-2 |
| 144.77526 | 14.60081 | 562 | Pit Edge-3 |
| 144.77745 | 14.60080 | 565 | Scarp Top |
| 144.77542 | 14.60090 | 539 | Shimmering Sands |
| 144.77552 | 14.60121 | 519 | Shimmering Vent |
| 144.77741 | 14.60064 | 583 | Shrimp's peak |
| 144.77688 | 14.60021 | 570 | Snowcone |
| 144.77756 | 14.60082 | 563 | Sulfurs & Mats |
| 144.77597 | 14.60088 | 525 | White Mat |
| 144.77536 | 14.60095 | 538 | White Wall |
| 144.77262 | 14.60041 | 656 | Yellow Granules |
| 144.77682 | 14.60033 | 570 | Yellow Top |

### 5.2.2 W Rota Dive Targets

| Long (E) | Lat (N) | Z (m) | W Rota (Targets) |
|---|---|---|---|
| 144.86281 | 14.32986 | 542 | Black on white |
| 144.85682 | 14.33250 | 966 | Black Pumice Outcrop |
| 144.85092 | 14.33374 | 1217 | Outcrop1-785 |
| 144.85318 | 14.33364 | 1111 | Pre-caldera Rocks |
| 144.86047 | 14.33141 | 802 | Wall |

### 5.2.3 E Diamante Dive Targets

| Long (E) | Lat (N) | Z (m) | E Diamante (Targets) |
|---|---|---|---|
| 145.68149 | 15.94275 | 351 | 5m Chimney |
| 145.67966 | 15.94185 | 347 | 6" Shell |
| 145.67269 | 15.93325 | 400 | A |
| 145.68333 | 15.94395 | 460 | A0 |
| 145.68117 | 15.94083 | 329 | A1 |
| 145.67817 | 15.93633 | 320 | A2 |
| 145.67426 | 15.93871 | 179 | Aquarium |
| 145.66918 | 15.93341 | 320 | B |
| 145.68274 | 15.94330 | 457 | Barnacle Beach |
| 145.68283 | 15.94329 | 457 | Barnacle Beach-788 |
| 145.68052 | 15.94094 | 324 | Basket Case |
| 145.68138 | 15.94273 | 345 | Big Boy |
| 145.67589 | 15.93901 | 267 | Boulder Vent |
| 145.67015 | 15.93633 | 300 | C |
| 145.68299 | 15.94342 | 461 | Charlie Vent |
| 145.68078 | 15.94086 | 330 | Crinoids & Corals |
| 145.66640 | 15.93874 | 240 | D |
| 145.68139 | 15.94270 | 345 | Diamante Chimney |
| 145.67674 | 15.93845 | 200 | E |
| 145.68029 | 15.94010 | 347 | End North Massive |
| 145.68138 | 15.94265 | 341 | Five Towers |
| 145.67574 | 15.93890 | 252 | Floc Storm |
| 145.67582 | 15.93924 | 272 | Intense Diffuse -10Eh |
| 145.67679 | 15.93976 | 331 | Limpets |
| 145.68040 | 15.93973 | 342 | Massive Lava |
| 145.67539 | 15.93869 | 213 | Mat City |
| 145.67615 | 15.93953 | 268 | Fe-Mn Crust |
| 145.67603 | 15.93956 | 280 | Negative Eh |
| 145.67991 | 15.94230 | 349 | Sedi-Smp |
| 145.68164 | 15.94280 | 369 | Snail Flange |
| 145.68146 | 15.94265 | 352 | Softy |
| 145.68113 | 15.94252 | 345 | SW Edge |
| 145.68149 | 15.94253 | 354 | S Edge |
| 145.68171 | 15.94286 | 380 | Sulphide Chimney |

### 5.2.4 Maug Dive Targets

| Long (E) | Lat (N) | Z (m) | Maug (Targets) |
|---|---|---|---|
| 145.22054 | 20.02402 | 150 | Anchor |
| 145.22035 | 20.02385 | 144 | Anchor Chain |
| 145.22264 | 20.02337 | 146 | Cave |
| 145.22302 | 20.02103 | 82 | Cloudy |
| 145.22172 | 20.02011 | 145 | Egg Drop Soup |
| 145.22270 | 20.02350 | 153 | Egg Foo Young |
| 145.22198 | 20.02371 | 143 | Egg Salad |
| 145.22277 | 20.02328 | 149 | Egg White Springs |
| 145.22039 | 20.02312 | 76 | Filmy blue coral |
| 145.22026 | 20.02322 | 92 | Gorgonian Wall |
| 145.22046 | 20.02238 | 41 | Grape clusters |
| 145.22299 | 20.02172 | 105 | Milky Cloud |
| 145.22311 | 20.02179 | 114 | Milky Cloud-2 |
| 145.22323 | 20.02186 | 126 | Milky Cloud-3 |
| 145.22300 | 20.02216 | 105 | Milky Cloud-4 |
| 145.22294 | 20.02202 | 97 | Milky Cloud-5 |

| Long (E) | Lat (N) | Z (m) | Maug (Targets) |
|---|---|---|---|
| 145.22252 | 20.02326 | 127 | NE Dike |
| 145.22071 | 20.02217 | 21 | Peak |
| 145.22218 | 20.02161 | 39 | Pinnacle |
| 145.22104 | 20.02081 | 51 | Rope |
| 145.22258 | 20.02340 | 144 | Talus Vent |
| 145.21816 | 20.02342 | 197 | Wall Base |
| 145.22277 | 20.02327 | 147 | Yellow Mat |

### 5.2.5 NW Eifuku Dive Targets

| Long (E) | Lat (N) | Z (m) | NW Eifuku (Targets) |
|---|---|---|---|
| 144.04070 | 21.49139 | 1860 | A |
| 144.03945 | 21.48986 | 1720 | B |
| 144.04056 | 21.48884 | 1715 | Bacterial Balls |
| 144.04372 | 21.48629 | 1608 | Bob's Rocks |
| 144.04292 | 21.48695 | 1560 | C |
| 144.04124 | 21.48753 | 1603 | Champagne |
| 144.04144 | 21.48761 | 1607 | Champagne-2 |
| 144.04182 | 21.48773 | 1573 | Cliff House |
| 144.04168 | 21.48775 | 1573 | Cliff House-793 |
| 144.04024 | 21.49037 | 1798 | Contact Old-New |
| 144.04256 | 21.48731 | 1536 | Eifuku Summit - Orange Rind |
| 144.04019 | 21.48819 | 1622 | Floc |
| 144.04165 | 21.48770 | 1576 | Fouling |
| 144.04101 | 21.48747 | 1617 | Ice Cream |
| 144.04073 | 21.48762 | 1643 | Ice Fall |
| 144.04088 | 21.48745 | 1641 | Ice Sheet |
| 144.04142 | 21.48776 | 1600 | More Mussels |
| 144.04162 | 21.48784 | 1595 | Mussel Cliff |
| 144.04168 | 21.48795 | 1594 | Mussel Mound |
| 144.04118 | 21.48813 | 1629 | neg-Eh |
| 144.04080 | 21.48827 | 1565 | Plume |
| 144.04279 | 21.48724 | 1539 | Push core-1 |
| 144.04095 | 21.48817 | 1633 | Ski Slope |
| 144.04344 | 21.48644 | 1578 | Smp- bacteria |
| 144.04171 | 21.48773 | 1573 | Spicules |
| 144.04153 | 21.48771 | 1615 | Sulfur Dendrite |
| 144.03929 | 21.48945 | 1664 | Top of Ridge |
| 144.04125 | 21.48686 | 1605 | Top Tower |
| 144.04177 | 21.48767 | 1605 | Trap @ Champagne |
| 144.04435 | 21.48595 | 1641 | Water Grenade |
| 144.04199 | 21.48817 | 1588 | Yellow Cone |
| 144.04035 | 21.48854 | 1675 | Yellow Top |
| 144.04216 | 21.48658 | 1607 | Yellow Top-S |

### 5.2.6 Kasuga-2 Dive Targets

| Long (E) | Lat (N) | Z (m) | Kasuga-2 (Targets) |
|---|---|---|---|
| 143.63616 | 21.60860 | 393 | Barnacle Boulders |
| 143.63634 | 21.60875 | 384 | Crab Slope |
| 143.63622 | 21.60846 | 389 | Cracked Vent |
| 143.63854 | 21.61011 | 380 | Eh 130 |
| 143.63888 | 21.61091 | 400 | Eh 98 |
| 143.63584 | 21.60885 | 409 | Flat Bottom |
| 143.63649 | 21.60924 | 348 | Hairy Mat |
| 143.63645 | 21.60914 | 358 | Hairy Rock |
| 143.63683 | 21.61117 | 300 | Summit |
| 143.63582 | 21.60803 | 412 | Mat Ridge |
| 143.63697 | 21.61055 | 303 | Pinnacle |
| 143.63617 | 21.61016 | 285 | Pinnacle-2 |
| 143.63565 | 21.60864 | 405 | SW Eels |
| 143.63643 | 21.60883 | 371 | Whale Rock |
| 143.63805 | 21.61241 | 341 | Yellow Overlord |

### 5.2.7 Daikoku Dive Targets

| Long (E) | Lat (N) | Z (m) | Daikoku (Targets) |
|---|---|---|---|
| 144.19200 | 21.32497 | 400 | AA |
| 144.19271 | 21.32341 | 344 | Bluff |
| 144.19281 | 21.32454 | 440 | Bottomless Pit |
| 144.19286 | 21.32367 | 360 | Bubbles |
| 144.19202 | 21.32499 | 396 | Cactus Flower |
| 144.19272 | 21.32438 | 391 | Crater tuff luck |
| 144.19189 | 21.32470 | 389 | Fish Crack |
| 144.19223 | 21.32463 | 379 | Fish Spa |

## 5.3 Navigation Processing and Final Navigation Files

***Susan Merle and Shannon Ristau***

The ROPOS navigation files were post-processed when we returned to the beach. Several steps are necessary for navigation processing. The main processing steps include:

1) IDL program Navedit4, written by Bill Chadwick. The program visually displays all the navigation points, plus allows one to edit out any outliers and errant points. Sometimes when errant points are removed a small amount of navigation is eliminated - usually at the start or end of a dive.

2) IDL program get_ropos_llt, written by Andy Lau, updated by Bill Chadwick. This program allows one to smooth the navigation. The more noise in the data, the larger the smoothing factor applied. The USBL navigation worked quite well for the shallow volcanoes. In deeper water a larger smoothing factor had to be applied to the data. Anyone requiring the final navigation files contact: susan.merle@noaa.gov

### 5.3.1 Processed Navigation Quality and Time Ranges

| Dive | Location | Bottom Time | Processed Navigation File Times |
|---|---|---|---|
| R782 | NW Rota-1 | 3/28 1448 -3/29 0011 | 3/28 1529 -3/29 0011 |
| When we arrived near the bottom at 1448 there were too many particulates in the water so we stayed off the bottom, going deeper down the slope. At 1533 we were on the bottom again. No good navigation data until that time. | | | |
| R783 | NW Rota-1 | 3/29 1148 - 3/30 0544 | 3/29 1148 - 3/30 0157 |
| The transponder for the USBL lost its charge at ~0200. The batteries went dead. No navigation after that point. | | | |
| R784 | NW Rota-1 | 3/30 1350 - 2323 | 3/30 1350 - 2323 |
| R785 | W Rota | 3/31 1131 - 1950 | 3/31 1137 - 1920 |
| Missing 30 minutes navigation at end of dive. The original nav fix file ended at 1920. No navigation after that point. | | | |
| R786 | NW Rota-1 | 4/1 0749 - 4/2 0205 | 4/1 0755 - 4/2 0203 |
| R787 | E Diamante | 4/3 0753 - 4/4 0001 | 4/3 0811 - 4/4 0001 |
| R788 | E Diamante | 4/4 1237 - 4/5 0351 | 4/4 1237 - 4/5 0350 |
| R789 | Maug | 4/7 0753 - 4/7 2143 | 4/7 0753 - 4/7 2143 |
| R790 | Maug | 4/8 0332 - 0709 | 4/8 0332 - 0708 |
| R791 | NW Eifuku | 4/9 0352 - 2020 | 4/9 0359 - 2019 |
| R792 | NW Eifuku | 4/10 0507 - 1427 | 4/10 0513 - 1427 |
| R793 | NW Eifuku | 4/11 0418 - 2252 | 4/11 0617 - 2252 |
| Missing 2 hours of navigation at the start of the dive. The nav system was set to the wrong frequency. Nav was restored at 0617. No navigation for first 3 samples (somewhere between Yellow Top and Bacterial Balls). | | | |
| R794 | Kasuga-2 | 4/12 1136 - 4/13 0038 | 4/12 1136 - 4/13 0037 |
| R795 | Daikoku | 4/13 1330 - 1750 | 4/13 1330 - 1750 |

# 6.0 ROPOS DIVES: STATISTICS and SUMMARIES

## 6.1 ROPOS DIVE STATISTICS

| | |
|---|---|
| 13 ROPOS Dives on Mariana Arc volcanoes | R782 – R795 |
| Total Wet Time | 200.11 hours |
| Total Bottom Time | 173.95 hours |
| Total Number of ROPOS samples | 323 |

## 6.2 ROPOS DIVE SUMMARIES

| |
|---|
| **R782: Northwest Rota-1** |
| wet time (UTC): 3/28 1415 - 3/29 0121. JD 88-89. 11.1 hrs. |
| bottom time (UTC): 3/28 1448 - 3/29 0011. 9.38 hrs. [21 samples] |
| **R782 Dive Summary:** Exploration dive at NW Rota-1. When arrived at the bottom at 1448 there were too many particulates in the water so we stayed off the bottom, heading down slope to try to get out of the plume. At 1558 we were on the bottom again. No nav until 1558. Diffuse venting evident in many places along the ridge and on the southern scarp of the summit. Biota consisted of crabs, gastropods and shrimp. Various geological features including massive lavas, outcroppings, dune-like structures, etc. New vent sites: **Shimmering, High Flow Area, Gastros, Yellow Top, Fault Shrimp**. Samples: 7 rocks, 2 sediments, 1 McLane pump, 4 suctions. **Shimmering Shrimp**: 1 biology, 5 suctions. **Scarp Top**: 1 rock sample. |
| |
| **R783: Northwest Rota-1** |
| wet time (UTC): 3/29 1117 - 3/30 0634. JD 89-90. 19.28 hrs. |
| bottom time (UTC): 3/29 1148 - 3/30 0544. 17.93 hrs. [37 samples] |
| HFS sampling dive at NW Rota-1. Navigation was lost due to inadequate battery charge around 3/30 0200. There was no decent navigation after that point (~2.5 hours at end of dive). A huge plume was found with intense heat and large amounts of sulfur. The crater was eventually named "Rota Pit" - but changed to "Brimstone Pit" at a later time. Started at Fault Shrimp, next to Scarp Top, then Iceberg for shrimp behavioral study, next to White Mat/Gastros, then to High Flow, then to exploring the Western Fault Scarp. At the end of the dive we returned to Brimstone Pit. Samples: **Fault Shrimp**: 2 plankton nets, 4 HFS, 1 gas tight, 1 suction, and 1 rock. **Scarp Top**: 5 HFS; 1 gas tight bottle, 1 suction 1 rock. **Iceberg**: 7 HFS, 1 gas tight bottle, 2 suctions, 1 rock. **Near Gastros**: 1 suction. **High Flow**: 3 HFS, 1 gas tight. **W Fault Scarp**: 1 suction, 1 rock. **Brimstone Pit**: 2 HFS. |
| |
| **R784: Northwest Rota-1** |
| wet time (UTC): 3/30 1312 – 3/31 0106. JD 90-91. 11.9 hrs. |
| bottom time (UTC): 3/30 1350 - 2323. 9.51 hrs. [9 samples]<br>**[Imagenex survey: 3/30 1613 – 2137. ~ 30 m off bottom]** |
| Biology/Geology dive at NW Rota-1. Began the dive at the area formerly called "Nice Colony" - it was re-named "**Cnidaria**". 3 biological samples collected in the Cnidaria area: (2 suctions and 1 bio/geo including soft coral, hydroids and an anemone). Next we completed an Imagenex survey of the summit of the volcano. Sampled with the McLane pump and plankton nets during the survey. At the end of the dive went to **Brimstone Pit** to explore, sampling 2 rocks. There we witnessed an eruptive event and terminated the dive in order to determine ship/ROPOS safety. Suctioned the top of the biobox to collect particulates from the eruptive plume. |
| |
| **R785: West Rota** |
| wet time (UTC): 3/31 1007 -3/31 2237. JD 91. 12.5 hrs. |
| bottom time (UTC): 3/31 1131 - 3/31 1950. 8.32 hrs. [12 samples] |
| Exploratory dive on W Rota, mainly observing the geologic features of the volcano. West Rota geological traverse from the caldera bottom up to the top of the east rim. Lots of pumice down in the caldera. Traversing up the east rim saw numerous bands of pyroclastic flows. Samples: 10 rocks and 2 plankton nets. ROPOS was halted on the ascent at Z=200 for over 2 hours due to winch problems. |

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|---|
| **R786: Northwest Rota-1** |
| wet time (UTC): 4/1 0705 - 4/2 2206. JD 92-93. 19.41 hrs. |
| bottom time (UTC): 4/1 0749 - 4/2 0205. 18.27 hrs. [39 samples]<br>**[Imagenex survey: 4/1 0749 - 4/2 0205. ~30 m off bottom]** |
| Biological, geological and HFS sampling dive at NW Rota-1. Transit from Brimstone Pit to Shimmering Sands. Deployed Marker-75 at White Wall. Next on to Fault Shrimp and Gastros, followed by Imagenex mapping and more sampling at Brimstone Pit. Samples: **Brimstone Pit**: 12 HFS, 2 gas tights, 1 rock, 2 plankton nets. **Shimmering Sands**: 9 HFS, 2 gas tights, 1 bio/geo, 1 suction (sediment). **White Wall**: 2 rocks. **Fault Shrimp**: 6 suctions (shrimp). **Gastros**: 1 suction (large shrimp). Imagenex and DSC surveys completed at Brimstone Pit area. |
| |
| **R787: East Diamante** |
| wet time (UTC): 4/3 0732 -4/4 0034. JD 94-95. 17.03 hrs. |
| bottom time (UTC): 4/3 0753 - 4/4 0001. 16.13 hrs. [31 samples] |
| Exploratory dive at E Diamante volcano. Dive began at Barnacle Beach, continued to the Black Forest area (and Diamante Chimney), then to Aquarium. Samples: **AO**: 1 suction (bacterial mat), 1 rock. **Barnacle Beach**: 4 bio/geo, 2 suctions (bacterial mat). **Black Forest**: 3 rocks, 1 sulfide, 1 suction (sediment), 2 plankton nets, 1 McLane. **Diamante Chimney**: 2 sulfides, 7 biology samples (actually 9 snails listed as 7 separate samples), 1 suction (particulates). **Middle Cone**: 1 suction (bio). **Boulder Vent**: 1 suction (bio). **Aquarium**: 1 bio/geo (rock and algae). **Central summit cone:** 1 bio/geo, 1 suction (bio). |
| |
| **R788: East Diamante** |
| wet time (UTC): 4/4 1201 - 4/5 0424. JD 95-96. 16.38 hrs. |
| bottom time (UTC): 4/4 1237 - 4/5 0351. 15.23 hrs. [31 samples] |
| HFS and biology sampling dive at high temperature vents on East Diamante. Dive began at Barnacle Beach and ended at Aquarium. Samples: **Barnacle Beach**: 6 HFS, 1 biology (crab trap), 1suction (sponges and snails). **5 Towers**: 2 suctions (bacterial mat), 4 HFS, 2 gas tights, 2 sulfides. **Diamante Chimney**: 4 HFS, 2 gas tights. **Black Forest**: 2 plankton net samples. **Fe-Mn Crust**: 1 suction (snails and bacterial mat). **Intense Diffuse**: 1 suction (sponges and snails). **Central Cone**: 3 suctions (1 bio 2 mat), 1 bio/geo (dacite and limpets). |
| |
| **R789: Maug** |
| wet time (UTC): 4/7 0737 - 4/7 2206. JD 98. 14.48 hrs. |
| bottom time (UTC): 4/7 0753 - 4/7 2143. 13.83 hrs. [7 samples] |
| Exploration dive at Maug caldera. Traversed around the central cone at the 145m contour. Found 2 sites of diffuse venting on the NE side of the main cone. Samples: **W of main central cone**: 1 water. **Maug (traverse)**: 3 rocks. **Egg Drop Soup**: 1 suction (bacterial mat). **Egg White Springs**: 1 rock. **Egg Salad**: 1 rock. |
| |
| **R790: Maug** |
| wet time (UTC): 4/8 0316 - 4/8 0733. JD 99. 4.28 hrs. |
| bottom time (UTC): 4/8 0332 -4/8 0709. 3.62 hrs. [16 samples] |
| HFS and suction sampling dive at Maug. Samples: **Talus Vent**: 1 gas tight. **Egg Foo Young**: 1 HFS. **Cave Vent**: 2 gas tights, 8 HFS; 1 rock, 2 suctions (bacterial mat). Another gas tight was tripped on the sub's ascent at Z=66, seawater was sampled. |
| |
| **R791: Northwest Eifuku** |
| wet time (UTC): 4/9 0216 - 4/9 2207. JD 100. 19.85 hrs. |
| bottom time (UTC): 4/9 0352 -4/9 2020. 16.47 hrs. [37 samples] |

Exciting HFS, biology and geology dive at NW Eifuku. Set down near yellow bacterial mat rolling down steep slope. The area was named Bacterial Balls. Ascended upslope toward the summit and discovered Mussel Mound and More Mussels. The mussels were found living in low-flow areas. Lots of biota. Moved on to discover Champagne area! Champagne is an area of small white chimneys pouring out white smoke and large CO2 bubbles. Liquid Co2 bubbles escaping from the seafloor in the area. Lots of sampling. The top of the volcano is blanketed with yellow bacterial mat. Samples: Near **Point B**: 1 rock. **Bacterial Balls**: 3 suctions (bacterial mat). **Yellow Top**: 1 suction (bacterial mat). **More Mussels**: 1 biology sample (mussels). **Icefall**: 2 HFS; 1 gas tight. **Top Tower**: 1 suction (bacterial mat and biology), 1 rock. **Champagne**: 9 HFS, 3 gas tights, 3 suctions (fauna, particulate debris and bacterial mat), 1 biology (mussel). **Champagne-2;** 1 HFS. **Cliff House**: 7 HFS. **Mussel Mound area**: Plankton net tow (port and stbd). When ROPOS neared the surface gas bubbles poured out of the HFS flush hose. Most HFS samples from Champagne site collected on this dive were lost.

**R792: Northwest Eifuku**

wet time (UTC): 4/10 0334 - 4/10 1550. JD 101. 12.26 hrs.

bottom time (UTC): 4/10 0507 - 4/10 1427. 9.33 hrs. [23 samples]

Geological and biological sampling at NW Eifuku. Deployed shrimp/crab trap at Champagne. Samples: **Transiting from SE of summit to summit**: 1 mini-water sample, 2 rocks, 1 Fe-oxide crust. **Orange Rind**: 1 push core of yellow/orange mound. **Mussel Mound to Fouling**: 1 stbd McLane pump. **Fouling area**: 1 biology (~26 mussels). 2 suctions (mussel assemblage fauna, assemblage particulates). **Champagne**: 4 rocks (chimney material, elemental sulphur, fresh lava), 5 suctions (particulates, bacterial mat, meiofauna), 1 bio/geo (limpets on rock), 1 gas tight, 2 plankton nets, 1 port McLane pump. Attempted a modified core sample of bubbles - but they didn't make it to the surface. Dive was aborted due to ROPOS hydraulic leak.

**R793: Northwest Eifuku**

wet time (UTC): 4/11 0253 - 4/12 0132. JD 102 - 103. 21.26 hrs.

bottom time (UTC): 4/11 0418 - 4/11 2252. 18.57 hrs. [37 samples]
**[Imagenex survey: 4/11 1655 – 2027. ~30 m off bottom]**

HFS, suction and geological sampling dive on NW Eifuku. Missing 2 hours of navigation at the start of the dive. Nav was restored at 0617. Samples: **Yellow Top**: 3 suctions (yellow mat). **Fouling area**: 2 HFS, 1 suction (juvenile mussels). **Yellow Cone**: 2 HFS, 2 suctions (mini chimney and bacterial mat). **Champagne**: 3 HFS, 1 gastight, 2 rocks, 1 shrimp trap, 1 suction (crab). **Sulfur Dendrite**: 5 HFS, 1 gas tight. **Cliff House**: 6 HFS, 2 gas tights, 1 rock. **Sulfur Spicules**: 1 HFS, 1 bio/geo (spicule and snails). **Summit and NW Venting area**: Imagenex survey, 2 plankton nets during survey. Collected liquid CO2 bubbles at Champagne and watched the phase change as the sub ascended. Observed HFS near surface. Bubbles were venting from the HFS sampler.

**R794: Kasuga-2**

wet time (UTC): 4/12 1042 - 4/13 0132. JD 103 - 104. 14.83 hrs.

bottom time (UTC): 4/12 1136 - 4/13 0038. 13.03 hrs. [16 samples]

Exploratory dive to Kasuga-2. Lots of searching for hydrothermal activity. Found a bit of diffuse flow. Cage took a tumble on the edge of the volcano. **Caldera area**: 2 rocks. **Near summit**: 1 suction (sediment and crust). **Barnacle Boulders**: 2 suctions (fauna and sediments). **Mat Ridge**: 3 suctions (tubeworms, sponges, bacterial mat). **Cracked**: 1 bio/geo (barnacles on rock), 5 HFS, 2 gas tights. Incredible abundance of flatfish (not sampled).

**R795: Daikoku**

wet time (UTC): 4/13 1259 - 4/13 1832. JD 104. 5.55 hrs.

bottom time (UTC): 4/13 1330 - 4/13 1750. 4.33 hrs. [7 samples]

Exploratory dive at Daikoku. Found some diffuse venting, tubeworms and other biota. Samples: **Bottomless Pit**: 1 HFS. **Fish Spa**: 5 suctions (bottom sediments under and around flatfish), 1 bio/geo (rock and anemones). Incredible abundance of flatfish (not sampled).

# 7.0 ROPOS SAMPLES

## 7.1 R782 Sample Log: NW Rota-1

| Sample | Lat (N) | Long (E) | Time | R782 Sample Description: NW Rota-1 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R782-RK-0001 | 14.5971 | 144.7721 | 15:39:59 Mar/28/04 | Fist size piece of lava/talus(?). Looks like a vesiculated lava - maybe glassy; maybe plagioclase crystals seen? Placed in the boot. Z=884.1. | SROF geo team (Stern) | |
| R782-RK-0002 | 14.5986 | 144.7724 | 16:23:36 Mar/28/04 | Sample of relatively fresh lava with white plagioclase phenocrysts about 6 cm in diameter with vesicles. Z=799.1. | SROF geo team (Stern) | |
| R782-RK-0003 | 14.5998 | 144.7726 | 16:57:52 Mar/28/04 | Sampled piece of lava here. Looks like phenocrysts of plagioclase and maybe some vesicles? Aprox. fist-size piece. Z=718.8. | SROF geo team (Stern) | |
| R782-SS-J1-0004 | 14.6012 | 144.7755 | 19:05:22 Mar/28/04 | Suction shrimp into jar-1. Z=516. **(Shimmering Vent)** | Juniper | Tunnicliffe |
| R782-SS-J3-0005 | 14.6012 | 144.7755 | 19:13:20 Mar/28/04 | Suction into jar-3 for loose sediment that shrimp were feeding upon. Probably bacterial mat. Z=516.1. **(Shimmering Vent)** | Juniper | |
| R782-RK-0006 | 14.6012 | 144.7755 | 19:31:29 Mar/28/04 | Sampled rock at diffuse site. Put in port biobox. Some yellow bacterial mat on surface. Rock crumbled. Ended up with smaller piece. Bacterial mat not present when rock taken from the biobox. Z=516.1. **(Shimmering Vent)** | SROF geo team | |
| R782-SS-J5-0007 | 14.6012 | 144.7755 | 19:34:24 Mar/28/04 | Suction into jar-5. Slurping yellow material off rock face in diffuse venting area. Yellow material is probably a sulfur coating with "bugs" in it. Subsamp: pebbles with orange stain. Z=515.8. **(Shimmering Vent)** | Moyer / de Ronde | Hein |
| R782-RK-0008 | 14.6012 | 144.7755 | 19:40:39 Mar/28/04 | Sample rock material with yellow bacterial mat/sulfur(?) on surface. Collected with suction sampler (very small piece of rock with mat on it). Put in port biobox. Note: this sample was not found in the biobox after the dive. Z=516.5. [SAMPLE LOST] **(Shimmering Vent)** | SROF geo team | Moyer |
| R782-Bio-0009 | 14.6012 | 144.7755 | 20:02:01 Mar/28/04 | Grabbed crab with suction sampler. Placed in port biobox. Z=516.6. **(Shimmering Vent)** | Tunnicliffe | |
| R782-SS-J2-0010 | 14.6012 | 144.7756 | 20:05:56 Mar/28/04 | Suction for biology into jar-2. Collected a white crab. Z=516.2. **(Shimmering Vent)** | Tunnicliffe | |
| R782-SS-J3-0011 | 14.6012 | 144.7756 | 20:12:58 Mar/28/04 | Suction biology into jar-3. A white crab. Z=515.3. **(Shimmering Vent)** | Juniper | |
| R782-SS-J8-0012 | 14.6012 | 144.7755 | 20:13:32 Mar/28/04 | Another crab ended up in the flush bottle jar-8. Z=515.4. **(Shimmering Vent)** | Tunnicliffe | |
| R782-SS-J4-0013 | 14.6012 | 144.7755 | 20:16:08 Mar/28/04 | Suction of shrimp and sediment into jar-4. We're at the top of the cone here about 2 meters from the last sample location. Subsamples: Sand and shrimp. Z=515.4. **(Shimmering Vent)** | Juniper | Hein / Tunnicliffe |
| R782-SS-J6/8-0014 | 14.6012 | 144.7755 | 20:21:30 Mar/28/04 | Collecting gravel and sand from previous shrimp site. Same sand as suctioned for shrimp. Fine-grained sediment washed out. Sample in same jar as R782-SS-J8-0012 (crab). Flushed remainder of sample in hose into jar-6. Z=515.2. **(Shimmering Vent)** | Hein | |
| R782-SS-J7-0015 | 14.6012 | 144.7755 | 21:06:50 Mar/28/04 | Suction sample for bacterial mat at base of shimmering shrimp vent site near cavern into jar-7. Tavg=11C. Continued after rock sample at 21:28. Z=517.5. **(Shimmering Vent)** | Moyer | |
| R782-RK-0016 | 14.6012 | 144.7755 | 21:15:29 Mar/28/04 | Completely altered rock - browns and grays. From roof of cavern venting shimmering fluids. Rock highly friable and broke into several pieces during sampling. In port biobox. Z=517.4. **(Shimmering Vent)** | SROF geo team | |
| R782-RK-0017 | 14.6006 | 144.7761 | 23:16:20 Mar/28/04 | Collecting mineralized gray-coated rock. Limpet on it. Largest rock in the boot. Shimmering water came from place rock was collected. Z=537.3. | SROF geo team (Hein) | Metaxas |
| R782-RK-0018 | 14.6008 | 144.7774 | 00:06:47 Mar/29/04 | Rock sample. Looks like may be sulfur(?) in this sample taken from shimmering water area. - big yellow outcrop. The rock is very porous. It crumbled when ROPOS grabbed it. Now 1 pebble size and several pieces - crumbs? Z=565.1. **(Scarp Top)** | SROF geo team | |
| R782-MP-0019a | 14.6008 | 144.7774 | 00:11:36 Mar/29/04 | Stbd McLane pump sample on the ascent. Pumping from 200m to surface. Rising 5 meters/min. 10 liter lots. Start 0039. Stop 0116:56. 20 lots total. Z=564.9. **(Scarp Top)** | Juniper | |
| R782-sed-0019b | 14.6001 | 144.7777 | 03:29:11 Mar/29/04 | Sediment sample consisting of rock fragments; pyrite; chalcopyrite(?); sulfur and some microbiology (foraminifera etc) collected from the bottom of the biobox. | Hein | |
| R782-sed-0020 | 14.6001 | 144.7777 | 03:29:15 Mar/29/04 | Sediment sample consisting of rock fragments; pyrite; chalcopyrite(?); sulfur and some microbiology (foraminifera etc) collected from the boot. | Hein | |

## 7.2 R783 Sample Log: NW Rota-1

| Sample | Lat (N) | Long (E) | Time | R783 Sample Description: NW Rota-1 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R783-net-S-0001 | 14.6010 | 144.7757 | 11:59:44 Mar/29/04 | Stbd larval net tow. 3-20 m above bottom. Ship 0.5kts. ROPOS ~1 kt. Start: Shimmering Shrimp; Fault Shrimp; 60m N of Fault Shrimp; Yellow Top; Fault Shrimp; 60m N of Fault Shrimp; Fault Shrimp. Z=517-572m. | Metaxas | |
| R783-net-P-0002 | 14.6010 | 144.7758 | 11:59:57 Mar/29/04 | Port larval net tow. 3-20 m above bottom. Ship 0.5kts. ROPOS ~1 kt. Start: Shimmering Shrimp; Fault Shrimp; 60m N of Fault Shrimp; Yellow Top; Fault Shrimp; 60m N of Fault Shrimp; Fault Shrimp. Z=517-572m. | Metaxas | |
| R783-HFS-11-0003 | 14.6008 | 144.7773 | 13:12:12 Mar/29/04 | HFS filtered bag-11. Start=1312 Stop=1317. T2=17 Tmax=23.1 T1avg= 22.1. Vol=650ml. Z=582.6. **(Fault Shrimp)** | Butterfield | |
| R783-HFS-13-0004 | 14.6007 | 144.7773 | 13:19:07 Mar/29/04 | Sterivex DNA filter-13. Start=1319 Stop=1332. T2=16 T1max=22.6 T1avg=20.4. Vol=1204ml. Z=582.7. **(Fault Shrimp)** | Butterfield | Bolton |
| R783-GTB-1-0005 | 14.6008 | 144.7773 | 13:22:56 Mar/29/04 | Fired gas tight bottle-1 (HIL #9). T=21.5. Z=582.7. **(Fault Shrimp)** | Lupton | Butterfield / Lilley |
| R783-HFS-7-0006 | 14.6008 | 144.7773 | 13:34:28 Mar/29/04 | HFS FISH filter-7. Start=1334 Stop=1335. T2=16.0 T1max=21.0 T1avg=20.6. Vol=203ml. Z=582.6. **(Fault Shrimp)** | Butterfield | Bolton |
| R783-HFS-5-0007 | 14.6008 | 144.7773 | 13:38:21 Mar/29/04 | HFS piston-5. Start=1338 Stop=1343. T2=17 T1max=22.2 T1avg=20.7. Vol=687ml. Z=582.7. **(Fault Shrimp)** | Butterfield | Bolton |
| R783-SS-JJ2-0008 | 14.6008 | 144.7773 | 14:12:53 Mar/29/04 | Suctioning yellowish mat material and shrimp in same general location as fluid sampling - into jar-J2. Z=582.4. **(Fault Shrimp)** | Juniper | De Ronde / Tunnicliffe |
| R783-RK-0009 | 14.6008 | 144.7773 | 14:29:51 Mar/29/04 | Piece of yellowish-white (sulfur) rock. Two small pieces fell into the bag from the larger piece in the frame grab. Z=582.6. **(Fault Shrimp)** | SROF geo team (De Ronde) | |
| R783-HFS-8-0010 | 14.6008 | 144.7775 | 15:23:34 Mar/29/04 | HFS unfiltered bag-8. Start 1529 Stop 1534. Tmax=39.7 Tavg=39.0 T2=25.8. Vol=625ml. Z=563.7. HFS valve sticking. Site is on top large mound of hydrothermal deposits. More vigorous flow. **(Scarp Top)** | Butterfield | Bolton |
| R783-HFS-9-0011 | 14.6008 | 144.7775 | 15:35:27 Mar/29/04 | HFS filtered bag-9. Start 1535 Stop 1541. Tmax=39.5 Tavg=39.2 T2=26.7. Vol=625ml. Z=563.8. Temperature is holding pretty stable here. **(Scarp Top)** | Butterfield | |
| R783-GTB-2-0012 | 14.6008 | 144.7775 | 15:42:14 Mar/29/04 | Firing gas tight bottle-2 (HIL #11). Fired at 1543. Tavg=39. Z=563.7. **(Scarp Top)** | Lupton | Butterfield / Lilley |
| R783-HFS-3-0013 | 14.6008 | 144.7775 | 15:44:45 Mar/29/04 | HFS sterivex DNA filter-3. Start 1545 Stop 1558. Tmax=39.9 Tavg=38.7 T2=26.0. Z=563.8. Vol=1201ml. There was a slight temperature drop during sampling. Current may have changed direction. **(Scarp Top)** | Butterfield | Bolton |
| R783-HFS-10-0014 | 14.6008 | 144.7775 | 15:59:39 Mar/29/04 | HFS filter-10 for RNA. Start 1600 Stop 1615. Tmax=39.1 Tavg=38.5 T2=26.0 Z=563.8 Vol=1219ml. Temperature was very stable during sampling. **(Scarp Top)** | Butterfield | Bolton |
| R783-HFS-4-0015 | 14.6008 | 144.7775 | 16:16:29 Mar/29/04 | HFS piston-4. Start 1616 Stop 1622. Tmax=39.0 Tavg=38.4 T2=26.0. Z=563.8. Vol=789ml. **(Scarp Top)** | Butterfield | Bolton |
| R783-SS-J1-0016 | 14.6008 | 144.7775 | 16:33:30 Mar/29/04 | Sampled crabs (3). Later added 3-4 shrimps and some of the yellow material (sulfur) encrusting the sediments in this Scarp Top area. Z=564.8. **(Scarp Top)** | Juniper | |
| R783-RK-0017 | 14.6008 | 144.7775 | 17:06:19 Mar/29/04 | Sampled rock and put in the purse. It is a vesiculated rock with one side having a coating of sulfur(?) on it. Sample about fist sized. Z=565.1. **(Scarp Top)** | SROF geo team | |
| R783-HFS-14-0018 | 14.6008 | 144.7763 | 18:02:17 Mar/29/04 | HFS filtered bag-14 Start 1802 Stop 1807. Tmax=46.1 Tavg=45.6 T2=29.0 Vol=662ml. Z=530. Temperature remained stable during sampling. **(Iceberg)** | Butterfield | |
| R783-HFS-12-0019 | 14.6008 | 144.7763 | 18:09:16 Mar/29/04 | HFS RNA filter-12. Start 1809 Stop 1823 Tmax=48.3 Tavg=46.0 T2=29.0 Vol=1252ml Z=530. Temperature was stable. **(Iceberg)** | Butterfield | Bolton |
| R783-GTB-3-0020 | 14.6008 | 144.7763 | 18:17:38 Mar/29/04 | Firing gas tight bottle-3 (HIL #7). Fired at 1821. Temperature at firing was 45 degrees and T2 was 29 degrees. Z=529.9. **(Iceberg)** | Lupton | Butterfield / Lilley |
| R783-HFS-21-0021 | 14.6008 | 144.7763 | 18:24:27 Mar/29/04 | HFS sterivex DNA filter-21. Start 1825 Stop 1836. Tmax=52.3 Tavg=51.7 T2=32.0. Vol=1025ml. Z=529.7. Pump stopped several times during sampling and had to be restarted. **(Iceberg)** | Butterfield | Bolton |
| R783-HFS-22-0022 | 14.6008 | 144.7763 | 18:36:45 Mar/29/04 | HFS piston-22. Start 1838 Stop 1844. Tmax=51.9 Tavg=49.6 T2=31.0. Vol=701ml. Z=529.9. Intermittent particles from the outflow. Temperature is very slowly increasing but relatively stable for each sample. **(Iceberg)** | Butterfield | Bolton |
| R783-HFS-2-0023 | 14.6008 | 144.7763 | 18:45:10 Mar/29/04 | HFS FISH filter-2. Start 1847 Stop 1848. Tmax=51.7 Tavg=51.5 T2=32.0. Vol=250ml Z=530. **(Iceberg)** | Butterfield | Bolton |
| R783-RK-0024 | 14.6008 | 144.7763 | 18:53:03 Mar/29/04 | Hydrothermally altered vesiculated lava taken from same spot as fluid sampling. Piece is about fist sized with sulfur on it. Going into the purse. Z=529.9. **(Iceberg)** | SROF geo team (De Ronde) | |

| Sample | Lat (N) | Long (E) | Time | R783 Sample Description: NW Rota-1 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R783-HFS-24-0025 | 14.6008 | 144.7763 | 19:24:21 Mar/29/04 | HFS piston-24. Start 1924 Stop 1932. Tmax=57.1 Tavg=57.0 T2=37.0. Vol=615ml. Z=529.2. Large vertical crack directly above site of previous fluid sampling. **(Iceberg)** | Butterfield | Bolton |
| R783-HFS-18-0026 | 14.6008 | 144.7762 | 19:34:36 Mar/29/04 | HFS filtered bag-18. Start 1934 Stop 1940. Tmax=57.2 Tavg=56.7 T2=36. Vol=651ml. Z=529. Second fluid sampling site. **(Iceberg)** | Butterfield | |
| R783-SS-J5-0027 | 14.6008 | 144.7763 | 19:48:38 Mar/29/04 | Suction sample into jar-5 - from the crack - for bacterial mats into jar-5. Tavg=~58 C. Start 1948. End 1956. Z=529. **(Iceberg)** | Moyer | |
| R783-SS-J6-0028 | 14.6007 | 144.7763 | 19:56:29 Mar/29/04 | Suction for bacterial mat into jar-6. from the crack. Tavg=~58. Start 1956. Stop 2006. Z=529. Lots of mat in that sample. **(Iceberg)** | Moyer | |
| R783-SS-J2-0029 | 14.6008 | 144.7760 | 20:47:46 Mar/29/04 | Suction for limpets at this site. Start 2047. Moved to a nearby spot. Start 2nd attempt 2056. No limpets collected - but shrimp were collected and put into jar-2. Stop 2112. Z=526.5. **(near Gastros)** | Juniper | |
| R783-HFS-23-0030 | 14.6010 | 144.7756 | 21:53:43 Mar/29/04 | HFS filtered piston-23. Start 2154 Stop=2204. Tmax=30.2 Tavg=26.7 Vol=701ml. Z=520.9. **(High Flow Area)** | Butterfield | |
| R783-HFS-19-0031 | 14.6010 | 144.7756 | 22:06:04 Mar/29/04 | HFS unfiltered bag-19 Start 2206 at 36.5C. Stop=2212 Tmax=36.8 Tavg=35.6 Vol=659ml Z=520.9. **(High Flow Area)** | Butterfield | |
| R783-HFS-16-0032 | 14.6010 | 144.7756 | 22:13:27 Mar/29/04 | HFS unfiltered bag-16. Start 2213 Stop=2219. Tmax=37.0 Tavg=35.5. Vol=603ml. Z=521.0. **(High Flow Area)** | Butterfield | |
| R783-GTB-4-0033 | 14.6010 | 144.7756 | 22:20:00 Mar/29/04 | Gas tight bottle-4 (HIL #2). T=35.5-37C. Z=520.9. **(High Flow Area)** | Lupton | Butterfield / Lilley |
| R783-SS-J3-0034 | 14.6027 | 144.7720 | 00:44:13 Mar/30/04 | Suction sample into jar-3. Search for fauna in sediment. Sediment at base of west fault. Z=636.9. **(western fault scarp)** | Juniper | |
| R783-RK-0035 | 14.6012 | 144.7713 | 01:17:37 Mar/30/04 | Collecting an unaltered volcanic rock. We're on the western fault near the summit. Z=618.1. | SROF geo team (Hein) | |
| R783-HFS-17-0036 | 14.6008 | 144.7753 | 04:37:00 Mar/30/04 | HFS bag-17 Start=4:37 Stop=4:41. Tmax=29.8 Tavg=25.8 T2=26. Vol=500ml. Z=565.5. On south side of central ridge. **(Brimstone Pit)** | Butterfield | |
| R783-HFS-20-0037 | 14.6008 | 144.7753 | 05:22:28 Mar/30/04 | HFS filtered piston-20. Start=0522 Stop=0526. T1avg=12.8 T1max=16.7 T2avg=12 T2max=16.7. Vol=712ml. Z=548.6. Temp varying due to billowing floc obscuring the view. **(Brimstone Pit)** | Butterfield | |

## 7.3 R784 Sample Log: NW Rota-1

| Sample | Lat (N) | Long (E) | Time | R784 Sample Description: NW Rota-1 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R784-bio/geo-0001 | 14.6049 | 144.7735 | 14:17:23 Mar/30/04 | Collected an anemone attached to a rock and placed it in the biobox. This is non-venting area. Z=606.0. **(Cnidaria area)** | Juniper | |
| R784-SS-J1-0002 | 14.6049 | 144.7733 | 14:34:19 Mar/30/04 | Suction sample of hydroids into jar-1. Suctioning rock were previous sample was collected. Z=601.2. **(Cnidaria)** | Juniper | |
| R784-SS-J2-0003 | 14.6049 | 144.7732 | 15:14:39 Mar/30/04 | Sampled soft coral into jar-2. Z=599.5. **(Cnidaria)** | Juniper | Tunnicliffe |
| R784-net-port-0004 | 14.6025 | 144.7720 | 16:18:08 Mar/30/04 | Opening port and stbd plankton nets. Towed during Imagenex survey at ~30m above the bottom. Zmin=537 Zmax=665 Zavg=~600. Start 1618 (start Line A) Stop 2113 (end Line L). (stbd net sample R784-0008) | Metaxas | |
| R784-RK-0005 | 14.6007 | 144.7752 | 22:36:05 Mar/30/04 | Fist-sized piece of highly fractured and altered rock collected from below the pit crater. Port side biobox. Z=561.9. **(near Brimstone Pit)** | SROF geo team (Hein) | |
| R784-RK-0006 | 14.6008 | 144.7752 | 22:44:14 Mar/30/04 | Sampled rock (spatter) from the edge of the pit crater rim. Less altered block of lava from area of mostly ash. Portside biobox. Z=551.5. **(Brimstone Pit)** | SROF geo team | |
| R784-SS-J5-0007 | 14.6008 | 144.7752 | 00:08:26 Mar/31/04 | Suctioning the top of the biobox to try to collect some particles from the plume into jar-5. Mostly sulfur plus some small pieces of rock and lapilli (ash). 202 micron Nytex double wrap mesh (Moyers). Stop 0017. Z=608.7. **(Brimstone Pit)** | SROF geo team | |
| R784-net-stbd-0008 | 14.6025 | 144.7720 | 16:11:55 Mar/30/04 | Opening port and stbd plankton nets at 1618. Towed during **Imagenex** survey at ~30m above the bottom. Zmin=537 Zmax=665 Zavg=~600. Start 1618 (start Line A) Stop 2113 (end Line L). [logged post-dive] | Metaxas | |
| R784-MP-0009 | 14.6026 | 144.7717 | 16:15:53 Mar/30/04 | Begin McLane pump run. 5 liters/min. Stbd pump. Altitude 30m above bottom. Total 1250 liters filtered. Filtered throughout entire **Imagenex** survey. Z=603. | Juniper | |

## 7.4 R785 Sample Log: W Rota

| Sample | Lat (N) | Long (E) | Time | R785 Sample Description: W Rota | PI | SubSmps |
|---|---|---|---|---|---|---|
| R785-RK-0001 | 14.3338 | 144.8510 | 12:22:48 Mar/31/04 | Piece of pumice with yellow/brown iron staining. Two pieces were taken: one from exterior - one from interior. The in situ rock was ~0.5m in diameter. Portside biobox. Z=1216.8. **(Outcrop 1)** | SROF geo team (Stern) | |
| R785-RK-0002 | 14.3337 | 144.8510 | 12:30:08 Mar/31/04 | Piece of pumice with Fe crust. The Fe crust on the seafloor covers many square m's and is several cm's thick. Crust is brown in the middle and black on the outside. Z=1217. **(Outcrop 1)** | SROF geo team (Hein) | |
| R785-RK-0003 | 14.3334 | 144.8515 | 12:48:51 Mar/31/04 | A clean piece of pumice collected in the big field of cobble sized pumice. Starboard biobox. Z=1199.8. **(54 m east of Outcrop 1).** | SROF geo team (Stern) | |
| R785-RK-0004 | 14.3332 | 144.8523 | 13:12:34 Mar/31/04 | Rhyolite collected from the field of coarse pumice. Placed in the boot. Z=1160.3. | SROF geo team (Stern) | |
| R785-RK-0005 | 14.3334 | 144.8526 | 13:20:24 Mar/31/04 | Black fist-size rock. This rock does not crush. Port biobox. Z=1143.5. | SROF geo team (Stern) | |
| R785-RK-0006 | 14.3334 | 144.8526 | 13:23:31 Mar/31/04 | Grey rock that is very friable. When placed in the boot it falls apart. Z=1143.6. | SROF geo team (Stern) | |
| R785-RK-0007 | 14.3337 | 144.8532 | 13:44:18 Mar/31/04 | Harder rock than pumice. Collected at the location where the older rocks are starting to show up. Placed in starboard biobox. It is a large rock. Z=1111.1. **(Pre-caldera Rocks)** | SROF geo team (Stern) | |
| R785-RK-0008 | 14.3314 | 144.8605 | 15:51:04 Mar/31/04 | Sample of lava from the wall (moving up east side of caldera slope). Port side biobox. Sample is cube shaped and has at least two sides that are weathered by Fe-oxides. Z=788.6. **(Wall)** | SROF geo team (Stern) | |
| R785-RK-0009 | 14.3313 | 144.8607 | 16:04:00 Mar/31/04 | Sampled large piece of rock sitting at base of pyroclastic unit. Elongate and reddish. Put in the boot. Z=778.6. **(eastern slope)** | SROF geo team (Stern) | |
| R785-RK-0010 | 14.3313 | 144.8607 | 16:10:27 Mar/31/04 | Collected a piece of rock sitting within the pyroclastic unit. About 15+ cm in size. Placed in the boot. Z=776.4. **(eastern caldera wall)** | SROF geo team (Stern) | |
| R785-net-port-0011 | 14.3295 | 144.8646 | 18:35:03 Mar/31/04 | Port and Stbd plankton nets opened. Port net sample good. Stbd net ripped near surface. 30m above bottom. 0.5 kts. Z=437.2. | Metaxas | |
| R785-net-stbd-0012 | 14.3243 | 144.8640 | 19:50:32 Mar/31/04 | Port and Stbd plankton net samples. Port net sample good. Stbd net ripped near surface. Start 1835 Stop 1950. 30m above bottom. 0.5 kts. | Metaxas | |

## 7.5 R786 Sample Log: NW Rota-1

| Sample | Lat (N) | Long (E) | Time | R786 Sample Description: NW Rota-1 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R786-HFS-1-0001 | 14.6008 | 144.7753 | 08:20:20 Apr/01/04 | HFS filter-1. The pipe is pointing down at 70-degree angle. T=29 +/-2. Z=560.9. Start=0820 Stop=0827. Tmax=33.8 (at the end) Tavg=24.1(+/-5) T2=20. Vol=504ml. **(Brimstone Pit)** | Butterfield | |
| R786-HFS-2-0002 | 14.6008 | 144.7752 | 08:28:26 Apr/01/04 | HFS FISH Filter-2. Z=560.90. Start=0828 Stop=0830. Tmax=32.6 (at the end) Tavg=30.3 T2=24. Vol=252ml. **(Brimstone Pit)** | Butterfield | Bolton |
| R786-HFS-3-0003 | 14.6008 | 144.7753 | 08:31:16 Apr/01/04 | HFS sterivex filter-3. Start1=0831 Stop1=0835. Start2=0837 Stop2=0844. Tmax=29.5 Tavg=19.9 T2=17. Vol=1013 ml. Start3=0913 Stop3=0915. Z=561. Vol=1279 ml. **(Brimstone Pit)** | Butterfield | Bolton |
| R786-GTB-1-0004 | 14.6008 | 144.7753 | 08:34:26 Apr/01/04 | Gas tight bottle-1 fired (HIL #11). Start=0833. T=27.4. Z=561.1. **(Brimstone Pit)** | Lupton | Butterfield / Lilley |
| R786-HFS-4-0005 | 14.6008 | 144.7753 | 08:44:50 Apr/01/04 | HFS piston-4. Start=0845 Stop=0847. Tmax=26.1 Tavg=23.6 +/-2 T2=18. Vol=390ml. Z=561. **(Brimstone Pit)** | Butterfield | Bolton |
| R786-HFS-8-0006 | 14.6008 | 144.7753 | 08:49:07 Apr/01/04 | HFS unfiltered bag-8. Start=0849 Stop=0853. Tmax=27.1 Tavg=23.3 +/-1.6 T2=18. Vol=471ml. Z=561. | Butterfield | Bolton |
| R786-GTB-2-0007 | 14.6008 | 144.7753 | 08:49:52 Apr/01/04 | Fired gas tight bottle-2 (HIL #9). T=26. Z=561. **(Brimstone Pit)** | Lupton | Butterfield / Lilley |
| R786-HFS-11-0008 | 14.6008 | 144.7753 | 08:54:01 Apr/01/04 | HFS filtered bag-11. Start=0854 Stop=0858. Tmax=29.5 Tavg=25.5 +/-2.2 T2=21. Vol=476 ml. Z=561. **(Brimstone Pit)** | Butterfield | |
| R786-HFS-14-0009 | 14.6008 | 144.7753 | 08:59:13 Apr/01/04 | HFS filtered bag-14. Start=0859 Stop=0902. Tmax=29.5 Tavg=24.9+/-2 T2=20. Vol=472 ml. Z=561. **(Brimstone Pit)** | Butterfield | |
| R786-HFS-5-0010 | 14.6008 | 144.7753 | 09:03:33 Apr/01/04 | HFS piston-5. Start=0907 Stop=0912. Tmax=29.4 Tavg=226+/-2.9 T2=18. Vol=518ml. Z=561. **(Brimstone Pit)** | Butterfield | Bolton |
| R786-HFS-9-0011 | 14.6009 | 144.7754 | 10:21:35 Apr/01/04 | HFS unfiltered bag-9. Start=1025 Stop=1029. Tmax=20.8 Tavg=18.9+/-1.5 T2=14. Vol=512ml. Z=541. **(Shimmering Sands)** | Butterfield | Bolton |

| Sample | Lat (N) | Long (E) | Time | R786 Sample Description: NW Rota-1 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R786-HFS-16-0012 | 14.6009 | 144.7754 | 11:08:29 Apr/01/04 | HFS filtered bag-16. Start=1110 Stop=1114. Tmax=75.3 Tavg=71+/-2.4 T2=45. Vol=469 ml. Z=539. **(Shimmering Sands)** | Butterfield | |
| R786-HFS-13-0013 | 14.6009 | 144.7754 | 11:14:41 Apr/01/04 | HFS sterivex filter-13. Start=1116 Stop=1129. Tmax=69.1 Tavg=65.4+/-1.8 T2=42. Vol=1647ml. Z=539. **(Shimmering Sands)** | Butterfield | Bolton |
| R786-GTB-3-0014 | 14.6009 | 144.7754 | 11:23:19 Apr/01/04 | Gas tight bottle-3 (HIL #5). Fired=1125. T=62. Z=539. **(Shimmering Sands)** | Lupton | Butterfield / Lilley |
| R786-HFS-12-0015 | 14.6009 | 144.7754 | 11:30:05 Apr/01/04 | HFS RNA filter-12. Start=1130 Stop=1138. Tmax=66.6 Tavg=65.1+/-0.8 T2=41. Vol=1100ml. Z=539. **(Shimmering Sands)** | Butterfield | Bolton |
| R786-HFS-7-0016 | 14.6009 | 144.7754 | 11:39:32 Apr/01/04 | HFS FISH filter-7. Start=1140 Stop=1143. Tmax=66.8. Tavg=65.4+/-0.9 T2=42. Vol=401ml. Z=539. **(Shimmering Sands)** | Butterfield | |
| R786-HFS-19-0017 | 14.6009 | 144.7754 | 11:44:28 Apr/01/04 | HFS unfiltered bag-19. Start=1145 Stop=1149. Tmax=71.1 Tavg=67.5+/-2.8 T2=44.5. Vol=476ml. Z=539. **(Shimmering Sands)** | Butterfield | Bolton |
| R786-GTB-4-0018a | 14.6009 | 144.7754 | 11:57:29 Apr/01/04 | Gas tight bottle-4 (HIL #12). Fired=1157. T=75.0. Z=538.8. **(Shimmering Sands)** | Lupton | Butterfield / Lilley |
| R786-HFS-20-0018b | 14.6009 | 144.7754 | 11:57:29 Apr/01/04 | HFS piston with filter-20. Start=1157 Stop=1202. Tmax=86 Tavg=79.7+/-4 T2=47. Vol=739ml. Z=539. **(Shimmering Sands)** | Butterfield | |
| R786-HFS-22-0019 | 14.6009 | 144.7754 | 11:57:29 Apr/01/04 | HFS piston-22. Start=1204 Stopped temporarily and moved to reposition. Started again. Stop=1209. Tmax=75.4 Tavg=74.4+/-0.7 T2=50. Vol=548ml. Z=539. **(Shimmering Sands)** | Butterfield | Bolton |
| R786-HFS-18-0021 | 14.6009 | 144.7754 | 12:10:35 Apr/01/04 | HFS filtered bag-18. Start=1211 Stop=1215. Tmax=75.1 Tavg=73.7+/-0.8 T2=50.8. Vol=594ml. Z=539. **(Shimmering Sands)** | Butterfield | |
| R786-RK-0022 | 14.6009 | 144.7754 | 12:42:56 Apr/01/04 | Nice piece of intensely altered white rock at the base of the White Wall site which sits immediately above the shimmering sands diffuse vent site. See specs of yellow sulfur and this white material (alunite?). Sample in purse. Z=533.8. **(White Wall)** | SROF geo team | |
| R786-RK-0023 | 14.6008 | 144.7754 | 13:35:19 Apr/01/04 | Intensely altered rock that sits as a number of pinnacles on top of the ash-covered ridge that surrounds the vent area. It's very white. Acid-altered? Sample in purse. Z=540.1. **(White Wall)** | SROF geo team | |
| R786-SS-J2-0024 | 14.6006 | 144.7774 | 15:31:29 Apr/01/04 | Suction sampling shrimp at base of steep volcanic cliff into jar-2. Z=582.8. **(Fault Shrimp)** | Tunnicliffe | Juniper |
| R786-SS-J5-0025 | 14.6006 | 144.7774 | 15:48:21 Apr/01/04 | Suction sampling a steep bacterial mat covered wall for bacterial mat into jar-5. Z=583.6. **(Fault Shrimp)** | Moyer | |
| R786-SS-J6-0026 | 14.6006 | 144.7774 | 16:00:51 Apr/01/04 | Suction sampling of bacterial mat into jar-6. Z=583.4. **(Fault Shrimp)** | Moyer | |
| R786-SS-J7-0027 | 14.6006 | 144.7774 | 16:05:35 Apr/01/04 | Suction sampling for bacterial mat into jar-7. Z=583.40. **(Fault Shrimp)** | Moyer | |
| R786-SS-J2-0028 | 14.6006 | 144.7774 | 16:51:04 Apr/01/04 | Suctioned a big shrimp into jar-2. [Sample 28 and 29 should have only been one sample - they both went into the same jar.] Z=584.4. **(Fault Shrimp)** | Tunnicliffe | |
| R786-SS-J2-0029 | 14.6006 | 144.7774 | 16:59:39 Apr/01/04 | Suctioned another big shrimp into jar-2. [Sample 28 and 29 should have only been one sample - they both went into the same jar.] Z=584.4. **(Fault Shrimp)** | Tunnicliffe | |
| R786-SS-J8-0030 | 14.6009 | 144.7760 | 17:47:47 Apr/01/04 | Suction sampled a large shrimp in flush jar-8. Z=523.5. **(Gastro)** | Tunnicliffe | |
| R786-Bio/geo-0031 | 14.6008 | 144.7760 | 18:01:39 Apr/01/04 | Volcaniclastic (?) rock sample collected for limpets. At least two limpets on rock. Rock ~20 cm long. Put in purse. Z=523.7. **(Gastro)** | Tunnicliffe | SROF geo team |
| R786-SS-J4-0032 | 14.6010 | 144.7754 | 18:30:13 Apr/01/04 | Suction sample sediment into jar-4. Probe was placed about 3-4 cm into the sediment. Tmax=46. Z=537.6. **(White Wall)** | SROF geo team (Hein) | |
| R786-RK-0033 | 14.6009 | 144.7753 | 18:47:06 Apr/01/04 | Grey altered rock from wall just north of Brimstone Pit. ~20cm in length. One side is less coated than the other. Placed in purse. Z=547.7. **(Brimstone Pit)** | SROF geo team (de Ronde) | |
| R786-net-P-0034 | 14.6008 | 144.7752 | 20:51:31 Apr/01/04 | Nets are open and starting to collect at 0.5 knots. Z=527 m - height above bottom 27 m. Transect lines are running E-W and are about 30 m long. Start=2051 Stop=2125. **(Brimstone Pit)** | Metaxas | |
| R786-net-S-0035 | 14.6008 | 144.7754 | 20:54:42 Apr/01/04 | Nets are open and starting to collect at 0.5 knots. Z=527 - height above bottom 27m. Transect lines are running E-W and are about 30 m long. Start=2051 Stop=2125. **(Brimstone Pit)** | Metaxas | |
| R786-HFS-21-0036 | 14.6010 | 144.7742 | 22:37:06 Apr/01/04 | HFS sterivex filter-21. Start 1037 Stop 1105. Vol=2422ml. Filter for plume background DNA sample. Start ~75m W of the pit on line O-P heading from east to west. Following ~30m above the bottom. Stopped on line Q-R ~100m NW of the pit. Z=562. **(Imagenex Survey)** | Butterfield | Bolton |

| Sample | Lat (N) | Long (E) | Time | R786 Sample Description: NW Rota-1 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R786-HFS-15-0037 | 14.6015 | 144.7747 | 23:06:39 Apr/01/04 | HFS chemistry filter-15 collected on Imagenex line Q-R. Start 1106 Stop 1114. Tmax= 7.7 Tavg=7.4. Small temperature anomaly during sampling. Vol=722ml. Z=519.9. **(Imagenex Survey)** | Butterfield | |
| R786-HFS-17-0038 | 14.6012 | 144.7760 | 23:17:03 Apr/01/04 | HFS filtered bag-17 collected on Imagenex line Q-R heading SE.. Start 1117 Stop 1122. Tmax=7.4 Tavg=7.1. Vol=626ml. Z=501.2. **(Imagenex Survey)** | Butterfield | |
| R786-HFS-10-0039 | 14.6020 | 144.7757 | 23:56:29 Apr/01/04 | HFS RNA filter-10. Filtered for plume background. Taken on Imagenex line S-T heading east to west. Start 1156 Stop 1227. Tmax=7.0 Tavg=6.7. Vol=2635ml. Z=545. **(Imagenex Survey)** | Butterfield | Bolton |

## 7.6 R787 Sample Log: E Diamante

| Sample | Lat (N) | Long (E) | Time | R787 Sample Description: E Diamante | PI | SubSmps |
|---|---|---|---|---|---|---|
| R787-RK-0001 | 15.9434 | 145.6833 | 08:19:38 Apr/03/04 | Rock sample. Triangular cross-section with reddish brown coating. 10cm. Port biobox. Z=457.5. **(near point A0)** | SROF geo group (Stern) | |
| R787-SS-J5-0002 | 15.9433 | 145.6829 | 08:39:39 Apr/03/04 | Suction quite viscous bacterial mat (?) into jar-5. Small Eh decrease so could be low-level venting here. No significant temperature anomaly. Z=456. **(near point A0)** | Moyer | |
| R787-Bio/Geo-0003 | 15.9433 | 145.6827 | 09:20:34 Apr/03/04 | Barnacle-covered rock from area of diffuse venting and bacterial mat. Stbd biobox. Z=457. **(Barnacle Beach)** | Tunnicliffe | Juniper |
| R787-Bio/Geo-0004 | 15.9433 | 145.6828 | 09:23:53 Apr/03/04 | Another barnacle-covered baseball-sized rock from this area of diffuse venting and bacterial mat. Stbd biobox. Z=457. **(Barnacle Beach)** | Tunnicliffe | Juniper |
| R787-Bio/Geo-0005 | 15.9433 | 145.6828 | 09:40:31 Apr/03/04 | Barnacles on rock. Into stbd biobox. Z=457. **(Barnacle Beach)** | Tunnicliffe | |
| R787-Bio/Geo-0006 | 15.9433 | 145.6828 | 09:43:52 Apr/03/04 | Rock with small barnacles and gastropods. Stbd biobox. Z=457. **(Barnacle Beach)** | Tunnicliffe | SROF geo team |
| R787-SS-J6-0007 | 15.9433 | 145.6828 | 10:25:09 Apr/03/04 | Suction sample of filamentous mat into jar-6. Sampled from a manganese oxide-stained altered lava. Z=457. **(Barnacle Beach)** | Moyer | |
| R787-SS-J7-0008 | 15.9434 | 145.6828 | 10:49:42 Apr/03/04 | Suction sampling filamentous microbial mat into jar-7. Some biology also made its way into the jar. Z=457. **(Barnacle Beach)** | Moyer | |
| R787-RK-0009 | 15.9410 | 145.6806 | 12:15:30 Apr/03/04 | Altered volcaniclastic rock with basket star. Rock is about 20cm - long triangular. Placed in the boot. Z=319. **(Basket Case)** | SROF geo group (Stern) | |
| R787-RK-0010 | 15.9425 | 145.6807 | 12:44:22 Apr/03/04 | Rock - approximately 10cm in diameter. Has a small coral on it. Placed it in the boot. Z=338. | SROF geo team (Stern) | |
| R787-RK-0011 | 15.9425 | 145.6807 | 12:48:41 Apr/03/04 | Another rock (~ 10cm) which is fresher and darker than previous sample. In the boot. Z=338. | SROF geo team (Stern) | |
| R787-SF-0012 | 15.9429 | 145.6817 | 13:26:45 Apr/03/04 | Piece of sulfide chimney ~2m high and ~10cm wide at the top. Looks fairly old with manganese coating on the outside. Port biobox. Z=379. **(Diamante Chimney)** | SROF geo group (de Ronde) | |
| R787-SF-0013 | 15.9427 | 145.6814 | 14:03:13 Apr/03/04 | Triplet of chimney tops from the most intense flow we have seen in the area. Chimney named Black Diamante (?) – then re-named Diamante Chimney. ~ 25cm wide before it went into the port biobox but broke. Z=344. **(Diamante Chimney)** | SROF geo team (de Ronde) | |
| R787-Bio-0014 | 15.9427 | 145.6814 | 14:32:37 Apr/03/04 | Suctioned one spiny snail with the sampler and placed it in the biobox. Near Don Ho (Bubbles). *[Verena logged samples R787-0014 thru R787-0020 as one sample bio-14].* Z=349. **(Diamante Chimney base)** | Tunnicliffe | Juniper |
| R787-Bio-0015 | 15.9427 | 145.6814 | 14:35:30 Apr/03/04 | Another snail suctioned into the biobox. Z=349. Near Don Ho. **(Diamante Chimney base)** | Tunnicliffe | |
| R787-Bio-0016 | 15.9427 | 145.6814 | 14:37:56 Apr/03/04 | Two snails in one suction! One spiny and one smooth. Z=349. Near Don Ho (Bubbles). **(Diamante Chimney base)** | Tunnicliffe | |
| R787-Bio-0017 | 15.9427 | 145.6814 | 14:40:23 Apr/03/04 | Another smooth snail. Z=349. Near Don Ho (Bubbles). **(Diamante Chimney base)** | Tunnicliffe | |
| R787-Bio-0018 | 15.9427 | 145.6814 | 14:42:53 Apr/03/04 | Two snails. Z=349. Near Don Ho (Bubbles). **(Diamante Chimney base)** | Tunnicliffe | |
| R787-Bio-0019 | 15.9427 | 145.6814 | 14:45:07 Apr/03/04 | One more snail. Z=349. Near Don Ho (Bubbles). **(Diamante Chimney base)** | Tunnicliffe | |
| R787-Bio-0020 | 15.9427 | 145.6814 | 14:47:14 Apr/03/04 | Another snail. Z=349. Near Don Ho (Bubbles). **(Diamante Chimney base)** | Tunnicliffe | |
| R787-J3-0021 | 15.9427 | 145.6814 | 15:00:08 Apr/03/04 | Suction sampling white organic material from around the snails into jar-3. Start=1503 Stop=1507. Z=349. Near Don Ho (Bubbles) **(Diamante Chimney base)** | Juniper | Tunnicliffe |

| Sample | Lat (N) | Long (E) | Time | R787 Sample Description: E Diamante | PI | SubSmps |
|---|---|---|---|---|---|---|
| R787-SF-0022 | 15.9426 | 145.6812 | 15:42:12 Apr/03/04 | Sulfide sample from extinct chimney. 20cm long and 10cm wide - cone shaped. Weathered knarly and probably pyrite marcasite chimney that is mostly infilled in the center. Some manganese coating and yellow stain. Put into boot. Z=274. **(Black Forest)** | SROF geo team (de Ronde) | |
| R787-SS-JJ2-0023 | 15.9423 | 145.6799 | 18:59:56 Apr/03/04 | Suction sample of sediments into jar-J2 (at position 4). Still circling the cone on the NE side of the caldera. Z=349. **(Black Forest)** | Juniper | |
| R787-net-P-0024 | 15.9424 | 145.6817 | 19:35:43 Apr/03/04 | Port plankton tow directly over Black Forest chimney field. ROPOS drove back and f orth over the vents for 30 minutes. (35m above the bottom - though the vents are at 345-350m). Start 1935 Stop 2012. Z=320. **(Black Forest)** | Metaxas | |
| R787-MP-0025 | 15.9427 | 145.6818 | 19:40:33 Apr/03/04 | Stbd McLane pump sample taken during plankton sample over Diamante Forest chimney field. ROPOS drove back and forth over the vents for 30 minutes. (35m above the bottom - though the vents are at 345-350m). Start 1935 Stop 2012. Vol=150 liters. Z=320. **(Black Forest)** | Juniper | |
| R787-SS-J2-0026 | 15.9396 | 145.6759 | 21:12:42 Apr/03/04 | Suctioning snails into jar-2. Sampled 4-5 snails and 3 sponges. Snails sitting on Mn coated lava blocks. Z=278. **(middle cone)** | Juniper | Tunnicliffe |
| R787-SS-J8-0027 | 15.9390 | 145.6759 | 21:49:29 Apr/03/04 | Suction sampled 2 white crabs and several limpets into jar-8. Eh is now -88mV. Z=267. **(Boulder Vent)** | Juniper | Tunnicliffe |
| R787-Bio/Geo-0028 | 15.9387 | 145.6742 | 22:37:17 Apr/03/04 | Rock with biota including green and red algae. The fact that the algae are this deep is quite a surprise. Rock about 15-20cm. Stbd biobox. Z=179.2. **(Aquarium)** | Tunnicliffe | SROF geo team |
| R787-SS-J1-0029 | 15.9384 | 145.6739 | 23:21:12 Apr/03/04 | Suction sample attempt at a basket star into jar-1. Seems we only got the legs and surrounding particulates. Z=170. **(Bio Summit-1).** | Juniper | |
| R787-Bio/Geo-0030 | 15.9388 | 145.6749 | 23:41:59 Apr/03/04 | Sampling a rock covered with a bluish-white bacterial mat. Large sample intro stbd biobox. Z=206. **(central cone area just E of summit)** | Juniper | |
| R787-net-S-00031 | 15.9424 | 145.6817 | 19:35:43 Apr/03/04 | Stbd plankton tow directly over Black Forest chimney field. ROPOS drove back and forth over the vents for 30 minutes. (35 m above the bottom - though the vents are at 345-350m). Start 1935 Stop 2012. [sample # out of order] Z=320. **(Black Forest)** | Metaxas | |

## 7.7 R788 Sample Log: E Diamante

| Sample | Lat (N) | Long (E) | Time | R788 Sample Description: E Diamante | PI | SubSmps |
|---|---|---|---|---|---|---|
| R788-HFS-1-0001 | 15.9433 | 145.6828 | 13:18:14 Apr/04/04 | HFS filter-1. Start=13:18 Stop=13:22. Tmax=13.7 Tavg=13.6 (sd=0.08) T2=12.1. Vol=528ml. Z=457. **(Barnacle Beach)** | Butterfield | |
| R788-HFS-2-0002 | 15.9433 | 145.6828 | 13:23:26 Apr/04/04 | HFS FISH filter-2. Start=13:23 Stop=13:25. Tmax=13.8 Tavg=13.8 (sd=0.05) T2=12.1. Vol=300ml. Z=457 m. **(Barnacle Beach)** | Butterfield | Bolton |
| R788-HFS-4-0003 | 15.9433 | 145.6828 | 13:26:25 Apr/04/04 | HFS piston-4. Start=13.26 Stop=13:32. Tmax=13.8 Tavg=13.8 (sd=0.00) T2= 12.2. Vol= 704ml. Z=457. **(Barnacle Beach)** | Butterfield | Bolton |
| R788-HFS-3-0004 | 15.9433 | 145.6828 | 13:33:20 Apr/04/04 | HFS sterivex filter-3. Start=13:33 Stop=13:45. Tmax=13.7 Tavg=13.6 (sd=0.1). T2=12.0. Vol=1604ml. Z=457 m. **(Barnacle Beach)** | Butterfield | Bolton |
| R788-HFS-11-0005 | 15.9433 | 145.6828 | 13:47:17 Apr/04/04 | HFS filtered bag-11. Start=13:47 Stop=13:52. Tmax=13.7 Tavg=13.7 (sd=0.05) T2=12.0. Vol=693ml. Z=457. **(Barnacle Beach)** | Butterfield | |
| R788-HFS-10-0006 | 15.9433 | 145.6828 | 13:52:55 Apr/04/04 | HFS RNA filter-10. Start=13:56 Stop=14:09. Tmax=13.6 Tavg=12.6 (sd=0.6) T2=11.5. Vol=1744ml. Z=457. **(Barnacle Beach)** | Butterfield | Bolton |
| R788-HFS-8-0007 | 15.9427 | 145.6814 | 15:39:51 Apr/04/04 | HFS unfiltered bag-8. Start=15:40 Stop=15:43. Tmax=223.5 Tavg=220.6 T2=110. Vol=481ml. Sampling probe moved out of vent orifice - sampling stopped then. Pump stopped as soon as temperature dropped. Z=341.7. **(5 Towers)** | Butterfield | Bolton |
| R788-GTB-1-0008 | 15.9427 | 145.6814 | 15:42:07 Apr/04/04 | Gastight bottle-1 (HIL #9) fired at 15:42. T=223. Z=341.7. At the black smoker **(5 Towers)** | Lupton | Butterfield / Lilley |
| R788-HFS-14-0009 | 15.9427 | 145.6814 | 15:51:39 Apr/04/04 | HFS filtered bag-14. Start=15.51 Stop=15:56. Tmax=223.5 Tavg=222 T2=107. Vol=663ml. Z=341. **(5 Towers)** | Butterfield | |
| R788-GTB-2-0010 | 15.9427 | 145.6813 | 15:52:21 Apr/04/04 | Gastight bottle-2 (HIL #12) fired at 15:52. T=222. Z=342m. **(5 Towers)** | Lupton | Butterfield / Lilley |
| R788-HFS-18-0011 | 15.9427 | 145.6814 | 15:58:23 Apr/04/04 | HFS filtered bag-18. Start1= 5:58 Stop1=15:59. Start2=16:07 Stop2=16:10. Tmax=220 Tavg=215 T2=101. Vol= 505ml. Came off chimney and stopped sampling. Repositioned and started sampling again. Z=341.7m. **(5 Towers)** | Butterfield | |
| R788-HFS-22-0012 | 15.9427 | 145.6814 | 16:12:34 Apr/04/04 | HFS piston-22. Start=16:13 Stop=16:16. Tmax=201.8 Tavg=196.8(+/- 2.4) T2=98. Vol=557ml. Z=341.7m. **(5 Towers)** | Butterfield | Bolton |

| Sample | Lat (N) | Long (E) | Time | R788 Sample Description: E Diamante | PI | SubSmps |
|---|---|---|---|---|---|---|
| R788-SS-J5-0013 | 15.9426 | 145.6814 | 16:36:52 Apr/04/04 | Suction sampling of bacterial mat into jar-5 - on the flank of the chimney. Z=344.1. **(5 Towers)** | Moyer | |
| R788-SS-J6-0014 | 15.9426 | 145.6814 | 17:55:08 Apr/04/04 | Suction sample of yellow (?) bacterial mat into jar-6. The mat is growing on a chimney. Z=346.8. **(Base of 5 towers)** | Moyer | |
| R788-HFS-9-0015 | 15.9427 | 145.6814 | 18:19:32 Apr/04/04 | HFS unfiltered bag-9. Start=1819 Stop=1824. Tmax=239.4 Tavg=239.0 T2=100. Vol=684ml. Z=345m. **(Diamante Chimney)** | Butterfield | Bolton |
| R788-GTB-3-0016 | 15.9427 | 145.6814 | 18:22:37 Apr/04/04 | Gas tight bottle-3 (HIL #7). Fired at 1825. T=238.9. Z=345m. **(Diamante Chimney)** | Lupton | Butterfield / Lilley |
| R788-HFS-16-0017 | 15.9427 | 145.6814 | 18:25:51 Apr/04/04 | HFS filtered bag-16. Start=1826 Stop=1829. Tmax=238.9. Tavg=238.8 T2=95. Vol=461ml. Z=345. Pump stopped itself during sampling. **(Diamante Chimney)** | Butterfield | |
| R788-GTB-4-0018 | 15.9427 | 145.6814 | 18:26:41 Apr/04/04 | Gas tight bottle-4 (HIL #2) at 1826. T=238.8. Z=345. **(Diamante Chimney)** | Lupton | Butterfield / Lilley |
| R788-HFS-17-0019 | 15.9427 | 145.6814 | 18:30:12 Apr/04/04 | HFS filtered bag-17. Start=1830 Stop=1834. Tmax=239.4 Tavg=239.1 T2=100. Vol=484ml. Z=345m. **(Diamante Chimney)** | Butterfield | |
| R788-HFS-24-0020 | 15.9427 | 145.6814 | 18:35:14 Apr/04/04 | HFS piston-24. Start=1837 Stop=1841. Tmax=239.4 Tavg=231.6 T2=100. Vol=495ml. Intake pulled out of the flow at the end of sampling. Z=345m. **(Diamante Chimney)** | Butterfield | Bolton |
| R788-SF-0021 | 15.9426 | 145.6814 | 19:38:03 Apr/04/04 | A few bits of the large chimney we broke off the top of 5 Towers made it into the purse. The material was too fragile so the whole piece did not make it. Z=~343.8. **(5 Towers)** | SROF geo team (de Ronde/Hein) | |
| R788-SF-0022 | 15.9427 | 145.6814 | 19:44:54 Apr/04/04 | Upper part (~20 cm) of active sulfide/sulfate chimney located about 5m up the side of 5 Towers chimney in the Black Forest vent field. Into the purse. Z=344.7. **(5 Towers)** | SROF geo team (de Ronde/Hein) | |
| R788-net-P-0023 | 15.9426 | 145.6814 | 19:49:46 Apr/04/04 | Port plankton tow over Black Forest vent field. Auto depth at 340m and staying 2-3 meters above the chimneys. Speed is 0.75 knots. Nets open at 1950. Nets closed at 2020. **(Black Forest)** | Metaxas | |
| R788-net-S-0024 | 15.9426 | 145.6814 | 19:53:08 Apr/04/04 | Stbd plankton tow over Black Forest vent field. Auto depth at 340m and staying 2-3 meters above the chimneys. Speed 0.75 knots. Nets open at 1950. Nets closed at 2020. **(Black Forest)** | Metaxas | |
| R788-SS-J3-0025 | 15.9395 | 145.6761 | 22:01:16 Apr/04/04 | Suctioning snails and mat into jar-3. Start 2200 Stop 2217. Final sample was light-white mat and a few snails. Z=288**. (Fe-Mn Crust)** | Juniper | Tunnicliffe |
| R788-SS-J1-0026 | 15.9393 | 145.6759 | 22:36:39 Apr/04/04 | Suction sponges and red snails into jar-1. (~10 snails in a 20x20cm area). Sampled ~10 sponges. Sponges are rare at hydrothermal vents. They could possibly have symbionts. Start 2237 Stop 1040. Z=274. **(Intense Diffuse)** | Tunnicliffe | |
| R788-bio/geo-0027 | 15.9388 | 145.6758 | 23:03:34 Apr/04/04 | Dacite sample covered with limpets. Eh is down to -200. Sample taken just south of floc storm target. Into the purse. Z=247.1. **(Central cone)** | Tunnicliffe | Juniper / Metaxas |
| R788-SS-J2-0028 | 15.9388 | 145.6758 | 23:14:45 Apr/04/04 | Suctioning small white crabs (at least 5) - with little black eyes and tuffs on their claws apparently used for harvesting bacteria. Sample into jar-2. Z=247.1. **(Central cone)** | Juniper | Tunnicliffe |
| R788-SS-J4-0029 | 15.9388 | 145.6758 | 23:26:34 Apr/04/04 | Suctioning rock surface for bacterial mat into jar-4. Mat is rather sparse on the rock. Limpets also collected. Z=247.2. **(Central cone)** | Juniper | |
| R788-SS-J7-0030 | 15.9387 | 145.6753 | 00:00:19 Apr/05/04 | Suction sample of white filamentous bacterial mats into jar-7. Z=206.1. **(Central cone)** | Moyer | |
| R788-Bio-0031 | 15.9433 | 145.6828 | 03:41:00 Apr/05/04 | 2004-04-05 03:41 Crab trap recovered from Barnacle Beach. There were 3 crabs in the trap when it left the bottom. 2004-04-05 03:50 Suction fluid sample for background water on the way up. **(above Barnacle Beach)** | Tunnicliffe | |

## 7.8 R789 Sample Log: Maug

| Sample | Lat (N) | Long (E) | Time | R789 Sample Description: Maug | PI | SubSmps |
|---|---|---|---|---|---|---|
| R789-water-0001 | 20.0223 | 145.2167 | 07:58:00 Apr/07/04 | Collecting a water sample during the testing of Tunnicliffe's new water sampler. Z=226. **(west of main central cone)** | Tunnicliffe | Butterfield |
| R789-RK-0002 | 20.0228 | 145.2172 | 08:23:00 Apr/07/04 | A greenish-yellow rock with one fresh surface. ~ 10cm. Port biobox. Z=212m. | SROF geo team (Stern) | |
| R789-RK-0003 | 20.0236 | 145.2181 | 09:13:01 Apr/07/04 | Nebraska-shaped rock ~20-25cm long. Port biobox. Z=194. **(near Wall Base)** | SROF geo team (Stern) | |
| R789-RK-0004 | 20.0213 | 145.2183 | 13:44:22 Apr/07/04 | Rock ~15cm with unidentifiable white material on it. Port biobox. Z=203. | SROF geo team (Stern) | |

| Sample | Lat (N) | Long (E) | Time | R789 Sample Description: Maug | PI | SubSmps |
|---|---|---|---|---|---|---|
| R789-SS-J5-0005 | 20.0201 | 145.2218 | 16:31:05 Apr/07/04 | Suction sample of yellow bacterial mat from the face of an outcrop into jar-5 - the filter is fairly clogged. Material is very easily disturbed. Start=1631 Stop=1635. Z=149. **(Egg Drop Soup)** | Moyer | |
| R789-RK-0006 | 20.0233 | 145.2228 | 19:46:27 Apr/07/04 | Sampled rock at diffuse venting site. Placed in the boot. Z=149. **(Egg White Springs)** | SROF geo team | |
| R789-RK-0007 | 20.0237 | 145.2220 | 20:36:30 Apr/07/04 | Rock sample - reddish-brown. ~12-15cm and covered with bluish-white bacterial mat. Eh+13mV. Largest sample in the boot. Z=143. **(Egg Salad)** | SROF geo team (Stern) | |

## 7.9 R790 Sample Log: Maug

| Sample | Lat (N) | Long (E) | Time | R790 Sample Description: Maug | PI | SubSmps |
|---|---|---|---|---|---|---|
| R790-HFS-8-0001 | 20.0235 | 145.2227 | 03:57:04 Apr/08/04 | HFS unfiltered bag-8. Start=0359 Stop=0404. Tmax=24.4 Tavg=24.0 T2=23.8. Vol=603ml. NE side of central cone - downslope from talus vents. Z=153.1. **(Egg Foo Young)** | Butterfield | |
| R790-GTB-1-0002 | 20.0235 | 145.2227 | 04:02:08 Apr/08/04 | Gas tight bottle-1 (HIL GTB 9) from same vent as first sample. T=23.7C - ambient is 23C. NE side of dome. Z=153.2. **(Talus)** | Lupton | Butterfield / Lilley |
| R790-HFS-9-0003 | 20.0234 | 145.2226 | 04:27:14 Apr/08/04 | HFS unfiltered bag-9 taken from vertical crack. Start=0436 Stop=0441. T1max =7.4 Tavg=27.0 T2=26.2. Vol=672ml. Z=144.5. **(Cave)** | Butterfield | |
| R790-GTB-2-0004 | 20.0234 | 145.2226 | 04:40:05 Apr/08/04 | Gas tight bottle-2 (HIL GTB 5). T=27.4. Z=144.5. **(Cave)** | Lupton | Butterfield / Lilley |
| R790-HFS-11-0005 | 20.0234 | 145.2226 | 04:43:06 Apr/08/04 | HFS filtered bag-11. Start=0442 Stop 0446. Eh=80. T1 & Tmax are bad. Tavg=28. Vol=560ml. Z=144.4. **(Cave) Problem with sampler - the rest of the samples will not have T1 and Tmax.** | Butterfield | |
| R790-HFS-14-0006 | 20.0234 | 145.2226 | 04:53:09 Apr/08/04 | HFS filtered bag-14. Start=0457 Stop=0500. Sampler might be leaking. Background T=23.2. T2=26.2. Vol=410ml. Z=144.2. **(Cave)** | Butterfield | |
| R790-GTB-3-0007 | 20.0234 | 145.2226 | 05:02:45 Apr/08/04 | Gas tight bottle-3 (HIL GTB 11). Same position as HFS-14-0006. T=25.8. Z=144.5. **(Cave)** | Lupton | Butterfield / Lilley |
| R790-HFS-13-0008 | 20.0234 | 145.2226 | 05:11:11 Apr/08/04 | HFS sterivex DNA filter-13. Start=0509 Stop=0517. T2=26.2. Vol=1001ml. Z=144.7. **(Cave)** | Butterfield | Bolton |
| R790-HFS-7-0009 | 20.0234 | 145.2226 | 05:18:36 Apr/08/04 | HFS FISH filter-7. Start=0518 Stop=0520. T2=26.2. Vol=290ml. Z=144.8. **(Cave)** | Butterfield | Bolton |
| R790-HFS-19-0010 | 20.0234 | 145.2226 | 05:22:14 Apr/08/04 | HFS unfiltered bag-19. Start=0522 Stop=0527. T2=26.2. Vol=635ml. Z=144.7. **(Cave)** | Butterfield | |
| R790-HFS-18-0011 | 20.0234 | 145.2226 | 05:28:09 Apr/08/04 | HFS filtered bag-18. Start=0527 Stop=0531. T2=26.2. Vol=667ml. Z=144.7. **(Cave)** | Butterfield | |
| R790-HFS-12-0012 | 20.0234 | 145.2226 | 05:32:40 Apr/08/04 | HFS RNA filter-12. Start=0532 Stop=0542. Background T=23.2 T2=26.2. Vol=1201ml. Z=144.7. **(Cave)** | Butterfield | Bolton |
| R790-RK-0013 | 20.0234 | 145.2226 | 05:42:59 Apr/08/04 | Rock sample from talus slope. 20cm. Wedge shape. Z=144.1. **(Cave)** | SROF geo team (Stern) | |
| R790-SS-J5-0014 | 20.0234 | 145.2226 | 06:13:38 Apr/08/04 | Suction sample of white filamentous bacteria into jar-5. Z=143.3. Subsample: snails. **(Cave)** | Moyer | Tunnicliffe |
| R790-SS-J6-0015 | 20.0234 | 145.2226 | 06:14:41 Apr/08/04 | Suction sample of white filamentous bacterial mat into jar-6. Start 0625 Stop 0629. Temperature probe not working. Not much of a sample. Z=142 **(Cave)** | Moyer | |
| R790-GTB-4-0016 | 20.0219 | 145.2229 | 07:11:00 Apr/08/04 | Gat tight bottle-4 (HIL-12) collected on ascent. Z=66. Seawater sample. | Lupton | Butterfield / Lilley |

## 7.10 R791 Sample Log: NW Eifuku

| Sample | Lat (N) | Long (E) | Time | R791 Sample Description: NW Eifuku | PI | SubSmps |
|---|---|---|---|---|---|---|
| R791-RK-0001 | 21.4895 | 144.0393 | 04:32:58 Apr/09/04 | Rock with glassy coating and possible phenocrysts. Placed into purse. Z=1702. **(near point B)** | SROF geo team (Stern) | |
| R791-SS-J5-0002 | 21.4888 | 144.0406 | 05:29:34 Apr/09/04 | Suction sample into jar-5. Yellow bacterial mat. Polysaccharide-microbial byproduct (bacterial mucus with cells). Start 0530 Stop 0545. Eh=83mV. Z=1716. **(Bacterial Balls)** | Moyer | |
| R791-SS-J6-0003 | 21.4889 | 144.0406 | 06:02:17 Apr/09/04 | Suction sample of yellow bacterial mat into jar-6. Eh=13mV. Mat is up to 2-3 cm thick in places. Z=1715. **(Bacterial Balls)** | Moyer | |
| R791-SS-J8-0004 | 21.4888 | 144.0406 | 06:13:44 Apr/09/04 | Suction sample into jar-8 of bacterial mat and bits of crust - likely Fe mineralization of the mat. Z=1715. **(Bacterial Balls)** | Moyer | Hein |
| R791-SS-J7-0005 | 21.4884 | 144.0404 | 06:27:51 Apr/09/04 | Suction thick layer (5+ cm) of bacterial mat into jar-7. T anomaly=1.3C. On a knife-like ridge a few meters wide. Eh=51mV - higher than previous mat sample. Z=1674. **(Yellow Top)** | Moyer | |

| Sample | Lat (N) | Long (E) | Time | R791 Sample Description: NW Eifuku | PI | SubSmps |
|---|---|---|---|---|---|---|
| R791-Bio-0006 | 21.4878 | 144.0414 | 07:41:53 Apr/09/04 | Collecting 3 mussels. Into the purse. Eh=-62mV. Z=1597. **(More Mussels)** | Tunnicliffe | |
| R791-HFS-8-0007 | 21.4876 | 144.0408 | 08:26:08 Apr/09/04 | HFS unfiltered bag-8. Start=0826 Stop=0829. Tmax=13.5 Tavg=12.5 (sd=0.5) T2=8. Vol=127ml. The pumps stopped on their own. Start2=0841 Stop2=0845. Tmax=13.5 Tavg=10.6 (sd=0.7) T2=8. Vol-collected=642ml. Vol-recovered=100ml. Z=1643. **(Icefall)** | Butterfield | |
| R791-GTB-1-0008 | 21.4876 | 144.0407 | 08:40:47 Apr/09/04 | Gas tight bottle-1 (HIL GTB 2). Fired=0841. T=10.9 T2=8.0. It seems like it snagged and did not retreat all the way back. Z=1643. **(Icefall)** | Lupton | Butterfield / Lilley |
| R791-HFS-3-0009 | 21.4877 | 144.0407 | 08:46:32 Apr/09/04 | HFS sterivex filter-3. Start=0847 Stop=0906. Tmax=15.0 Tavg=12.1 (sd=1.45) T2=9.0. Vol=1809ml. Z=1643. **(Icefall)** | Butterfield | Bolton |
| R791-RK-0010 | 21.4869 | 144.0413 | 09:58:14 Apr/09/04 | Rock - friable brown; grey and red coating. Rectangular shape. In the purse. The structure is multiphased. Z=1605. **(Top Tower)** | SROF geo team (Hein) | |
| R791-SS-J1-0011 | 21.4868 | 144.0412 | 10:06:04 Apr/09/04 | Suction sample of the grey and orange matrix into jar-1. The orange matrix may be old bacterial mat. Also 2 shrimp; 5 galatheids; 2 mussels; 1 polynoid; possibly 4 snails. Z=1604. **(Top Tower)** | SROF geo team (Hein) | Juniper |
| R791-HFS-9-0012 | 21.4876 | 144.0414 | 11:14:34 Apr/09/04 | HFS unfiltered bag-9. Start=1114 Stop=1119. Tmax=88 Tavg=83.5 (sd=6) T2=10. Vol-collected=205ml. [Broke in the cylinder; compromised sample] Z=1607. **(Champagne)** | Butterfield | Bolton |
| R791-GTB-4-0013 | 21.4876 | 144.0414 | 11:14:34 Apr/09/04 | Gas tight bottle-4 (HIL GTB 11). Fired=1114. T=99 T2=58. Z=1607. **(Champagne)** | Lupton | Butterfield / Lilley |
| R791-HFS-11-0014 | 21.4877 | 144.0413 | 11:20:11 Apr/09/04 | HFS bag-11. Start=1120 Stop=1123. Tmax=101.3 Tavg=99.7 (sd=0.9) T2=59. Vol-collected=209ml. Z=1607. [cylinder exploded; sample lost] **(Champagne)** | Butterfield | |
| R791-GTB-2-0015 | 21.4876 | 144.0413 | 11:23:33 Apr/09/04 | Gas tight bottle-2 (HIL GTB 7). Fired=11:24. T1=100 T2=59. Z=1607. **(Champagne)** | Lupton | Butterfield / Lilley |
| R791-HFS-14-0016 | 21.4876 | 144.0414 | 11:23:58 Apr/09/04 | HFS bag-14. Start=1125 Stop=1127. Tmax=101.3 Tavg=100.7 (sd=0.45) T2=59. Vol-collected=221ml. Z=1607. [cylinder exploded; sample lost] **(Champagne)** | Butterfield | |
| R791-HFS-20-0017 | 21.4876 | 144.0415 | 11:27:39 Apr/09/04 | HFS filtered piston-20. Start=1128 Stop=1130. Tmax=104 Tavg=103.5 (sd=0.4) T2=59. Vol-collected=254ml. Z=1607. [unknown problem; no sample] **(Champagne)** | Butterfield | |
| R791-HFS-15-0018 | 21.4876 | 144.0415 | 11:31:35 Apr/09/04 | HFS chemistry filter-15. Start=1132 Stop=1136. Tmax=105.9. Tavg=103.1 (sd=1.0) T2=58. Vol=442ml. Z=1607. **(Champagne)** | Butterfield | |
| R791-GTB-3-0019 | 21.4875 | 144.0415 | 11:33:47 Apr/09/04 | Gas tight bottle-3 (HIL GTB 9). T=105.9. Fired=1135. Z=1607. **(Champagne)** | Lupton | Butterfield / Lilley |
| R791-HFS-13-0020 | 21.4876 | 144.0415 | 11:37:05 Apr/09/04 | HFS sterivex filter-13. Start=1137 Stop=1145. Tmax=103 Tavg=102 (sd=0.6) T2=59. Vol=1000ml. Z=1607. **(Champagne)** | Butterfield | Bolton |
| R791-HFS-7-0021 | 21.4876 | 144.0415 | 11:46:42 Apr/09/04 | HFS FISH filter-7. Start=1147 Stop=1149. Tmax=103.5 Tavg=103 (sd=0.3) T2=57. Vol=249ml. Z=1607. **(Champagne)** | Butterfield | Bolton |
| R791-HFS-4-0022 | 21.4876 | 144.0414 | 11:50:06 Apr/09/04 | HFS unfiltered piston-4. Start=1150 Stop=1152. Tmax=103.9 Tavg=102.8 (sd=0.8) T2=49. Vol-collected=230ml. Z=1607. [aprox. 100ml recovered with 200ml gas] **(Champagne)** | Butterfield | Bolton |
| R791-HFS-1-0023 | 21.4876 | 144.0416 | 11:54:20 Apr/09/04 | HFS chemistry filter-1. Start=1154 Stop=1158. Tmax=103.7 Tavg=102.6 (sd=0.5) T2=25. Vol=366ml. Z=1607. **(Champagne)** | Butterfield | |
| R791-SS-J2-0024 | 21.4876 | 144.0414 | 12:37:15 Apr/09/04 | Suctioning fauna into jar-2: 6 shrimp; 2 scale worms; 5 limpets; 5-6 Provannid snails. Z=1608. **(Champagne)** | Juniper | Tunnicliffe |
| R791-SS-J3-0025 | 21.4876 | 144.0415 | 13:10:05 Apr/09/04 | Suction sample into jar-3. Particulate debris from the rock surface rather than on the gravely sediment substrate between the rocks. From 3 different rocks. Z=1609. **(Champagne)** | Juniper | |
| R791-Bio-0026 | 21.4875 | 144.0417 | 13:55:01 Apr/09/04 | Mussel that had the foot exposed was sampled and will be placed in the purse. Z=1608. **(Champagne)** | Tunnicliffe | |
| R791-SS-J4-0027 | 21.4876 | 144.0415 | 14:15:29 Apr/09/04 | Suction sample into jar-4. White-yellowish material seen on a flange. Small pieces going into suction tube. **(Champagne)** | Juniper | de Ronde |
| R791-HFS-24-0028 | 21.4876 | 144.0416 | 14:41:12 Apr/09/04 | HFS unfiltered piston-24. Start=1440 Stop=1441. Tmax=88.8 Tavg=76.5 T2=30. Vol=227ml. Z=1607. **(Champagne-2)** | Butterfield | |
| R791-HFS-19-0029 | 21.4877 | 144.0418 | 16:01:31 Apr/09/04 | HFS unfiltered bag-19. Start1=1601 Stop1=1602. Start2=1602 Stop2=1605. Tmax=71.4. Tavg=71.4 (sd=.06) T2=42. Vol-collected=351ml. Z=1574.5. [no sample recovered] **(Cliff House)** | Butterfield | Bolton |
| R791-HFS-18-0030 | 21.4876 | 144.0419 | 16:06:50 Apr/09/04 | HFS unfiltered bag-18. Start=1607 Stop=1610. Tmax=71.5 Tavg=71.4 sd=0.04) T2=42.8. Vol-collected=361ml. Z=1574.5. [bag broken but recovered some water] **(Cliff House)** | Butterfield | |
| R791-HFS-22-0031 | 21.4878 | 144.0418 | 16:12:22 Apr/09/04 | HFS unfiltered pistion-22. Start=1612 Stop=1616. Tmax=71.7 Tavg=71.5 (sd=0.15). Vol-collected=398ml. Z=1574.5. [recovered 100 ml] **(Cliff House)** | Butterfield | |

| Sample | Lat (N) | Long (E) | Time | R791 Sample Description: NW Eifuku | PI | SubSmps |
|---|---|---|---|---|---|---|
| R791-HFS-17-0032 | 21.4877 | 144.0419 | 16:18:16 Apr/09/04 | HFS filtered bag-17. Start=1618 Stop=1622. Tmax=71.3 Tavg=70.4 (sd=0.75). Vol-collected=367ml. Z=1574.4. [recovered 100ml sample] **(Cliff House)** | Butterfield | |
| R791-HFS-21-0033 | 21.4877 | 144.0418 | 16:22:43 Apr/09/04 | HFS sterivex filter-21. Start=1623 Stop=1642. Tmax=71.7 Tavg=70.8 (sd=0.8). Eh=-174mV. Vol=2032ml. Z=1574.5. **(Cliff House)** | Butterfield | Bolton |
| R791-HFS-2-0034 | 21.4877 | 144.0419 | 16:43:47 Apr/09/04 | HFS FISH filter-2. Start=1643 Stop=1647. Tmax=71.9 Tavg=71.7. Vol=476ml. Z=1574. **(Cliff House)** | Butterfield | Bolton |
| R791-HFS-10-0035 | 21.4878 | 144.0418 | 16:48:58 Apr/09/04 | HFS RNA filter-10. Start=1650 Stop=1659. Tmax=71.8 T2=42.7. Vol=1006ml. Z=1574. **(Cliff House)** | Butterfield | Bolton |
| R791-net-P-0036 | 21.4880 | 144.0416 | 18:37:41 Apr/09/04 | Plankton tow over Mussel Cliff and Mussel Mound. Flying just above the bottom over the mussel beds. Nets open at 18:39. Nets closed at 19:19. **(Mussel Mound area)** | Metaxas | |
| R791-net-S-0037 | 21.4878 | 144.0416 | 18:40:56 Apr/09/04 | Plankton tow over Mussel Cliff and Mussel Mound. Flying just above the bottom over the mussel beds. Nets open at 18:39. Nets closed at 19:19. **(Mussel Mound area)** | Metaxas | |

## 7.11 R792 Sample Log: NW Eifuku

| Sample | Lat (N) | Long (E) | Time | R792 Sample Description: NW Eifuku | PI | SubSmps |
|---|---|---|---|---|---|---|
| R792-water-1-0001 | 21.4860 | 144.0443 | 05:26:32 Apr/10/04 | Deploying the Verena's mini-water sampler to get background sample. Triggered at 5:28 and leaving open for 2 minutes. Placed into stbd biobox. Z=1640. **(SE of summit)** | Tunnicliffe | |
| R792-RK-0002 | 21.4861 | 144.0439 | 05:54:03 Apr/10/04 | Rock (lava shelf from lava tube) placed in the boot. Z=1604. **(near Bob's Rocks)** | SROF geo team (Stern) | |
| R792-Geo-0003 | 21.4864 | 144.0434 | 06:08:23 Apr/10/04 | Geology sample (and possibly bacterial mat). Fe-oxide crust and orange sediment/mat. May be cemented volcaniclastic sand present in lava sheets. Port biobox. Z=1580.5. **(Ascent up SE flank the summit)** | SROF geo team (Embley) | |
| R792-RK-0004 | 21.4873 | 144.0427 | 06:29:29 Apr/10/04 | Yellow-orange stained small rock. Put in boot. Z=1537. **(Eifuku summit)** | SROF geo team (Stern) | |
| R792-Core-0005 | 21.4872 | 144.0428 | 06:42:30 Apr/10/04 | Push core in mound of yellow/orange deposit. Z=1538. **(Orange Rind - Eifuku summit)** | SROF geo team (Hein) | Juniper |
| R792-RK-0006 | 21.4877 | 144.0418 | 07:17:37 Apr/10/04 | Rock - ~8cm in length. Placed in boot. **(Champagne-2)** Z=1606. | SROF geo team (Stern) | |
| R792-MP-S-0007 | 21.4881 | 144.0413 | 07:41:04 Apr/10/04 | Started stbd McLane pump at 0741. Beginning of mussel transect upslope. Stopped the pump at "Fowling" at 0823. Pumped 200 liters. **(Mussel Mound area)** | Juniper | |
| R792-Bio-0008 | 21.4877 | 144.0419 | 08:35:05 Apr/10/04 | Collecting a fairly large number (~26) of mussels with filaments. Port biobox. Eh=-115mV. Z=1576. **(near Fouling)** | Tunnicliffe | Juniper / Metaxas |
| R792-SS-J1-0009 | 21.4878 | 144.0418 | 09:09:22 Apr/10/04 | Suctioning fauna from a "typical" mussel assemblage into jar-1. 8 scale worms; several shrimp; 27 galatheids. Z=1594. **(~10m downslope from Fouling)** | Juniper | Metaxas |
| R792-SS-J3-0010 | 21.4878 | 144.0418 | 09:44:43 Apr/10/04 | Suction into jar-3 - 200 micron mesh. Sampling particulates at "typical" mussel assemblage. 20% suction. Suctioning at 2-3 different spots. Z=1594. **(~10m downslope from Fouling)** | Juniper | |
| R792-SS-J5-0011 | 21.4877 | 144.0418 | 10:46:55 Apr/10/04 | Suction sampling mat from chimney surface into jar-5. Start1=1047 Stop1=1049. Start2=1051 Stop2=1054. Start3=1100 Stop3=1104. T=4 with occasional spikes to 25C. Z=1606.7. **(Champagne)** | Moyer | |
| R792-RK-0012 | 21.4876 | 144.0419 | 11:47:39 Apr/10/04 | A piece of material from the chimney area. Very fragile and porous. Funny little ridges on top - probably mostly silica. T~100C. Port biobox. Z=1608. **(Champagne-2)** | SROF geo team (De Ronde) | |
| R792-RK-0013 | 21.4877 | 144.0418 | 12:09:56 Apr/10/04 | Rock sample. Relatively fresh piece of vesiculated lava. ~10 cm in diameter. In port biobox. Z=1608. **(Champagne-2)** | SROF geo team (De Ronde) | |
| R792-RK-0014 | 21.4877 | 144.0417 | 12:15:03 Apr/10/04 | Sulphur rich precipitate from area where we suctioned small chimneys. The sediment underneath this piece is falling away. Looks like a solid chunk of elemental sulphur. In port biobox. Z=1610. **(Champagne)** | SROF geo team (De Ronde) | |
| R792-SS-J2-0015 | 21.4876 | 144.0418 | 12:21:21 Apr/10/04 | Suction sample into jar-2. Collecting particulates and bacterial mat near the base of a chimney. Pebble-sized particles collected. Z=1698. **(Champagne)** | SROF geo team (De Ronde) | |
| R792-SS-J6-0016 | 21.4876 | 144.0418 | 12:27:23 Apr/10/04 | Suctioning fluffy white (a hint of yellow) thick microbial mat into jar-6. The area has excessive amount of gas. Start:1236 Stop:12:40. T=6-7. Z=1608. Downslope from the chimneys and ~0.5 m to the right. **(Champagne)** | Moyer | |
| R792-SS-J7-0017 | 21.4875 | 144.0419 | 12:40:17 Apr/10/04 | Suction fluffy white/yellow microbial mat into jar-7. The area has excessive amount of gas. Start 1241 Stop 12:46. T=6-7. Z=1608. Downslope from the chimneys and ~0.5 m to the right. **(Champagne)** | Moyer | |

| Sample | Lat (N) | Long (E) | Time | R792 Sample Description: NW Eifuku | PI | SubSmps |
|---|---|---|---|---|---|---|
| R792-SS-J4-0018 | 21.4876 | 144.0419 | 12:47:52 Apr/10/04 | Suction sample for meiofauna into jar-4. T=6-7. Z=1607. Downslope from the chimneys and ~0.5 m to the right. **(Champagne)** | Juniper | Tunnicliffe |
| R792-Bio/geo-0019 | 21.4878 | 144.0417 | 13:07:51 Apr/10/04 | Limpets on rocks. Limpets appear just on the edge of the white staining. The small rock (~5cm) has a smooth surface and larger rock (~10 cm) has a rough surface. In the boot. Z=1605. **(Champagne)** | Metaxas | |
| R792-GTB-1-0020 | 21.4876 | 144.0418 | 13:51:46 Apr/10/04 | Gas tight bottle-1 (HIL-12) attached to bubble corer. Fired 0152. Bottle is left open. Very slow leak at the top of the corer. Can see the bubbles actually deforming as they leak. Similar to those seen coming out of tubes at JADE site of Okinawa Trough. Z=1609. **(Champagne)** | Lupton | Butterfield / Lilley |
| R792-MP-P-0021 | 21.4876 | 144.0413 | 14:14:01 Apr/10/04 | Started sampling port McLane pump at 1413. Stop 1457. 207.4L sampled. Z=770. **(Champagne area)** | Juniper | |
| R792-net-P-0022 | 21.4876 | 144.0412 | 14:16:17 Apr/10/04 | Port plankton net open 14:16. Closed 1423 due to technical difficulties. Tow 30 meters above the bottom. Speed=0.5 knots. **(Champagne area)** | Metaxas | |
| R792-net-S-0023 | 21.4877 | 144.0409 | 14:18:03 Apr/10/04 | Open starboard plankton net. Start=1418. Stop 1423 due to technical problems. Tow 30 meters above the bottom. Speed=0.5 knots. **(Champagne area)** | Metaxas | |

## 7.12 R793 Sample Log: NW Eifuku

| Sample | Lat (N) | Long (E) | Time | R793 Description: NW Eifuku | PI | SubSmps |
|---|---|---|---|---|---|---|
| R793-SS-J6-0001 | 21.4885 | 144.0404 | 05:17:36 Apr/11/04 | Suction sampling yellow mat into jar-6. Eh=90mV. Z=1678. No nav. **(Yellow Top/Bacterial Balls Area)** | Moyer | |
| R793-SS-J7-0002 | 21.4885 | 144.0404 | 05:26:06 Apr/11/04 | Suction sample yellow mat into jar-7. Z=1678. No nav. **(Yellow Top/Bacterial Balls Area** | Moyer | |
| R793-SS-J3-0003 | 21.4885 | 144.0404 | 05:32:41 Apr/11/04 | Suction sample yellow mat into jar-3 (200 micron mesh). The mat was ~3cm thick here. Z=1678. No nav. **(Yellow Top/Bacterial Balls Area** | Juniper | |
| R793-HFS-8-0004 | 21.4877 | 144.0417 | 07:08:11 Apr/11/04 | HFS unfiltered bag-8. Start 7:08 Stop 7:13. Lots of shrimp and mussels in area. Tmax=2.5 Tavg=2.4 Tbackground=2.0 (stdev=0.1). Eh=140mV. Vol=211ml. Z=1576. **(Fouling)** | Butterfield | |
| R793-HFS-9-0005 | 21.4878 | 144.0417 | 07:54:51 Apr/11/04 | HFS unfiltered bag-9. Start=0750 Stop=0752. Tmax=19.9 Tavg=17.9 (sd=3) T2=5. Vol=410ml. Z=1574. **(3 m upslope from Fouling - "Fouling Heights")** | Butterfield | Bolton |
| R793-SS-J2-0006 | 21.4877 | 144.0419 | 08:00:03 Apr/11/04 | Suction sample of juvenile mussels into jar-2. Also sweeping the rock for settlers. Repositioning the sub during sampling. Sampled 2-3 different locations. Eh=-126mV. Z=1573. **(Fouling Heights)** | Tunnicliffe | Juniper |
| R793-HFS-11-0007 | 21.4882 | 144.0420 | 08:57:37 Apr/11/04 | HFS filtered bag-11. Start=0857 Stop=0901. Tmax=6.3 Tavg=4.2 (sd=1) T2=2.5. Vol=592ml. Z=1587. The probe is moving around but has remained in the orifice. Clear fluid out of the exhaust. **(Yellow Cone)** | Butterfield | |
| R793-HFS-19-0008 | 21.4882 | 144.0420 | 09:07:42 Apr/11/04 | HFS unfiltered bag-19. Start=0908 Stop=0911. Start2=0912 Stop2=0913. Moving a bit but the HFS probe stayed in the hole. Temperature is creeping up. Tmax=11.4 Tavg=8.1 (sd=1) T2=4.2. Vol=702ml. Z=1587. **(Yellow Cone)** | Butterfield | Bolton |
| R793-SS-J4-0009 | 21.4882 | 144.0420 | 09:31:21 Apr/11/04 | Suctioning a mini chimney into jar-4. Attempting to collect the most stick-like one, which appears more coherent. Got a piece of it - mostly from the base. Z=1587. **(Yellow Cone)** | SROF geo team (Hein) | |
| R793-SS-J1-0010 | 21.4882 | 144.0421 | 09:47:39 Apr/11/04 | Suction sample of bacterial mat and sediment into jar-1. Start1=0956 Stop1=1000. Start2=1003 Stop2=1004. Z=1587. **(Yellow Cone)** | Moyer | Juniper |
| R793-HFS-4-0011 | 21.4876 | 144.0417 | 11:07:09 Apr/11/04 | HFS piston-4. Start1=1107 Stop1=1107. Start2=1108 Stop2=1116. Limpets; crab and shrimp near probe. Tmax=76.6 Tavg=71.9 (sd=1.7) T2=18. Vol=~600ml. Z=1607. **(Champagne)** | Butterfield | |
| R793-GTB-1-0012 | 21.4877 | 144.0416 | 11:17:26 Apr/11/04 | Gas tight bottle-1 (HIL GTB 5). Fired=1118. T=68C. After triggered T2 went up. Z=1607. **(Champagne)** | Lupton | Butterfield / Lilley |
| R793-HFS-5-0013 | 21.4877 | 144.0418 | 11:19:55 Apr/11/04 | HFS piston-5. Start=1120 Stop=1132. Tmax=74.2 Tavg=64.5 (sd=4.3) T2=28. Vol=~600ml. Z=1607. **(Champagne)** | Butterfield | |
| R793-HFS-1-0014 | 21.4876 | 144.0417 | 11:33:03 Apr/11/04 | HFS chemistry filter-1. Start=1133 Stop=1139. Tmax=67.8 Tavg=63.4 (sd=1.8) T2=25. Eh=-114.79. Vol=619ml. Z=1607. **(Champagne)** | Butterfield | |
| R793-HFS-3-0015 | 21.4877 | 144.0415 | 12:17:42 Apr/11/04 | HFS sterivex filter-3. Start=1217 Stop=1231. Temperature dropped quite a bit and then increased again while sampling. Tmax=55.3 Tavg=41.4 ( sd=10). T2=30. Vol=1201ml. Z=1615. **(Sulfur Dendrite)** | Butterfield | Bolton |
| R793-GTB-2-0016 | 21.4877 | 144.0416 | 12:21:05 Apr/11/04 | Gas tight bottle-2 (HIL GTB 11). Fired=1221. T1=48 T2=30. Z=1615. **(Sulfur Dendrite)** | Lupton | Butterfield / Lilley |
| R793-HFS-2-0017 | 21.4877 | 144.0416 | 12:32:17 Apr/11/04 | HFS FISH filter-2. Start=1232 Stop=1234. Tmax=54.4 Tavg=53 (sd=0.76) T2=34. Vol=301ml. Z=1615. **(Sulfur Dendrite)** | Butterfield | Bolton |

| Sample | Lat (N) | Long (E) | Time | R793 Description: NW Eifuku | PI | SubSmps |
|---|---|---|---|---|---|---|
| R793-HFS-18-0018 | 21.4878 | 144.0416 | 12:37:00 Apr/11/04 | HFS filtered bag-18. Start=1237 Stop=1238. Tmax=54.7 Tavg=54.1 (sd=0.2) T2=34. Vol=174ml. Z=1615. **(Sulfur Dendrite)** | Butterfield | |
| R793-HFS-24-0019 | 21.4877 | 144.0416 | 12:39:27 Apr/11/04 | HFS piston-24. Start=1240 Stop=1251. Clear effluent most of the time. Tmax=55.7 Tavg=54.7 (sd=0.4) T2=32. Vol=~600ml. Z=1615. **(Sulfur Dendrite)** | Butterfield | |
| R793-HFS-12-0020 | 21.4877 | 144.0416 | 12:52:35 Apr/11/04 | HFS RNA filter-12. Start=1253 Stop=1255. Start2=0100 Stop2=0108. We were pushed forward during the sampling and got out of the vent. Tmax=55.4 Tavg=44.5 (sd=2.3) T2=31. Vol=1268ml. Z=1615. **(Sulfur Dendrite)** | Butterfield | Bolton |
| R793-RK-0021 | 21.4877 | 144.0415 | 13:26:22 Apr/11/04 | Rock sample near HFS site - ~10+ cm. Fairly angular with sufficient covering of sulfur. Some degree of alteration. At lower - western margin - slope. In purse. Z=1607. **(Champagne)** | SROF geo team (De Ronde) | |
| R793-RK-0022 | 21.4877 | 144.0415 | 13:37:15 Apr/11/04 | Rock sample ~12 cm across. More circular and relatively fresh. Mostly surficial alteration. In purse. Z=1607. **(Champagne)** | SROF geo team (De Ronde) | |
| R793-HFS-23-0023 | 21.4878 | 144.0417 | 13:53:05 Apr/11/04 | HFS piston-23. Start=14:05 Stop=1417. Tmax=69.7 Tavg=69.0 (sd=0.26) T2=48. Vol=~600ml. Z=1574. **(Cliff House)** | Butterfield | Bolton |
| R793-GTB-3-0024 | 21.4877 | 144.0418 | 14:11:15 Apr/11/04 | Gas tight bottle-3 (HIL GTB 7). Fired at 1414. T=69. T2=48. Z=1574. **(Cliff House)** | Lupton | Butterfield / Lilley |
| R793-HFS-20-0025 | 21.4877 | 144.0418 | 14:19:24 Apr/11/04 | HFS filtered piston-20. Start=1420 Stop=1428. Outflow from the sampler is coming out clear. Piston filled completely to the end of the bottle. Tmax=69.4 Tavg=68.8 (sd=0.2) T2=48. Vol=800ml. Z=1574. **(Cliff House)** | Butterfield | |
| R793-GTB-4-0026 | 21.4878 | 144.0417 | 14:21:01 Apr/11/04 | Gas tight bottle-4 (HIL GTB 2). Fired at 1421. Something is wrong. It was already triggered when we fired it. There is an unknown sample in GTB-4. Z=1574. **(Cliff House)** | Lupton | Butterfield / Lilley |
| R793-HFS-15-0027 | 21.4878 | 144.0417 | 14:29:35 Apr/11/04 | HFS chemistry filter-15. Start=1429 Stop=1434. Tmax=69.5 Tavg=69.0 (sd=0.2) T2=48. Vol=650ml. Z=1574. **(Cliff House)** | Butterfield | |
| R793-HFS-10-0028 | 21.4878 | 144.0416 | 14:34:44 Apr/11/04 | HFS RNA filter-10. Start=1435 Stop=1444. Tmax=69.4 Tavg=68.9 (sd=0.2) T2=48. Vol=1143ml. Z=1574. **(Cliff House)** | Butterfield | Bolton |
| R793-HFS-7-0029 | 21.4878 | 144.0418 | 14:45:49 Apr/11/04 | HFS FISH filter-7. Start=1446 Stop=1448. Tmax=69.4 Tavg=69.0 (sd=0.2) T2=48. Vol=310ml. Z=1574. **(Cliff House)** | Butterfield | Bolton |
| R793-HFS-13-0030 | 21.4877 | 144.0417 | 14:48:47 Apr/11/04 | HFS Sterivex DNA filter-13. Start=1449 Stop=1503. Tmax=69.6 Tavg=69.0 (sd=0.2) T2=48. Vol=1753ml. Z=1574. **(Cliff House)** | Butterfield | Bolton |
| R793-RK-0031 | 21.4879 | 144.0417 | 15:14:20 Apr/11/04 | Rock - about 3-4cm across and likely massive sulfur. Maybe not sulfur but a piece of hydrothermally altered rock with some sulfur coating it. Collected immediately (0.5meter) upslope from fluid sampling site. Into purse. Z=1574. **(Cliff House**) | SROF geo team (De Ronde) | |
| R793-HFS-16-0032 | 21.4877 | 144.0417 | 15:58:57 Apr/11/04 | HFS filtered bag-16. Start=1559 Stop=1602. Tmax=3.7 Tavg=3.3 T2=4.6? Tbackground=2.0. May be something wrong with the intake. T2 should not be higher than T1. Vol=500ml. Z=1573. **(Sulfur Spicules)** | Butterfield | |
| R793-Bio/Geo-0033 | 21.4877 | 144.0416 | 16:10:53 Apr/11/04 | Pac-man sample of sulfur spicule material covered in snails. Into the purse. Z=1573. **(Sulfur Spicules)** | Tunnicliffe / de Ronde | |
| R793-net-P-0034 | 21.4880 | 144.0401 | 16:59:15 Apr/11/04 | Port plankton tow during Imagenex survey. Moving at 0.5 knot and 30m off the bottom. Open at 1659. Closed at 2027. Depth range 1538-1710m. **(summit and NW venting area)** | Metaxas | |
| R793-net-S-0035 | 21.4879 | 144.0398 | 17:02:22 Apr/11/04 | Stbd plankton tow during Imagenex survey. Moving at 0.5 knot and 30m off the bottom. Open at 1659. Closed at 2027. Depth range 1538-1710m. **(summit and NW venting area)** | Metaxas | |
| R793-bio-0036 | 21.4876 | 144.0413 | 20:59:58 Apr/11/04 | Shrimp trap recovered. Lots of animals in it. Into the purse. Z=1606. **(Champagne)** | Tunnicliffe | |
| R793-SS-J8-0037 | 21.4877 | 144.0413 | 21:49:53 Apr/11/04 | Suctioned one large-clawed crab into jar-8. Z=1606. **(Champagne)** | Tunnicliffe | |

## 7.13 - R794 Sample Log: Kasuga-2

| Sample | Lat (N) | Long (E) | Time | R794 Sample Description: Kasuga-2 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R794-RK-0001 | 21.6073 | 143.6443 | 13:29:35 Apr/12/04 | Angular rock ~10 cm long. Brown-orange and red on the outside. In the purse. Z=625. **(caldera area)** | SROF geo team (Stern) | |
| R794-RK-0002 | 21.6083 | 143.6428 | 14:24:40 Apr/12/04 | Collected a piece of rock from the dike that is tooth-shaped. Into the purse. Z=562.6 **(NW part of the caldera)** | SROF geo team (Stern) | |
| R794-SS-J8-0003 | 21.6124 | 143.6381 | 18:17:10 Apr/12/04 | Suction sample into jar-8. Some of the yellow-colored crust material seen on the slope of the summit. Looks like mostly dark sediment with some of the yellow crust included. Z=345. **(near summit)** | SROF geo team (de Ronde) | Hein |

| Sample | Lat (N) | Long (E) | Time | R794 Sample Description: Kasuga-2 | PI | SubSmps |
|---|---|---|---|---|---|---|
| R794-SS-J1-0004 | 21.6086 | 143.6361 | 21:27:53 Apr/12/04 | Suction fauna into jar-1 (1mm mesh). Eh=-75mV. Collecting whatever is in the sediment. Looking for polychaetes. Keith got a shrimp and a fish!! Z=393. **(Barnacle Boulders)** | Juniper | Tunnicliffe |
| R794-SS-J2-0005 | 21.6086 | 143.6361 | 21:47:35 Apr/12/04 | Suctioning sediment and biota into jar-2. Crab; Provana snails.. Collected in area of gravel without much bacterial mat cover. An area of extensive flat fish habitat. Z=393. **(Barnacle Boulders)** | Tunnicliffe / Juniper | |
| R794-SS-J3-0006 | 21.6085 | 143.6363 | 22:52:07 Apr/12/04 | Suction of Lamellibrachia tubeworms; sponges; and rocks into jar-3. The worms are living between sponges on the rock surface. Z=387. **(Mat Ridge)** | Tunnicliffe | |
| R794-bio/geo-0007 | 21.6085 | 143.6362 | 22:56:45 Apr/12/04 | Barnacles on a rock. Carried in the claw. (sample was logged late - collected at 2208) Z=390. **(Cracked Vent)** | Juniper | SROF geo team |
| R794-HFS-8-0008 | 21.6084 | 143.6363 | 23:29:56 Apr/12/04 | HFS unfiltered bag-8. Start 2335 Stop 2339. Tmax=24.3 Tavg=21.4 T2=19 background T=13.5. Vol=572ml. Z=388. **(Cracked Vent)** | Butterfield | Bolton |
| R794-HFS-9-0009 | 21.6085 | 143.6363 | 23:40:01 Apr/12/04 | HFS unfiltered bag-9. Start 2339 Stop 2343. Intake probe pulled out of the flow at the end of sampling. Tmax=26.9 Tav g=22.0 T2=19.0. Vol=660ml. Z=387. **(Cracked Vent)** | Butterfield | Bolton |
| R794-GTB-1-0010 | 21.6084 | 143.6362 | 23:40:50 Apr/12/04 | Gas tight bottle-1 (HIL 9). Fired at 2341. T=24. Z=387. **(Cracked Vent)** | Lupton | Butterfield / Lilley |
| R794-GTB-2-0011 | 21.6084 | 143.6363 | 23:41:44 Apr/12/04 | Gas tight bottle-2 (HIL 12). Fired at 2342. T=24.5. Z=387. **(Cracked Vent)** | Lupton | Butterfield / Lilley |
| R794-HFS-5-0012 | 21.6084 | 143.6363 | 23:46:44 Apr/12/04 | HFS piston-5. Start 2346 Stop 2351. Tmax=26.5 Tavg=24.8 T2=22.0. Vol=~500ml. Z=387. **(Cracked Vent)** | Butterfield | Bolton |
| R794-HFS-11-0013 | 21.6084 | 143.6363 | 23:52:21 Apr/12/04 | HFS filtered bag-11. Start 2352 Stop 2357. Tmax=26.4 Tavg=24.5 T2=22.0. Vol=760ml. Temperature stable during sampling. Z=387. **(Cracked Vent)** | Butterfield | Bolton |
| R794-HFS-13-0014 | 21.6084 | 143.6363 | 23:57:34 Apr/12/04 | HFS sterivex filter-13. Start 2357 Stop 0006. Tmax=27.0 Tavg=25.3 T2=22.0. Vol=1312ml. Z=387. **(Cracked Vent)** | Butterfield | Bolton |
| R794-SS-J4-0015 | 21.6080 | 143.6359 | 00:16:21 Apr/13/04 | Suction fluffy bacterial mat into jar-4. Start 0017. Trying to suction the mat off the top without getting the orange crust below. Z=391. **(Mat Ridge)** | Moyer | |
| R794-SS-J5-0016 | 21.6080 | 143.6359 | 00:37:38 Apr/13/04 | Suctioned extra mat in jar-5. It was going to be just for flushing but there was quite a bit of mat in the hose. Z=390. **(Mat Ridge)** | Moyer | |

## 7.14 R795 Sample Log: Daikoku

| Sample | Lat (N) | Long (E) | Time | R795 Sample Description: Daikoku | PI | SubSmps |
|---|---|---|---|---|---|---|
| R795-HSF-9-0001 | 21.3247 | 144.1929 | 15:51:49 Apr/13/04 | HSF unfiltered bag-9. Start=15:51 Stop=15:56. T1=14.7 T2=14.6. Vol=730ml. Background water sample. - Pretty much entirely contained within the bottomless pit area. Z=400-375. **(Bottomless Pit)** | Butterfield | |
| R795-SS-J2-0002 | 21.3246 | 144.1922 | 17:30:46 Apr/13/04 | Suctioning large "dumpling" sediment deposits that are around the dense populations of flat fish into jar-2. Start 1732. Z=378. **(Fish Spa)** | Tunnicliffe / Juniper | |
| R795-SS-J3-0003 | 21.3246 | 144.1922 | 17:36:18 Apr/13/04 | Suctioning finer sediments under the dense populations of flat fish into jar-3. (same location as jar 2) Start 1738. Z=378. **(Fish Spa)** | Tunnicliffe / Juniper | |
| R795-SS-J4-0004 | 21.3246 | 144.1922 | 17:41:16 Apr/13/04 | Suctioning a combination of bottom material from under the dense populations of flat fish into jar-4. Start 1740. Z=378. **(Fish Spa)** | Tunnicliffe / Juniper | |
| R795-SS-J5-0005 | 21.3246 | 144.1922 | 17:42:39 Apr/13/04 | Suctioning a combination of bottom material - white filamentous covered sediments - from under the dense populations of flat fish into jar-5. Start 1742. Z=378. **(Fish Spa)** | Moyer | |
| R795-bio/geo-0006 | 21.3247 | 144.1924 | 17:47:16 Apr/13/04 | Sampling a rock that is covered with anemones. It is about 15-20cm in diameter and was sitting in the middle of a sandy slope. Z=378. **(Fish Spa)** | SROF geo team | Tunnicliffe / Juniper |
| R795-SS-J6-0007 | 21.3246 | 144.1922 | 17:44:16 Apr/13/04 | Suctioning white filamentous covered sediments into flush jar-6. Actually is the jar-5 overflow into jar-6 [Sample not logged as a sample in dive log - added post-cruise] **(Fish Spa)** | Moyer | |

# 8.0 ROPOS DIVE LOGS

## 8.1 R782: Dive Log NW Rota-1

| **R782: Northwest Rota-1** |
|---|
| wet time (UTC): 3/28 1415 - 3/29 0121. JD 88-89. 11.1 hrs. |
| bottom time (UTC): 3/28 1448 - 3/29 0011. 9.38 hrs. [21 samples] |
| Navigation not logging until 1528. Got near the bottom and then headed down slope to get away from particulates in water column. On bottom again at 1533. |
| **R782 DSC information:** The digital still camera was inoperable and no DSCs were taken on this dive. |
| **R782 Dive Summary:** Exploration dive at NW Rota-1. When arrived at the bottom at 1448 there were too many particulates in the water so we stayed off the bottom, heading down slope to try to get out of the plume. At 1558 we were on the bottom again. No nav until 1558. Diffuse venting evident in many places along the ridge and on the southern scarp of the summit. Biota consisted of crabs, gastropods and shrimp. Various geological features including massive lavas, outcroppings, dune-like structures, etc. New vent sites: **Shimmering, High Flow Area, Gastros, Yellow Top, Fault Shrimp**. Samples: 7 rocks, 2 sediments, 1 McLane pump, 4 suctions. **Shimmering Shrimp**: 1 biology, 5 suctions. **Scarp Top**: 1 rock sample. |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 14:15:26 Mar/28/04 | 1 | 323 | 12.9580 | 143.6107 | ROPOS is in the water. Waypoints used during this dive are: 'A' (14 35.93'N; 144 46.34'E); 'B' (14 36.05'N; 144 46.35'E); 'C' (14 36.08'N; 144 46.54'E). | | | |
| 14:46:26 Mar/28/04 | 700 | 89 | 14.5988 | 144.7720 | ROPOS is 50% heavy. | | | |
| 14:48:17 Mar/28/04 | 708 | 9 | 14.5988 | 144.7720 | Lots of particulates in the water; summit ~540 m; near bottom. | | | |
| 14:49:12 Mar/28/04 | 718 | 148 | 14.5988 | 144.7720 | See big black smoker? 20 m off bottom. | | | |
| 14:52:23 Mar/28/04 | 771 | 351 | 14.5988 | 144.7721 | Too many particulates in the water column so we'll back off and go into deeper water. Don't want to come down on top of this as can't see. Plumes seen on sonar reflection? 13.2C reading from ROPOS sensor when normally ~9C at 40m. | | | |
| 14:56:16 Mar/28/04 | 754 | 1 | 14.5990 | 144.7722 | Drive ROV ~200 m south then go down again. | | | |
| 15:02:26 Mar/28/04 | 738 | 211 | 14.5988 | 144.7722 | Still moving ship southwards to land further to the SW than original landing spot. | | | |
| 15:06:16 Mar/28/04 | 739 | 194 | 14.5986 | 144.7722 | Still moving into position. | | | |
| 15:25:06 Mar/28/04 | 797 | 229 | 14.5972 | 144.7720 | See some kind of plume at 797 m! | | | |
| 15:27:55 Mar/28/04 | 798 | 187 | 14.5972 | 144.7721 | Going down to seafloor at this position. | | | |
| 15:32:41 Mar/28/04 | 864 | 353 | 14.5972 | 144.7721 | Descending into a cloud of particulates. Temperature stable. | | | |
| 15:33:54 Mar/28/04 | 886 | 358 | 14.5971 | 144.7721 | See lava in sight; near bottom now. Talus slope. On bottom. Blocky lava; very murky here. | | | |
| 15:34:39 Mar/28/04 | 885 | 23 | 14.5971 | 144.7721 | Looking at seafloor. Very murky. 10-120 cm across blocks of lava. | | | |
| 15:35:54 Mar/28/04 | 884 | 44 | 14.5972 | 144.7721 | Decided to pick up a piece of lava (?) to see what looks like. | | | |
| 15:38:41 Mar/28/04 | 884 | 47 | 14.5971 | 144.7720 | Piece of talus sample placed in the boot. | | | R782-001 |
| 15:39:26 Mar/28/04 | 884 | 47 | 14.5972 | 144.7721 | Piece of talus sample placed in the boot - up close. | | | R782-002 |
| 15:39:59 Mar/28/04 | 884 | 47 | 14.5971 | 144.7721 | Fist size piece of lava/talus(?). Looks like a vesiculated lava - maybe glassy; maybe plagioclase crystals seen? Placed in the boot. Z=884.1. [NW Rota1] | R782-RK-0001 | SROF geo team (Stern) | |
| 15:42:51 Mar/28/04 | 884 | 53 | 14.5972 | 144.7721 | Moving upslope towards site 'A' heading 054. | | | |
| 15:43:52 Mar/28/04 | 881 | 52 | 14.5972 | 144.7721 | Loosely consolidated talus pile. Maybe low density lavas? See some sediments. Volcaniclastic sands? Sandy material plus rock. Likely not in-situ. Murky water. | | | |
| 15:45:05 Mar/28/04 | 878 | 53 | 14.5972 | 144.7721 | Dusting of sediment seen on top of all lava blocks. 50% sandy material and 50% cobble and boulder size material; pieces 10-20 cm. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 15:46:57 Mar/28/04 | 872 | 51 | 14.5973 | 144.7722 | Previous plumes may have been sediment off bottom. See pockets of sandy material and then blocks of 'lava' at 871 m water depth. | | | |
| 15:49:12 Mar/28/04 | 868 | 50 | 14.5973 | 144.7722 | Larger boulder size rocks; angular blocks; not in-situ. | | | |
| 15:51:32 Mar/28/04 | 864 | 30 | 14.5974 | 144.7722 | Material irregular shaped pieces; up to 60 cm pieces; looks light weight; similar composition rocks? | | | |
| 15:53:41 Mar/28/04 | 864 | 26 | 14.5974 | 144.7722 | Picking up piece of rock to have a look at it; typically 10-20 cm in size; volcaniclastics? | | | |
| 15:53:55 Mar/28/04 | 864 | 26 | 14.5975 | 144.7722 | Talus slope. | | | R782-003 |
| 15:54:38 Mar/28/04 | 864 | 27 | 14.5974 | 144.7722 | Looking at piece of rock; looks like lava; black matrix with white plagioclase phenos? Same as previous sample. | | | |
| 15:54:49 Mar/28/04 | 864 | 28 | 14.5974 | 144.7722 | Looking at another piece of rock. Looks the same as the earlier sample. | | | R782-004 |
| 15:56:05 Mar/28/04 | 861 | 33 | 14.5975 | 144.7722 | Moving upslope with some larger size pieces of rock; larger pieces than seen previously. | | | |
| 15:57:38 Mar/28/04 | 852 | 31 | 14.5976 | 144.7723 | Somewhat different material. Small size pieces of rock. Pebble size - ~1 cm. More sediment. Some outcrops. | | | |
| 15:58:11 Mar/28/04 | 852 | 37 | 14.5976 | 144.7723 | Now into much different material. Pebble size about 1 cm. | | | R782-005 |
| 15:59:26 Mar/28/04 | 847 | 31 | 14.5977 | 144.7723 | Approx. 120 m from point 'A'; mostly sandy patches with minor rock outcrop. See 'slabs' of rock material; followed by boulder material. | | | |
| 16:00:48 Mar/28/04 | 843 | 2 | 14.5978 | 144.7723 | See larger size blocks of rock. Evidence for mechanical weathering of blocks probably from moving down slope. Very irregular textures. | | | |
| 16:03:42 Mar/28/04 | 834 | 20 | 14.5979 | 144.7723 | See continuous outcrop of rock - fairly 'crusty' looking. Often pieces are well rounded and dusted by thin layer of sediment. | | | |
| 16:05:57 Mar/28/04 | 827 | 12 | 14.5981 | 144.7723 | Still continuous blocky material - low density and some 'sandy' patches. Some white material seen commonly on surface of the boulders. Range in size of boulders few centimeters to 10's of centimeters. | | | |
| 16:08:12 Mar/28/04 | 821 | 9 | 14.5982 | 144.7723 | Very irregular blocks of lava; looks scoriaceous; very blocky; ~70 m from point 'A'. | | | |
| 16:09:41 Mar/28/04 | 818 | 6 | 14.5982 | 144.7723 | Scree of mainly blocky lava of smaller (pebble size) with less sediments; perhaps some outcrop here in-situ? | | | |
| 16:11:19 Mar/28/04 | 813 | 5 | 14.5984 | 144.7723 | Reasonably well-sorted blocks of lava all <10 cm in size. We're ~30 m from point 'A'. Looks like a bank of pumice but perhaps vesiculated lava? | | | |
| 16:13:34 Mar/28/04 | 804 | 2 | 14.5985 | 144.7724 | Locally see well-sorted piles of rocks. Now and then see more fresh looking lava that looks a bit glassy. Columnar jointed piece of lava. Massive. 50 cm in length. | | | |
| 16:14:36 Mar/28/04 | 803 | 42 | 14.5985 | 144.7724 | More angular pieces about 30 cm surrounded by smaller pebble sized pieces. | | | R782-006 |
| 16:15:59 Mar/28/04 | 803 | 52 | 14.5985 | 144.7724 | Angular rock. Looks much denser than other material we have seen so far. | | | R782-007 |
| 16:16:44 Mar/28/04 | 801 | 7 | 14.5985 | 144.7724 | Continue to see larger blocks of this more obviously columnar jointed rock. | | | |
| 16:17:25 Mar/28/04 | 799 | 34 | 14.5986 | 144.7724 | Looking for a piece of this more angular rock to sample. | | | R782-008 |
| 16:18:18 Mar/28/04 | 799 | 326 | 14.5986 | 144.7724 | See some flow banding of the lavas here? Maybe a block seen sitting within lava = volcaniclastic? Attempt to sample rock here. | | | |
| 16:20:13 Mar/28/04 | 799 | 349 | 14.5986 | 144.7724 | Outcrop material with vertical joints. | | | R782-009 |
| 16:20:43 Mar/28/04 | 799 | 348 | 14.5986 | 144.7724 | Looks like more massive lava here. Attempt to sample. | | | |
| 16:22:45 Mar/28/04 | 799 | 9 | 14.5986 | 144.7724 | Piece of rock to be sampled. Size is about 10 cm. | | | R782-010 |
| 16:23:13 Mar/28/04 | 799 | 359 | 14.5986 | 144.7724 | Rock sample: R782-RK-0002. | | | R782-011 |
| 16:23:36 Mar/28/04 | 799 | 359 | 14.5986 | 144.7724 | Sample of relatively fresh lava with white plagioclase phenocrysts about 6 cm in diameter with vesicles. Z=799.1. [NW Rota 1]. | R782-RK-0002 | SROF geo team (Stern) | |
| 16:26:22 Mar/28/04 | 798 | 350 | 14.5986 | 144.7724 | Continuing upslope; about 40 m from point 'A'. See lots of blocky outcrop. Visibility poor here. | | | |
| 16:28:41 Mar/28/04 | 791 | 343 | 14.5987 | 144.7723 | Visibility poor. Sandy material and some blocks of lava. | | | |
| 16:29:23 Mar/28/04 | 789 | 346 | 14.5987 | 144.7723 | Outcrop? Big blocks of lava ~50 cm across. Poor visibility. Close to point 'A'. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 16:30:30 Mar/28/04 | 786 | 347 | 14.5988 | 144.7724 | See some individual 'columns' about 1 m in length. Poor visibility. | | | |
| 16:32:53 Mar/28/04 | 779 | 348 | 14.5989 | 144.7724 | See some larger blocks of lava; very poor visibility. Maybe some flow banding type textures seen from time to time? Blocks locally has white material on surfaces; older material? | | | |
| 16:34:26 Mar/28/04 | 774 | 352 | 14.5990 | 144.7724 | Slightly north of point 'A' and moving off towards point 'B' to the north. Terrible visibility. | | | |
| 16:36:23 Mar/28/04 | 766 | 351 | 14.5991 | 144.7724 | From about 800 m water depth visibility went very poor. Still see large (~50 cm) blocks of lava with sediment. | | | |
| 16:39:44 Mar/28/04 | 745 | 350 | 14.5993 | 144.7724 | See bottom again; blocky lava with some sediment; lost visibility again. | | | |
| 16:42:26 Mar/28/04 | 735 | 34 | 14.5995 | 144.7726 | See bottom again. Blocky lavas again that are poorly sorted; angular blocks. Up to 50 cm in length. Columnar jointing locally. See white material on surfaces of some pieces of rock. | | | |
| 16:44:59 Mar/28/04 | 731 | 13 | 14.5996 | 144.7727 | Less sediments around this area. 30-40 cm size blocks. Cooling fractures and angular blocks. Could be an outcrop? White stains (747 m now). | | | |
| 16:46:51 Mar/28/04 | 725 | 6 | 14.5997 | 144.7726 | Note that blocks are getting bigger as we traverse up slope. We don't see any of those well-sorted pebble size 'outcrops' like we saw 30 minutes ago. | | | |
| 16:50:17 Mar/28/04 | 719 | 3 | 14.5998 | 144.7726 | Stopping ship to take a temperature measurement. Wondered if any faint venting from this area? | | | |
| 16:52:01 Mar/28/04 | 719 | 7 | 14.5998 | 144.7726 | No obvious change in the temperature (probe placed in cracks between rocks). Take a look at rock at this locality. | | | |
| 16:57:34 Mar/28/04 | 719 | 21 | 14.5998 | 144.7726 | Rock sample number three (R872-RK-0003). Small fist sized piece of lava with bits of plagioclase. | | | R782-012 |
| 16:57:37 Mar/28/04 | 719 | 22 | 14.5998 | 144.7726 | Will sample here. | | | |
| 16:57:52 Mar/28/04 | 719 | 25 | 14.5998 | 144.7726 | Sampled piece of lava here. Looks like phenocrysts of plagioclase and maybe some vesicles? Aprox. fist-size piece. Z=718.8.[NW Rota 1]. | R782-RK-0003 | SROF geo team (Stern) | |
| 17:00:05 Mar/28/04 | 714 | 343 | 14.5999 | 144.7726 | See more and more white staining on blocks of lava in this area. Blocky lavas with sediment in between. Most surfaces of lavas have some sort of staining on them (white). | | | |
| 17:01:40 Mar/28/04 | 711 | 354 | 14.5998 | 144.7726 | Saw a shrimp! Probably not so far away from some sort of venting here? Cobble size pieces of lava most with staining on them ranging from yellowish to white. | | | |
| 17:03:38 Mar/28/04 | 709 | 352 | 14.6000 | 144.7726 | Lots of blocks of lava here; perhaps a bit older here? Well jointed in place (708 m depth). See white stains on some surfaces. | | | |
| 17:07:10 Mar/28/04 | 697 | 15 | 14.6001 | 144.7726 | See more unconsolidated material overlying in places some outcrop of lava; saw a fish! | | | |
| 17:09:14 Mar/28/04 | 689 | 358 | 14.6002 | 144.7726 | See overhand of obvious massive lavas; massive here. Moving along fault scarp. Nice flow banding here. We see alteration staining on surface of lava (682 m). This is a massive lava flow. | | | |
| 17:09:49 Mar/28/04 | 686 | 358 | 14.6002 | 144.7726 | Banded lava on a large vertical wall. | | | R782-013 |
| 17:10:09 Mar/28/04 | 683 | 352 | 14.6002 | 144.7725 | Band of alteration in the vertical wall of lava. | | | R782-014 |
| 17:11:18 Mar/28/04 | 683 | 332 | 14.6002 | 144.7726 | White staining on surface of lava; 10-20 cm band of staining on surface of rock. | | | |
| 17:11:24 Mar/28/04 | 683 | 338 | 14.6002 | 144.7726 | Altered layer 10-20 cm wide in vertical wall. | | | R782-015 |
| 17:12:39 Mar/28/04 | 683 | 339 | 14.6002 | 144.7726 | Close-up of surface staining. Looks only surficial as bits of staining. | | | R782-016 |
| 17:13:24 Mar/28/04 | 683 | 340 | 14.6002 | 144.7726 | More of the vertical wall that appears to have some vesicles. | | | R782-017 |
| 17:14:08 Mar/28/04 | 683 | 339 | 14.6002 | 144.7726 | Surface staining of white material (683 m depth) that is just a coating on the rock surface. We're along a rock fracture. Rock locally has vesicles. | | | |
| 17:17:02 Mar/28/04 | 678 | 360 | 14.6002 | 144.7726 | Banded pattern on rock up on the top of the wall. | | | R782-018 |
| 17:17:25 Mar/28/04 | 676 | 1 | 14.6002 | 144.7726 | See tall structure of intact columnar lava. About 1 m tall. See white material on joint surfaces. About 60 m away from point 'B'. | | | |
| 17:17:38 Mar/28/04 | 676 | 14 | 14.6002 | 144.7726 | Lava column with more banding patterns. | | | R782-019 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 17:19:11 Mar/28/04 | 669 | 20 | 14.6003 | 144.7726 | Locally around here see tops of some lava flows. Lots of vesicularity. Joints commonly stained by alteration. | | | |
| 17:20:24 Mar/28/04 | 665 | 13 | 14.6003 | 144.7726 | Going up on massive lava flows; very blocky; lots of mass wasting in places; lots of alteration; perhaps sulfur seen? | | | |
| 17:21:23 Mar/28/04 | 658 | 351 | 14.6004 | 144.7726 | Yellowish sediment that may be sulfur. | | | R782-020 |
| 17:22:33 Mar/28/04 | 654 | 350 | 14.6004 | 144.7726 | See some pillow perhaps here? Massive flow of lava here. | | | |
| 17:23:04 Mar/28/04 | 650 | 350 | 14.6004 | 144.7726 | Cross-section of a large lava flow. | | | R782-021 |
| 17:23:55 Mar/28/04 | 644 | 358 | 14.6005 | 144.7726 | In and out from massive lava flows into more blocky flows. Locally see mass wasting and sediments. | | | |
| 17:26:37 Mar/28/04 | 632 | 340 | 14.6005 | 144.7727 | Moving upslope towards point 'B' and continue to see mostly blocky lavas; locally massive with flow banding type structures. | | | |
| 17:31:34 Mar/28/04 | 620 | 339 | 14.6004 | 144.7726 | Massive vesiculated lavas - then commonly blocky. | | | |
| 17:32:43 Mar/28/04 | 612 | 338 | 14.6007 | 144.7726 | Pyroclastite or glassy sediments. | | | R782-022 |
| 17:33:10 Mar/28/04 | 607 | 335 | 14.6007 | 144.7726 | Massive flow with columnar jointing and vesicles. | | | |
| 17:34:18 Mar/28/04 | 591 | 352 | 14.6008 | 144.7726 | See rare pillows with some of these lavas. | | | |
| 17:34:57 Mar/28/04 | 586 | 27 | 14.6008 | 144.7726 | At point 'B' here and will head to point 'C'. See what looks like pillows near top of this ridge. | | | |
| 17:35:05 Mar/28/04 | 586 | 1 | 14.6008 | 144.7726 | Cross-section of a vertical pillow. | | | R782-023 |
| 17:35:37 Mar/28/04 | 587 | 12 | 14.6008 | 144.7726 | Vertical pillow lava. | | | R782-024 |
| 17:36:03 Mar/28/04 | 584 | 30 | 14.6008 | 144.7726 | See crab and flow banding - see fish too. Crab with spiny back. Very nice video here! | | | |
| 17:36:38 Mar/28/04 | 583 | 19 | 14.6008 | 144.7726 | Spiny crab. | | | R782-025 |
| 17:36:54 Mar/28/04 | 583 | 4 | 14.6008 | 144.7726 | Spiny crab and fish in the background. | | | R782-026 |
| 17:37:11 Mar/28/04 | 583 | 6 | 14.6008 | 144.7726 | Close-up of spiny crab. | | | R782-027 |
| 17:38:16 Mar/28/04 | 582 | 36 | 14.6009 | 144.7727 | Moving about NE towards point 'C'. See nice ridge of blocky lavas commonly with pillows. See more fish up at top of this ridge. Flow banding also seen of more massive lavas. | | | |
| 17:40:15 Mar/28/04 | 575 | 31 | 14.6009 | 144.7728 | Mushroom shaped rock. | | | R782-028 |
| 17:40:40 Mar/28/04 | 575 | 30 | 14.6009 | 144.7728 | Very interesting lava column that looks like a mushroom. | | | |
| 17:42:14 Mar/28/04 | 571 | 13 | 14.6009 | 144.7729 | At top of this ridge see alternating white and dark bands of sediment. There are also lots of blocky lavas and mass wasting going on - even up at this altitude. | | | |
| 17:44:45 Mar/28/04 | 570 | 20 | 14.6010 | 144.7729 | See some winnowing of finer grained sediments from coarser sediments. | | | |
| 17:46:04 Mar/28/04 | 565 | 13 | 14.6010 | 144.7730 | Fish! | | | |
| 17:46:33 Mar/28/04 | 565 | 46 | 14.6010 | 144.7731 | Going up along knife-edge ridge made up of loose material. Currents seem to have winnowed the coarse dark and finer light material. | | | |
| 17:47:41 Mar/28/04 | 562 | 40 | 14.6010 | 144.7731 | A couple of shrimp on a large longitudinal dune. | | | R782-029 |
| 17:48:05 Mar/28/04 | 562 | 25 | 14.6010 | 144.7732 | Slope is steeper to the right (south) almost like a dune. | | | |
| 17:49:42 Mar/28/04 | 560 | 17 | 14.6011 | 144.7733 | Getting into some pillows now. Could be the headwall of a slump? We are following this summit ridge to the NE toward the summit of the volcano (point C). | | | |
| 17:51:49 Mar/28/04 | 565 | 355 | 14.6012 | 144.7734 | Rock outcrops have yellow alteration on them. | | | |
| 17:52:33 Mar/28/04 | 568 | 351 | 14.6012 | 144.7734 | Not following the top of the ridge up to the summit - the ship is driving a direct route to point C (at the summit). The slope to the south is much steeper in the bathymetry. | | | |
| 17:53:47 Mar/28/04 | 574 | 345 | 14.6013 | 144.7736 | Overhang of massive lava flow with yellow staining. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 17:58:19 Mar/28/04 | 582 | 18 | 14.6014 | 144.7737 | Surface ripples on sediments; currents coming from the west at the moment. Lot of mass wasting around here. | | | |
| 17:58:38 Mar/28/04 | 582 | 10 | 14.6013 | 144.7738 | Surface ripples indicating current flow from the east. | | | R782-030 |
| 18:01:59 Mar/28/04 | 582 | 3 | 14.6014 | 144.7739 | Wavelength of ripples about 10 cm and amplitude about 203 cm? | | | |
| 18:03:06 Mar/28/04 | 579 | 8 | 14.6014 | 144.7740 | See nice contact that looks like a recent event. Slumping of sediments. Still rippled. | | | |
| 18:04:58 Mar/28/04 | 574 | 25 | 14.6014 | 144.7742 | Sediment not so obviously rippled here. We see a number of straight lines in the sediment. Could it be biological? | | | |
| 18:06:31 Mar/28/04 | 571 | 70 | 14.6013 | 144.7743 | See slope of ridge with sediment on top and steep slope off to one side; lots of sediments. | | | |
| 18:07:42 Mar/28/04 | 568 | 23 | 14.6013 | 144.7744 | Mass wasting in progress! | | | |
| 18:08:51 Mar/28/04 | 563 | 37 | 14.6014 | 144.7745 | Moving along ridge working toward point 'C'; about 120 m away. | | | |
| 18:14:40 Mar/28/04 | 537 | 62 | 14.6014 | 144.7750 | Continue to see granulated sediments. Evidence for mass wasting. The sediments are easily disturbed by ROPOS and very poorly sorted. | | | |
| 18:17:22 Mar/28/04 | 526 | 71 | 14.6014 | 144.7752 | See rare lava flows sticking out of massive sediments. There are some shrimp here. | | | |
| 18:18:47 Mar/28/04 | 523 | 71 | 14.6014 | 144.7753 | Mass wasting of sediment at 543 m. | | | |
| 18:19:48 Mar/28/04 | 521 | 77 | 14.6014 | 144.7753 | Winnowed glass veins. | | | R782-031 |
| 18:20:28 Mar/28/04 | 520 | 111 | 14.6014 | 144.7754 | Crab seen on ridge ready to jump! Walking along very top of ridge with winnowing of darker sediments on knife-edge of ridge (519 m). | | | |
| 18:21:09 Mar/28/04 | 520 | 103 | 14.6014 | 144.7754 | Crab ready for some shrimp cocktail. | | | R782-032 |
| 18:22:59 Mar/28/04 | 516 | 165 | 14.6012 | 144.7755 | See loads of shrimp and yellow sulfur on lava. | | | |
| 18:23:14 Mar/28/04 | 516 | 164 | 14.6012 | 144.7755 | Possible evidence of hydrothermal activity. Rock is covered with shrimp. | | | R782-033 |
| 18:25:04 Mar/28/04 | 519 | 130 | 14.6012 | 144.7755 | Lots of shimmering around base of lava blocks surrounded by sediment. See lots of shrimp here. | | | |
| 18:29:56 Mar/28/04 | 517 | 122 | 14.6012 | 144.7755 | Stopping the ship and then will move on to point 'C'. | | | |
| 18:32:44 Mar/28/04 | 517 | 169 | 14.6012 | 144.7755 | Going back to cage for tether management. | | | |
| 18:37:55 Mar/28/04 | 522 | 85 | 14.6013 | 144.7753 | Back on the bottom and continuing towards point 'C'. | | | |
| 18:39:52 Mar/28/04 | 518 | 101 | 14.6012 | 144.7755 | Moving along ridge ~40 m from point 'C'. We're back at first diffuse venting area where we saw sulfur stained lava with sediment surrounds. Lots of shrimp. | | | |
| 18:41:56 Mar/28/04 | 517 | 215 | 14.6011 | 144.7755 | See lots of shimmering water; white bacterial material seen in water column. | | | |
| 18:43:32 Mar/28/04 | 519 | 295 | 14.6010 | 144.7755 | Pillar near target C around the area of venting. | | | R782-034 |
| 18:44:17 Mar/28/04 | 519 | 301 | 14.6011 | 144.7755 | Now close to point 'C'; 35 m SSW of 'C'. See granulated sediment(?) on top of some columns of lava. | | | |
| 18:46:59 Mar/28/04 | 516 | 144 | 14.6012 | 144.7755 | Lots of white bacterial material on top of slope here and on the surface of rocks. Flocculants in the water column. | | | |
| 18:51:13 Mar/28/04 | 540 | 60 | 14.6011 | 144.7753 | Flushing hose to prepare for sampling. | | | |
| 18:54:40 Mar/28/04 | 517 | 150 | 14.6012 | 144.7755 | Going back to sample some shrimp from this area of diffuse venting where see yellow staining on lava. | | | |
| 18:56:26 Mar/28/04 | 516 | 138 | 14.6012 | 144.7755 | Shrimp near rock with yellow deposits. | | | R782-035 |
| 18:56:36 Mar/28/04 | 516 | 138 | 14.6012 | 144.7755 | Nice close-ups of shrimp on lava plus sediments near diffuse venting at base of lava. | | | |
| 18:59:44 Mar/28/04 | 516 | 139 | 14.6012 | 144.7755 | More shrimp. | | | R782-036 |
| 19:01:33 Mar/28/04 | 516 | 137 | 14.6012 | 144.7755 | Continue to focus on shrimps at this diffuse site. | | | |
| 19:02:19 Mar/28/04 | 516 | 136 | 14.6012 | 144.7755 | Mound covered with shrimp and some crab. | | | R782-037 |
| 19:03:45 Mar/28/04 | 516 | 136 | 14.6012 | 144.7755 | Image for shrimp density with lasers in view. | | | R782-038 |
| 19:03:50 Mar/28/04 | 516 | 139 | 14.6012 | 144.7755 | Image for shrimp density with lasers in view. | | | R782-039 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 19:04:07 Mar/28/04 | 516 | 138 | 14.6012 | 144.7755 | Image for shrimp density with lasers in view. | | | R782-040 |
| 19:04:20 Mar/28/04 | 516 | 135 | 14.6012 | 144.7755 | Image for shrimp density with lasers in view. | | | R782-041 |
| 19:04:59 Mar/28/04 | 516 | 139 | 14.6012 | 144.7755 | Image for shrimp density with lasers in view. | | | R782-042 |
| 19:05:22 Mar/28/04 | 516 | 138 | 14.6012 | 144.7755 | Sampling shrimp into jar #1. Z=516. [NW Rota 1]. | R782-SS-J1-0004 | Juniper | |
| 19:10:49 Mar/28/04 | 516 | 137 | 14.6012 | 144.7755 | Continuing sampling of shrimps. | | | |
| 19:12:05 Mar/28/04 | 516 | 138 | 14.6012 | 144.7755 | Attempt to sample rock that has the yellow material on its surface. Sulfur or bacterial material? | | | |
| 19:13:20 Mar/28/04 | 516 | 138 | 14.6012 | 144.7755 | SS Jar-3 for loose sediment that shrimp were feeding upon. Probably bacterial mat. Z=516.1. [NW Rota 1]. | R782-SS-J3-0005 | Juniper | |
| 19:29:54 Mar/28/04 | 516 | 146 | 14.6012 | 144.7755 | Rock to be sampled. | | | R782-043 |
| 19:30:14 Mar/28/04 | 516 | 147 | 14.6012 | 144.7755 | Fourth rock sample near site with all the shrimp. R782-RK-0006. | | | R782-044 |
| 19:31:29 Mar/28/04 | 516 | 148 | 14.6012 | 144.7755 | Sampled rock at diffuse site. Put in port biobox. Some yellow bacterial mat on surface. Rock crumbled. Ended up with smaller piece. Bacterial mat not present when rock taken from the biobox. Z=516.1. [NW Rota 1]. | R782-RK-0006 | SROF geo team | |
| 19:33:01 Mar/28/04 | 516 | 150 | 14.6012 | 144.7755 | Just sampled rock at diffuse site; next attempt to get suction sample of yellow material at diffuse site. | | | |
| 19:34:24 Mar/28/04 | 516 | 171 | 14.6012 | 144.7755 | SS Jar-5. Slurping yellow material off rock face in diffuse venting area. Yellow material is probably a sulfur coating with "bugs" in it. Subsamp: pebbles with orange stain. Z=515.8. [NW Rota 1]. | R782-SS-J5-0007 | Moyer/de Ronde | |
| 19:35:49 Mar/28/04 | 516 | 144 | 14.6012 | 144.7755 | Yellow deposits to be suctioned. | | | R782-045 |
| 19:40:39 Mar/28/04 | 517 | 149 | 14.6012 | 144.7755 | Sample rock material with yellow bacterial mat/sulfur(?) on surface. Collected with suction sampler (very small piece of rock with mat on it). Put in port biobox. Note: this sample was not found in the biobox after the dive. Z=516.5. [SAMPLE LOST]. | R782-RK-0008 | SROF geo team | |
| 19:46:13 Mar/28/04 | 517 | 150 | 14.6012 | 144.7755 | Slurp gun rock sample being placed in the biobox - small piece with bacterial mat. (sample #6). | | | |
| 19:53:46 Mar/28/04 | 517 | 159 | 14.6012 | 144.7755 | Still trying to collect Rk-0006- the sample with the yellow mat was growing on. | | | |
| 20:00:15 Mar/28/04 | 517 | 185 | 14.6012 | 144.7756 | Crab to be suctioned. | | | R782-046 |
| 20:00:30 Mar/28/04 | 517 | 180 | 14.6012 | 144.7755 | Suctioning crab. To be placed in bio box. | | | R782-047 |
| 20:01:06 Mar/28/04 | 517 | 172 | 14.6012 | 144.7756 | Collecting a crab with suction sampler. but into port biobox. | | | |
| 20:02:01 Mar/28/04 | 517 | 168 | 14.6012 | 144.7755 | Grabbed crab with suction sampler. Placed in port biobox. Z=516.6. [NW Rota 1 - Shimmering Shrimp]. | R782-Bio-0009 | Tunnicliffe | |
| 20:05:42 Mar/28/04 | 516 | 256 | 14.6012 | 144.7755 | Crab about to be suctioned to bio box. Sample 10. | | | R782-048 |
| 20:05:56 Mar/28/04 | 516 | 251 | 14.6012 | 144.7756 | Suction for biology into jar-2. Collected a white crab. Z=516.2. [NW Rota 1 - Shimmering Shrimp]. | R782-SS-J2-0010 | Tunnicliffe | |
| 20:07:10 Mar/28/04 | 515 | 337 | 14.6012 | 144.7755 | Another crab about to be suctioned. | | | R782-049 |
| 20:07:31 Mar/28/04 | 515 | 341 | 14.6012 | 144.7755 | Crab in suction on its way to bio box. | | | R782-050 |
| 20:12:58 Mar/28/04 | 515 | 17 | 14.6012 | 144.7756 | Biology SS into jar 3. It's a white crab. Z=515.3. [NW Rota 1 - Shimmering Shrimp]. | R782-SS-J3-0011 | Juniper | |
| 20:13:32 Mar/28/04 | 515 | 18 | 14.6012 | 144.7755 | Another crab ended up in the flush bottle jar#8. This vent has been christened Shimmering Shrimp Vent. Z=515.4. [NW Rota 1 - Shimmering Shrimp]. | R782-SS-J8-0012 | Tunnicliffe | |
| 20:13:55 Mar/28/04 | 515 | 20 | 14.6012 | 144.7755 | Top down view over yellow mat. | | | R782-051 |
| 20:15:17 Mar/28/04 | 515 | 117 | 14.6012 | 144.7755 | We're at the top of the cone here about 2 meters from the last samples. There was a high density of shrimp here. We'll sample them and sediments. | | | |
| 20:15:45 Mar/28/04 | 515 | 112 | 14.6012 | 144.7755 | Shrimp swarm on top of pinnacle. | | | R782-052 |
| 20:16:08 Mar/28/04 | 515 | 114 | 14.6012 | 144.7755 | Suction of shrimp and sediment into jar#4. We're at the top of the cone here about 2 meters from the last sample location. Subsamples: Sand and shrimp. Z=515.4. [NW Rota 1 - Shimmering Shrimp]. | R782-SS-J4-0013 | Juniper | |
| 20:16:25 Mar/28/04 | 515 | 115 | 14.6012 | 144.7755 | Suctioning shrimp on small pinnacle. | | | R782-053 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
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| 20:21:30 Mar/28/04 | 515 | 115 | 14.6012 | 144.7755 | Collecting gravel and sand from previous shrimp site. Same sand as sucked with shrimp. Fine-grained sediment washed out. Sample in same jar as sample 12 (crab). Flushed remainder of sample in hose into Jar 6. Z=515.2. [NW Rota 1 - Shimmering Shrimp]. | R782-SS-J6/8-0014 | Hein | |
| 20:21:46 Mar/28/04 | 515 | 119 | 14.6012 | 144.7755 | Suctioning sediment. | | | R782-054 |
| 20:25:56 Mar/28/04 | 515 | 120 | 14.6012 | 144.7755 | Trying to find a jar to put sediment sample in. | | | R782-055 |
| 20:29:12 Mar/28/04 | 515 | 118 | 14.6012 | 144.7755 | Discussion of whether there will be cross contamination of samples due to the misalignment of a jar on the holder. | | | |
| 20:36:22 Mar/28/04 | 515 | 121 | 14.6012 | 144.7755 | Begin search for high-flow site- a basin where venting was noted earlier. | | | |
| 20:38:09 Mar/28/04 | 517 | 120 | 14.6012 | 144.7755 | Looking for high flow region. | | | R782-056 |
| 20:39:26 Mar/28/04 | 517 | 275 | 14.6011 | 144.7755 | Small chimney venting fluid and particulate matter. Reorienting to sample. | | | |
| 20:39:57 Mar/28/04 | 517 | 313 | 14.6011 | 144.7755 | Particulates from high flow area. | | | R782-057 |
| 20:42:19 Mar/28/04 | 517 | 260 | 14.6011 | 144.7755 | High flow in region of shimmering water. | | | R782-058 |
| 20:42:58 Mar/28/04 | 515 | 293 | 14.6011 | 144.7755 | Marking with navaid called high-flow area. Shimmering flow coming out of a fracture at the base of a rock surrounded by sediment. More diffuse flow through an outcrop. Z=518. 275 hdg. | | | |
| 20:44:51 Mar/28/04 | 518 | 276 | 14.6011 | 144.7755 | Particulates and staining in high flow area. | | | R782-059 |
| 20:46:04 Mar/28/04 | 518 | 275 | 14.6011 | 144.7755 | Taking temperature using SS probe. | | | R782-060 |
| 20:46:10 Mar/28/04 | 518 | 276 | 14.6011 | 144.7755 | Temperature measurement of suction sampler; alien probe' Tmax=15C; Tambient=3.7-4.0C. | | | |
| 20:53:34 Mar/28/04 | 518 | 155 | 14.6011 | 144.7755 | Staining on rocks near diffuse flow. | | | R782-061 |
| 20:55:49 Mar/28/04 | 518 | 111 | 14.6012 | 144.7755 | Looking for place to take suction sample and rock sample; high-flow vent site. | | | |
| 20:58:42 Mar/28/04 | 518 | 100 | 14.6012 | 144.7755 | Possible "snow blower"? | | | R782-062 |
| 20:59:47 Mar/28/04 | 518 | 87 | 14.6012 | 144.7755 | Shimmering water emerging. | | | R782-063 |
| 21:00:31 Mar/28/04 | 518 | 86 | 14.6012 | 144.7755 | At base of shimmering shrimp vent site. Frame grab of outcrop with shimmering fluid flow. Outcrop stained yellows and browns. | | | |
| 21:05:17 Mar/28/04 | 518 | 87 | 14.6012 | 144.7755 | Large amount of shimmering fluid venting from small cavern in outcrop; frame grab. Looking for slurp sample site here. | | | |
| 21:06:50 Mar/28/04 | 518 | 90 | 14.6012 | 144.7755 | Suction sample for bacterial mat at base of shimmering shrimp vent site near cavern. Tavg=11C. Continued after rock sample at 21:28. Z=517.5. [NW Rota 1]. | R782-SS-J7-0015 | Moyer | |
| 21:08:24 Mar/28/04 | 518 | 85 | 14.6012 | 144.7755 | Slurping bacteria. | | | R782-064 |
| 21:14:59 Mar/28/04 | 517 | 85 | 14.6012 | 144.7755 | Hein rock sample R782-RK-16 in situ before collection. | | | R782-065 |
| 21:15:29 Mar/28/04 | 517 | 86 | 14.6012 | 144.7755 | Completely altered rock - browns and grays. From roof of cavern venting shimmering fluids. Rock highly friable and broke into several pieces during sampling. In port biobox. Z=517.4. [NW Rota 1]. | R782-RK-0016 | SROF geo team | |
| 21:15:54 Mar/28/04 | 517 | 86 | 14.6012 | 144.7755 | Hein rock sample R782-RK-0016 before breaking to smaller fragments. | | | R782-066 |
| 21:19:09 Mar/28/04 | 517 | 84 | 14.6012 | 144.7755 | Hein rock sample R782-RK-0016. | | | R782-067 |
| 21:27:30 Mar/28/04 | 518 | 63 | 14.6012 | 144.7755 | Continuing last suction sample for Moyer. | | | |
| 21:33:32 Mar/28/04 | 518 | 40 | 14.6012 | 144.7755 | End of suction sampling. | | | |
| 21:34:37 Mar/28/04 | 518 | 40 | 14.6012 | 144.7755 | Done suction sampling and heading to do a little more exploring around the summit. | | | |
| 21:38:08 Mar/28/04 | 517 | 50 | 14.6012 | 144.7755 | Moving the ship to central location over the summit. | | | |
| 21:39:50 Mar/28/04 | 515 | 5 | 14.6011 | 144.7755 | Exploring summit of volcano - ridge where hydrothermal venting is coming from is N-S 030 hdg. | | | |
| 21:40:45 Mar/28/04 | 514 | 345 | 14.6011 | 144.7755 | Looking along ridge where venting occurring. | | | R782-068 |
| 21:41:24 Mar/28/04 | 514 | 116 | 14.6012 | 144.7755 | We're looking east right now with another ridge coming off. We haven't been out to the east yet. | | | |

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| 21:41:27 Mar/28/04 | 514 | 110 | 14.6012 | 144.7755 | Looking east at another ridge. | | | R782-069 |
| 21:41:57 Mar/28/04 | 516 | 123 | 14.6012 | 144.7756 | Driving east along 2nd ridge. | | | R782-070 |
| 21:41:59 Mar/28/04 | 516 | 124 | 14.6012 | 144.7756 | We're driving east along another ridge. We're exploring the area. | | | |
| 21:42:48 Mar/28/04 | 515 | 302 | 14.6012 | 144.7756 | We're going to the northwest instead of east. We're following another ridgeline. Orientation is northwest (we think)? All fragmental material along the ridge crest. Slope to the south is steeper than the slope to the north. | | | |
| 21:43:01 Mar/28/04 | 515 | 317 | 14.6012 | 144.7755 | Following ridgeline NW. | | | R782-071 |
| 21:43:20 Mar/28/04 | 517 | 314 | 14.6013 | 144.7755 | Still following ridge NW. | | | R782-072 |
| 21:43:38 Mar/28/04 | 518 | 325 | 14.6013 | 144.7755 | Crest of ridge. | | | R782-073 |
| 21:44:10 Mar/28/04 | 521 | 355 | 14.6014 | 144.7754 | We're turning around and going back up the ridge to the summit and will then head farther to the east. Heading 125. | | | |
| 21:44:26 Mar/28/04 | 518 | 114 | 14.6014 | 144.7754 | Going back up ridge to summit. | | | R782-074 |
| 21:45:51 Mar/28/04 | 514 | 133 | 14.6012 | 144.7755 | We're now at the shallowest point. Back at the rocks on top with yellow staining and shrimp. Another attempt to head east. | | | |
| 21:46:12 Mar/28/04 | 515 | 124 | 14.6012 | 144.7756 | Heading east along ridge from summit. | | | R782-075 |
| 21:46:41 Mar/28/04 | 515 | 148 | 14.6012 | 144.7756 | The orientation of the ridge (where the vents are) is NW/SE. We're getting closer to the bottom to look for shimmering water. | | | |
| 21:46:45 Mar/28/04 | 516 | 138 | 14.6012 | 144.7756 | Moving east along ridge. Staining on rock. | | | R782-076 |
| 21:47:25 Mar/28/04 | 517 | 111 | 14.6012 | 144.7756 | Looking for signs of shimmering near bottom. | | | R782-077 |
| 21:47:41 Mar/28/04 | 517 | 144 | 14.6012 | 144.7756 | Scattered shrimp along the crest of this ridge. Don't see any shimmering water. | | | |
| 21:49:16 Mar/28/04 | 518 | 148 | 14.6012 | 144.7756 | We're exploring this area. The white on the rocks could possibly to alunite (according to de Ronde - Hein doesn't think so). | | | |
| 21:49:23 Mar/28/04 | 518 | 175 | 14.6012 | 144.7756 | Still looking for shimmering water. | | | R782-078 |
| 21:51:01 Mar/28/04 | 513 | 105 | 14.6012 | 144.7756 | Plume measurements here were low pH and high sulfur. We're looking north at the ridge that goes east from the summit. We're on the east side of the summit. | | | |
| 21:51:19 Mar/28/04 | 518 | 0 | 14.6012 | 144.7756 | Looking north at the east running ridge. | | | R782-079 |
| 21:51:37 Mar/28/04 | 517 | 12 | 14.6012 | 144.7756 | Lower view on same ridge. | | | R782-080 |
| 21:52:09 Mar/28/04 | 515 | 84 | 14.6012 | 144.7756 | We're continuing down away from the summit a little more. | | | |
| 21:53:39 Mar/28/04 | 525 | 3 | 14.6011 | 144.7756 | We're on the south side of this ridge that heads east from the summit. It's very steep. | | | |
| 21:53:39 Mar/28/04 | 525 | 3 | 14.6011 | 144.7756 | Climbing cliff on east side of summit. | | | R782-081 |
| 21:54:10 Mar/28/04 | 519 | 27 | 14.6011 | 144.7756 | Climbing cliff on east side of summit. | | | R782-082 |
| 21:54:34 Mar/28/04 | 515 | 333 | 14.6012 | 144.7756 | We're continuing east along the ridge. | | | |
| 21:55:08 Mar/28/04 | 512 | 26 | 14.6012 | 144.7757 | Sit cam is going off at 2155. | | | |
| 21:55:25 Mar/28/04 | 514 | 304 | 14.6012 | 144.7757 | There's an incredible plume visible on the cage camera. Where is it coming from? The cage is at 483m and we're at 517m. | | | |
| 21:55:53 Mar/28/04 | 517 | 356 | 14.6011 | 144.7757 | Staining on rock along eastward running ridge. | | | R782-083 |
| 21:56:54 Mar/28/04 | 519 | 94 | 14.6011 | 144.7758 | We're continuing east along the ridge. It's now sediment covered. There are scattered shrimp and outcrops (mainly on the south side of the ridge). | | | |
| 21:57:36 Mar/28/04 | 518 | 101 | 14.6011 | 144.7759 | Evidence of venting in the area of some of the outcrops. | | | |
| 21:57:55 Mar/28/04 | 519 | 82 | 14.6010 | 144.7759 | Sediment cover on eastward running ridge. With shrimp. | | | R782-084 |
| 21:58:40 Mar/28/04 | 519 | 80 | 14.6011 | 144.7759 | We're going to head as far as we can down the south side of this ridge - as far as the tether will allow. | | | |

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| 21:59:50 Mar/28/04 | 521 | 81 | 14.6011 | 144.7758 | Small outcrops with caverns all showing evidence of venting such as staining around the openings. Outcrops composed entirely of altered rock. | | | |
| 21:59:50 Mar/28/04 | 521 | 81 | 14.6011 | 144.7758 | Looking for shimmering water. | | | R782-085 |
| 22:00:52 Mar/28/04 | 522 | 88 | 14.6011 | 144.7759 | Still looking for shimmering. Lots of shrimp. | | | R782-086 |
| 22:00:58 Mar/28/04 | 522 | 86 | 14.6011 | 144.7759 | White staining but no shimmering. | | | R782-087 |
| 22:01:19 Mar/28/04 | 522 | 67 | 14.6010 | 144.7759 | Yellow and white staining of outcrops. Lots of shrimp; green-brown sand and gray-brown rock. Clear white stain around vent openings and yellow stain farther from vent. None now active. No shimmering fluid. | | | |
| 22:03:43 Mar/28/04 | 523 | 103 | 14.6010 | 144.7759 | Lots of mat on rocks. About 10m down on south side of summit. | | | R782-088 |
| 22:03:48 Mar/28/04 | 523 | 105 | 14.6010 | 144.7759 | Bacterial mats on outcrops. White staining along fractures - 10 m down S side of ridge. There are dead vent sites all along the steep face of this ridge. | | | |
| 22:05:50 Mar/28/04 | 532 | 114 | 14.6009 | 144.7759 | Yellow-green stained sand; gray sand; pale-colored rocks. This area may be less altered. Lots of bacterial mats and white staining along fractures and at base of outcrops in contact with sediment. | | | |
| 22:06:14 Mar/28/04 | 530 | 82 | 14.6009 | 144.7759 | Increasing number of shrimp. Heading SE along rock outcrops. | | | R782-089 |
| 22:07:51 Mar/28/04 | 525 | 91 | 14.6009 | 144.7759 | Lots of mats on slope. | | | R782-090 |
| 22:08:03 Mar/28/04 | 525 | 75 | 14.6009 | 144.7759 | Shimmering water and extensive white staining. Mark site with navaid. 60 m SE of high-flow vent site. Extensive fluid flux here. Called White Mat vent site; Suction alien T probe into vents. Tmax=12.6C. | | | |
| 22:08:12 Mar/28/04 | 526 | 83 | 14.6009 | 144.7759 | Low flow of shimmering water. Quite diffuse. | | | R782-091 |
| 22:08:39 Mar/28/04 | 525 | 54 | 14.6009 | 144.7760 | Shimmering water on cliff. | | | R782-092 |
| 22:08:49 Mar/28/04 | 526 | 49 | 14.6009 | 144.7760 | More shimmering. | | | R782-093 |
| 22:09:41 Mar/28/04 | 527 | 62 | 14.6009 | 144.7760 | Shimmering water about 60m SE of "high flow area". | | | R782-094 |
| 22:11:55 Mar/28/04 | 527 | 57 | 14.6009 | 144.7760 | Checking temp in diffuse vents with SS temp probe. | | | R782-095 |
| 22:15:25 Mar/28/04 | 527 | 98 | 14.6009 | 144.7760 | Continue exploration around White Mat vent site. About m-thick rocks with lots of shrimp; shimmering water; gastropods; yellow and white coatings on rocs; gray to yellow-gray sediment. | | | |
| 22:16:39 Mar/28/04 | 527 | 89 | 14.6008 | 144.7760 | Moving ESE....more staining and more shrimp. | | | R782-096 |
| 22:17:04 Mar/28/04 | 528 | 84 | 14.6008 | 144.7760 | Some sort of mat plus either snails or limpets. Also shrimp here. | | | R782-097 |
| 22:20:19 Mar/28/04 | 528 | 70 | 14.6008 | 144.7760 | Limpets. | | | R782-098 |
| 22:20:40 Mar/28/04 | 528 | 69 | 14.6008 | 144.7760 | Snails or limpets on edge of rock near shimmering water and white bacterial mats. | | | |
| 22:21:23 Mar/28/04 | 528 | 69 | 14.6008 | 144.7760 | Snails or limpets? | | | R782-099 |
| 22:21:51 Mar/28/04 | 528 | 66 | 14.6008 | 144.7760 | Snails or limpets? | | | R782-100 |
| 22:22:33 Mar/28/04 | 528 | 67 | 14.6008 | 144.7760 | Snails or limpets? Biologists unsure. | | | R782-101 |
| 22:23:57 Mar/28/04 | 528 | 67 | 14.6008 | 144.7760 | More limpets. | | | R782-102 |
| 22:25:25 Mar/28/04 | 527 | 54 | 14.6009 | 144.7760 | Earlier we went to the E then to the S and now going back N to main ridge and then continue farther E than we have been before. Following a ridge N. All outcrops on the W side of ridge. Sediment on the E side. | | | |
| 22:26:18 Mar/28/04 | 526 | 87 | 14.6009 | 144.7760 | Mats on rock; heading back north toward summit. | | | R782-103 |
| 22:27:26 Mar/28/04 | 517 | 6 | 14.6010 | 144.7760 | Heading east along ridge from summit. | | | R782-104 |
| 22:27:48 Mar/28/04 | 519 | 1 | 14.6010 | 144.7759 | Looking northwest from eastward running ridge. | | | R782-105 |
| 22:28:55 Mar/28/04 | 520 | 61 | 14.6011 | 144.7760 | Still looking east along ridge. | | | R782-106 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
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| 22:29:05 Mar/28/04 | 521 | 73 | 14.6011 | 144.7760 | Driving E from summit. Vertical cliffs with knife edge ridge; many shrimp and white coating on rocks. Turning around looking back W. Rocky cliff face on N side; sediment covered on S side. Shrimp and crabs - no venting evident. | | | |
| 22:29:25 Mar/28/04 | 524 | 100 | 14.6011 | 144.7761 | White staining along eastward running ridge. Knife-edge ridge. | | | R782-107 |
| 22:30:18 Mar/28/04 | 523 | 85 | 14.6010 | 144.7761 | Crab and shrimp near end of eastward ridge. | | | R782-108 |
| 22:32:10 Mar/28/04 | 523 | 231 | 14.6011 | 144.7761 | Shimmering water in places. White coatings on rocks. Gray sediment. Outcrops of grayish colored rocks. Driving back to summit and will explore to the S from there; following ridge back to the W. | | | |
| 22:34:20 Mar/28/04 | 518 | 309 | 14.6010 | 144.7759 | Continuing driving to the W. Getting back into large outcrops near the summit; pale-colored rocks surrounded by gray to gray-green sediment; stained yellow in places. Back at Shimmering Shrimp vent site. | | | |
| 22:34:52 Mar/28/04 | 519 | 276 | 14.6012 | 144.7757 | Main outcrops near summit again. | | | R782-109 |
| 22:35:30 Mar/28/04 | 514 | 236 | 14.6012 | 144.7756 | Back on yellow rock at highest point on summit. | | | R782-110 |
| 22:36:23 Mar/28/04 | 515 | 104 | 14.6012 | 144.7755 | Now driving to the S. Following a rocky face with thick outcrops. We're at the high-flow site and will continue S from here. Lost bottom and stirred-up debris in the water. | | | |
| 22:36:51 Mar/28/04 | 516 | 158 | 14.6011 | 144.7755 | Back in high flow area. Following rocky face from summit toward south. | | | R782-111 |
| 22:40:30 Mar/28/04 | 522 | 45 | 14.6010 | 144.7754 | Now water clearing and outcrops visible. Thick outcrops with little or no staining or coatings. Very clean rock face - over hanging in places. Moving into area of white coatings. | | | |
| 22:40:37 Mar/28/04 | 523 | 50 | 14.6010 | 144.7754 | Approaching vertical wall. | | | R782-112 |
| 22:42:49 Mar/28/04 | 521 | 63 | 14.6010 | 144.7754 | Top of rock wall. Wall had lots of overhangs. | | | R782-113 |
| 22:43:16 Mar/28/04 | 520 | 89 | 14.6011 | 144.7755 | Vertical-face outcrops with yellow staining and black to dark-gray sediment on top of thick blocks of rock. We are going to sit tight for about 5 minutes while the ship's GPS hard drive computer is being switched. | | | |
| 22:43:26 Mar/28/04 | 519 | 75 | 14.6011 | 144.7755 | Overhang with some yellow staining. | | | R782-114 |
| 22:44:01 Mar/28/04 | 518 | 38 | 14.6011 | 144.7755 | Top of pillar near high flow area. | | | R782-115 |
| 22:45:59 Mar/28/04 | 519 | 9 | 14.6010 | 144.7755 | Shrimp on top of pillar. | | | R782-116 |
| 22:47:41 Mar/28/04 | 519 | 8 | 14.6011 | 144.7755 | Detailed view of top of pillar. | | | R782-117 |
| 22:52:38 Mar/28/04 | 519 | 328 | 14.6011 | 144.7755 | Back to exploration. Piles of sediment at base of outcrops. Some shimmering water at base of outcrop. Moving the ship about 90 m to SE. That will put the ship just above the White Mat Vent site. | | | |
| 22:53:28 Mar/28/04 | 519 | 339 | 14.6011 | 144.7755 | Shimmering water coming out through sediments. South of high temperature area. | | | R782-118 |
| 22:55:35 Mar/28/04 | 514 | 4 | 14.6011 | 144.7755 | ROV is off bottom in order to move ship. Outcrops of thick, layered rock with yellow and white coatings. Yellow coatings on high points of each outcrop and white coatings at vent openings. Crab and shrimp; heading E from the big yellow rock. | | | |
| 23:00:02 Mar/28/04 | 518 | 158 | 14.6010 | 144.7760 | Outcrop continuously several m below crust of ridge. Mostly extinct vent sites. | | | |
| 23:00:57 Mar/28/04 | 522 | 189 | 14.6008 | 144.7760 | Continuing to follow ridge to SE. Moving ship to SE to White Mat vent site and then will explore to the SE from there. Looking NE at slope with vent over much of it and lots of white coatings and patches of dark sand. Lots of shrimp on rock with yellow. | | | |
| 23:04:36 Mar/28/04 | 542 | 46 | 14.6006 | 144.7760 | White coating along fractures in rock and around contact of rocks with sediment - which are the main loci of venting. Moving S following ridge into deeper water. Steep slope of rock outcrops with same pattern of yellow and white coatings. | | | |
| 23:05:22 Mar/28/04 | 542 | 69 | 14.6006 | 144.7760 | Moving southward (but looking at west face of ridge). Mats and shrimp on ridge. | | | R782-119 |
| 23:06:06 Mar/28/04 | 546 | 111 | 14.6005 | 144.7760 | More mats. | | | R782-120 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 23:06:30 Mar/28/04 | 548 | 83 | 14.6005 | 144.7760 | Steep slope of ridge oriented N-S. We are on W side of it and top of ridge is getting deeper as we go S. Transiting over crest of ridge to other side - which is covered with clastics. E. side is mostly clastics with ripples. | | | |
| 23:07:45 Mar/28/04 | 543 | 11 | 14.6004 | 144.7761 | Clastics on east side of ridge. | | | R782-121 |
| 23:08:41 Mar/28/04 | 542 | 294 | 14.6005 | 144.7762 | Ripples in sediment parallel to ridge axis. | | | R782-122 |
| 23:09:05 Mar/28/04 | 541 | 315 | 14.6005 | 144.7762 | Over crest of ridge on E side about 20 m down slope. Shrimp and small outcrops of highly altered rocks with craggy; rough surfaces. White to gray coating at contact of rock and sediment and along cracks and yellow coating. | | | |
| 23:09:40 Mar/28/04 | 543 | 346 | 14.6006 | 144.7762 | Getting more shrimp on rock outcrops. | | | R782-123 |
| 23:10:44 Mar/28/04 | 540 | 272 | 14.6006 | 144.7762 | Stained outcrop. | | | R782-124 |
| 23:11:15 Mar/28/04 | 537 | 257 | 14.6006 | 144.7762 | Limpets; lots of shrimp; crab; rocks encrusted with gray coating. Highlights going on. Collecting rock sample. | | | |
| 23:11:43 Mar/28/04 | 537 | 220 | 14.6006 | 144.7761 | Limpets on outcrop. | | | R782-125 |
| 23:12:48 Mar/28/04 | 535 | 277 | 14.6006 | 144.7761 | More shrimp and limpets. | | | R782-126 |
| 23:13:36 Mar/28/04 | 535 | 74 | 14.6006 | 144.7761 | Outcrop on top of ridge. Lots of shrimp. | | | R782-127 |
| 23:14:50 Mar/28/04 | 537 | 42 | 14.6006 | 144.7761 | Shrimp and limpets. | | | R782-128 |
| 23:15:33 Mar/28/04 | 537 | 47 | 14.6006 | 144.7761 | Preparing to grab rock. | | | R782-129 |
| 23:16:06 Mar/28/04 | 537 | 57 | 14.6006 | 144.7761 | Grabbing rock. | | | R782-130 |
| 23:16:20 Mar/28/04 | 537 | 64 | 14.6006 | 144.7761 | Collecting mineralized gray-coated rock. Limpet on it. Largest rock in the boot. Shimmering water came from place rock was collected. Z=537.3. [NW Rota 1]. | R782-RK-0017 | SROF geo team (Hein) | |
| 23:18:10 Mar/28/04 | 537 | 47 | 14.6006 | 144.7761 | Grabbing 2nd rock. Chadwick says it has a limpet. | | | R782-131 |
| 23:18:41 Mar/28/04 | 537 | 47 | 14.6006 | 144.7761 | Rock with limpet being put into boot. | | | R782-132 |
| 23:19:17 Mar/28/04 | 537 | 37 | 14.6006 | 144.7761 | Rock going into boot. Largest rock collected on dive. | | | R782-133 |
| 23:21:02 Mar/28/04 | 538 | 69 | 14.6006 | 144.7761 | Moving the ship about 190 m to the SE. | | | |
| 23:24:37 Mar/28/04 | 549 | 128 | 14.6004 | 144.7761 | Moving ship to area of major fault E of summit; N-W facing normal fault. Mostly sediment covered seafloor. Some areas of ripples - mostly degraded and pockmarked. Elongate white coating along fractures[?] or sediment layers. | | | |
| 23:25:47 Mar/28/04 | 551 | 133 | 14.6003 | 144.7762 | Heading SE to intersect the eastern fault. | | | R782-134 |
| 23:27:28 Mar/28/04 | 553 | 123 | 14.6003 | 144.7763 | Either bacterial mat (or ripples?) on ridge crest. | | | R782-135 |
| 23:29:45 Mar/28/04 | 558 | 119 | 14.6002 | 144.7765 | Continuing along degraded rippled and pockmarked sediment surface along the crest of a ridge. Yellowish stain in places and gravel lag in other places. | | | |
| 23:32:23 Mar/28/04 | 566 | 122 | 14.6000 | 144.7766 | Rock outcrop with white coating and dark-gray sediment. Yellowish-gray coating in places. Heading E. Gray sediment covered outcrop. White coating along fractures. White coating is distributed all over rock. | | | |
| 23:32:25 Mar/28/04 | 566 | 118 | 14.6000 | 144.7766 | White mats or staining on rocky outcrops. | | | R782-136 |
| 23:33:48 Mar/28/04 | 576 | 43 | 14.5999 | 144.7767 | Bright white staining on outcrops. | | | R782-137 |
| 23:34:51 Mar/28/04 | 571 | 80 | 14.6001 | 144.7768 | More white stains on ridge and outcrops. | | | R782-138 |
| 23:37:02 Mar/28/04 | 571 | 37 | 14.6001 | 144.7768 | Lots of staining on rocky outcrops but no shrimp. | | | R782-139 |
| 23:38:27 Mar/28/04 | 570 | 10 | 14.6002 | 144.7769 | No animals feeding on the white coating; so may not be bacterial mat; but rather mineralized. | | | |
| 23:40:14 Mar/28/04 | 571 | 59 | 14.6003 | 144.7769 | Yellow staining. | | | R782-140 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 23:40:35 Mar/28/04 | 572 | 53 | 14.6003 | 144.7769 | Yellow and white staining on sediment. | | | R782-141 |
| 23:40:42 Mar/28/04 | 573 | 51 | 14.6003 | 144.7769 | Yellow hill site; extensive yellow coating on rocks. Not many organisms here either. Yellow likely mineral deposit from what is now inactive venting. Driving to NNE. | | | |
| 23:43:42 Mar/28/04 | 572 | 18 | 14.6005 | 144.7768 | Sandy bottom with burrows and gravel in lows of ripples. Pockmarked and burrowed areas alternating with rippled areas with rock fragments in troughs. | | | |
| 23:44:21 Mar/28/04 | 574 | 333 | 14.6005 | 144.7769 | White material seems to be covering most of the bottom. | | | R782-142 |
| 23:46:20 Mar/28/04 | 567 | 22 | 14.6007 | 144.7767 | Ripples in sediment on ridge. | | | R782-143 |
| 23:47:03 Mar/28/04 | 571 | 105 | 14.6006 | 144.7768 | Sediment and outcrops with white and yellow coatings. Yellowish outcrops. Area of diffuse flow. Completely altered rock - or more likely hydrothermal precipitate. Yellowish slabby material up against the Eastern fault. | | | |
| 23:47:14 Mar/28/04 | 572 | 99 | 14.6006 | 144.7768 | Yellow staining on rocky outcrops. | | | R782-144 |
| 23:48:30 Mar/28/04 | 575 | 41 | 14.6006 | 144.7769 | Heavy yellow staining on outcrops. Shrimp colored yellow too. | | | R782-145 |
| 23:51:26 Mar/28/04 | 578 | 73 | 14.6008 | 144.7772 | Approaching eastern fault. | | | R782-146 |
| 23:52:10 Mar/28/04 | 580 | 117 | 14.6008 | 144.7772 | Looking down on wall at eastern fault. Some flow from wall. | | | R782-147 |
| 23:52:25 Mar/28/04 | 581 | 129 | 14.6008 | 144.7772 | Up against the eastern fault; rugged outcrop; everything mineralized; yellows; white/gray. Abundant shrimp and shimmering water coming out planes between layers in rock. Scarp is trending SE-NW. | | | |
| 23:54:19 Mar/28/04 | 579 | 106 | 14.6008 | 144.7772 | Shrimp in shimmering water on wall. | | | R782-148 |
| 23:54:41 Mar/28/04 | 580 | 108 | 14.6008 | 144.7772 | Close-up of shrimp. | | | R782-149 |
| 23:57:55 Mar/28/04 | 576 | 70 | 14.6009 | 144.7772 | We're at the top of this fault scarp. Lots of shrimp. Venting coming out of the fault face. Good flow. | | | |
| 23:58:18 Mar/28/04 | 577 | 67 | 14.6009 | 144.7772 | Fairly high flow from face of fault scarp. | | | R782-150 |
| 23:59:38 Mar/28/04 | 574 | 119 | 14.6009 | 144.7773 | We're going to continue to explore this fault a bit more. We're now east of the fault. There's an outcrop with shrimp at the base. | | | |
| 00:00:26 Mar/29/04 | 571 | 91 | 14.6008 | 144.7773 | Vertical outcrop on eastern fault scarp (SE of summit). | | | R782-151 |
| 00:00:52 Mar/29/04 | 568 | 99 | 14.6009 | 144.7773 | We're on the eastern fault. SE of the summit. The fault trends NW/SE. This is more of the last fault. | | | |
| 00:02:12 Mar/29/04 | 563 | 73 | 14.6008 | 144.7774 | Shimmering water coming out. We were just in the middle of the scarp earlier (at a step). We're on the top now. Abundant crabs and shrimp. | | | |
| 00:02:33 Mar/29/04 | 563 | 346 | 14.6008 | 144.7774 | White staining on fault scarp. | | | R782-152 |
| 00:03:01 Mar/29/04 | 565 | 357 | 14.6008 | 144.7774 | Shrimp. | | | R782-153 |
| 00:03:07 Mar/29/04 | 565 | 1 | 14.6008 | 144.7774 | These crabs are vent endemic "bythograeid austinograea". Sulfur flower species suspected by Verena. Navaid added: Scarp Top. Shimmering water and a big yellow outcrop. | | | |
| 00:03:27 Mar/29/04 | 565 | 352 | 14.6008 | 144.7774 | Shrimps on fault scarp top. | | | R782-154 |
| 00:04:10 Mar/29/04 | 565 | 353 | 14.6008 | 144.7774 | Crab and shrimp. | | | R782-155 |
| 00:04:20 Mar/29/04 | 565 | 353 | 14.6008 | 144.7774 | Crab and shrimp on scarp. | | | R782-156 |
| 00:04:53 Mar/29/04 | 565 | 352 | 14.6008 | 144.7774 | More shots of crab. | | | R782-157 |
| 00:05:14 Mar/29/04 | 565 | 354 | 14.6008 | 144.7774 | We're going to grab a piece of this rock at the scarp top. | | | |
| 00:06:47 Mar/29/04 | 565 | 351 | 14.6008 | 144.7774 | Rock sample. Looks like may be sulfur(?) in this sample taken from shimmering water area. - big yellow outcrop. The rock is very porous. It crumbled when ROPOS grabbed it. Now 1 pebble size and several pieces - crumbs? Z=565.1. [NW Rota 1 - Scarp Top]. | R782-RK-0018 | SROF geo team | |
| 00:07:36 Mar/29/04 | 565 | 346 | 14.6008 | 144.7774 | Grabbing piece of scarp top. Crabs in background. | | | R782-158 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R782 Comments: NW Rota-1 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 00:08:43 Mar/29/04 | 565 | 346 | 14.6008 | 144.7774 | Grabbing piece of scarp top. Crabs in background. | | | R782-159 |
| 00:10:06 Mar/29/04 | 565 | 355 | 14.6008 | 144.7774 | Preparing to put in boot. | | | R782-160 |
| 00:11:21 Mar/29/04 | 565 | 355 | 14.6008 | 144.7774 | We'll pump on the way up. Leaving the bottom. | | | |
| 00:11:36 Mar/29/04 | 565 | 1 | 14.6008 | 144.7774 | Stbd McLane pump sample on the ascent. Pumping from 200m to surface. Rising 5 meters/min. 10 liter lots. Start 0039. Stop 0116:56. 20 lots total. Z=564.9. [NW Rota 1]. | R782-MP-0019 | Juniper | |
| 00:15:03 Mar/29/04 | 550 | 165 | 14.6002 | 144.7775 | Home sweet home. | | | R782-161 |
| 00:21:48 Mar/29/04 | 552 | 298 | 14.6000 | 144.7775 | ROPOS is in the cage. | | | |
| 00:40:53 Mar/29/04 | 207 | 196 | 14.6001 | 144.7776 | Starting 2nd 10 liter batch. | | | |
| 00:42:29 Mar/29/04 | 198 | 162 | 14.6000 | 144.7776 | End 2nd pump batch and begin third. | | | |
| 00:46:02 Mar/29/04 | 181 | 159 | 14.6000 | 144.7776 | End 4th pump. Begin 5th. | | | |
| 00:47:43 Mar/29/04 | 172 | 163 | 14.6000 | 144.7777 | End 5th pump. Begin 6th. | | | |
| 00:49:23 Mar/29/04 | 164 | 145 | 14.6000 | 144.7777 | End 6th pump. Begin 7. | | | |
| 00:51:03 Mar/29/04 | 156 | 181 | 14.6001 | 144.7776 | End 7. Begin 8. | | | |
| 00:53:15 Mar/29/04 | 144 | 198 | 14.6001 | 144.7776 | We lost comms to the pump. | | | |
| 00:53:39 Mar/29/04 | 142 | 210 | 14.6001 | 144.7776 | Finished 8 before we lost comms. | | | |
| 00:56:16 Mar/29/04 | 142 | 221 | 14.6001 | 144.7776 | Start 9 - comms are back up again. | | | |
| 00:57:57 Mar/29/04 | 133 | 237 | 14.6001 | 144.7776 | End 9. Begin 10. | | | |
| 00:59:27 Mar/29/04 | 124 | 263 | 14.6001 | 144.7777 | End 10. Begin 11. | | | |
| 01:01:05 Mar/29/04 | 116 | 263 | 14.6001 | 144.7777 | End 11. Begin 12. | | | |
| 01:02:42 Mar/29/04 | 107 | 257 | 14.6000 | 144.7777 | End 12. Begin 13. | | | |
| 01:04:21 Mar/29/04 | 99 | 230 | 14.6001 | 144.7777 | End 13. Begin 14. | | | |
| 01:05:56 Mar/29/04 | 95 | 215 | 14.6001 | 144.7777 | End 14. Start 15. | | | |
| 01:07:29 Mar/29/04 | 85 | 234 | 14.6001 | 144.7777 | End 15. Begin 16. | | | |
| 01:09:04 Mar/29/04 | 81 | 237 | 14.6001 | 144.7777 | End 15. Begin 16. | | | |
| 01:10:41 Mar/29/04 | 70 | 197 | 14.6001 | 144.7777 | End 16. Begin 17. | | | |
| 01:12:15 Mar/29/04 | 61 | 196 | 14.6001 | 144.7776 | End 17. Begin 18. | | | |
| 01:13:57 Mar/29/04 | 53 | 187 | 14.6001 | 144.7777 | End 18. Begin 19. | | | |
| 01:15:29 Mar/29/04 | 45 | 194 | 14.6001 | 144.7777 | End 19. Begin 20. | | | |
| 01:16:56 Mar/29/04 | 14 | 188 | 14.6001 | 144.7777 | End 20. Finished McLane sampling. | | | |
| 01:21:18 Mar/29/04 | 2 | 285 | 14.6001 | 144.7777 | ROPOS is on the deck. | | | |
| 03:29:11 Mar/29/04 | 0 | 0 | 14.6001 | 144.7777 | Sediment sample consisting of rock fragments; pyrite; chalcopyrite(?); sulfur and some microbiology (foraminifera etc) collected from the bottom of the biobox. [NW Rota 1]. | R782-sed-0019 | Hein | |
| 03:29:15 Mar/29/04 | 0 | 0 | 14.6001 | 144.7777 | Sediment sample consisting of rock fragments; pyrite; chalcopyrite(?); sulfur and some microbiology (foraminifera etc) collected from the boot. [NW Rota 1]. | R782-sed-0020 | Hein | |

## 8.2 R783 Dive Log: NW Rota-1

| **R783: Northwest Rota-1** |
|---|
| wet time (UTC): 3/29 1117 - 3/30 0634. JD 89-90. 19.28 hrs. |
| bottom time (UTC): 3/29 1148 - 3/30 0544. 17.93 hrs. [37 samples] |
| The transponder for the USBL lost its charge at ~0200. The batteries went dead. No navigation after that point. |
| **R783 DSC information:** The digital still camera was inoperable and no DSCs were taken on this dive. |
| HFS sampling dive at NW Rota-1. Navigation was lost due to inadequate battery charge around 3/30 0200. There was no decent navigation after that point (~2.5 hours at end of dive). A huge plume was found with intense heat and large amounts of sulfur. The crater was eventually named "Rota Pit" - but changed to "Brimstone Pit" at a later time. Started at Fault Shrimp, next to Scarp Top, then Iceberg for shrimp behavioral study, next to White Mat/Gastros, then to High Flow, then to exploring the Western Fault Scarp. At the end of the dive we returned to Brimstone Pit. Samples: **Fault Shrimp**: 2 plankton nets, 4 HFS, 1 gas tight, 1 suction, and 1 rock. **Scarp Top**: 5 HFS; 1 gas tight bottle, 1 suction 1 rock. **Iceberg**: 7 HFS, 1 gas tight bottle, 2 suctions, 1 rock. **Near Gastros**: 1 suction. **High Flow**: 3 HFS, 1 gas tight. **W Fault Scarp**: 1 suction, 1 rock. **Brimstone Pit**: 2 HFS. |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 11:17:16 Mar/29/04 | 0 | 0 | 14.6001 | 144.7777 | ROPOS is in the water. | | | |
| 11:30:30 Mar/29/04 | 117 | 125 | 14.6011 | 144.7756 | We are recording descent for Tunnicliffe. Started at 11:28. | | | |
| 11:48:56 Mar/29/04 | 508 | 121 | 14.6011 | 144.7753 | ROPOS in thick plume. | | | |
| 11:48:56 Mar/29/04 | 508 | 121 | 14.6011 | 144.7753 | At bottom which is 492m. First sight of plume. | | | R783-001 |
| 11:54:38 Mar/29/04 | 533 | 333 | 14.6010 | 144.7753 | Almost at site to begin larval net tows. We'll head north a bit and then tow for 30 minutes or to the HFS sampling site whichever is longer. | | | |
| 11:57:55 Mar/29/04 | 522 | 83 | 14.6013 | 144.7754 | Unconsolidated sediment at bottom. | | | R783-002 |
| 11:58:02 Mar/29/04 | 521 | 86 | 14.6013 | 144.7754 | Plankton tows started. Trying to stay 5m above bottom. We'll tow for 30 minutes. | | | |
| 11:59:44 Mar/29/04 | 509 | 83 | 14.6010 | 144.7757 | Stbd larval net tow. 3-20 m above bottom. Ship 0.5kts. ROPOS ~1 kt. Start: Shimmering Shrimp; Fault Shrimp; 60m N of Fault Shrimp; Yellow Top; Fault Shrimp; 60m N of Fault Shrimp; Fault Shrimp. Z=517-572m. [NW Rota 1]. | R783-net-S-0001 | Metaxas | |
| 11:59:57 Mar/29/04 | 510 | 79 | 14.6010 | 144.7758 | Port larval net tow. 3-20 m above bottom. Ship 0.5kts. ROPOS ~1 kt. Start: Shimmering Shrimp; Fault Shrimp; 60m N of Fault Shrimp; Yellow Top; Fault Shrimp; 60m N of Fault Shrimp; Fault Shrimp. Z=517-572m. [NW Rota 1]. | R783-net-P-0002 | Metaxas | |
| 12:02:08 Mar/29/04 | 528 | 90 | 14.6010 | 144.7763 | Ship started moving at a half knot. | | | |
| 12:07:45 Mar/29/04 | 573 | 110 | 14.6010 | 144.7770 | Bottom while collecting at 5m altitude. | | | R783-003 |
| 12:11:56 Mar/29/04 | 570 | 190 | 14.6005 | 144.7775 | Ship is stopped. ROPOS moving down to remain 5m above bottom. | | | |
| 12:15:14 Mar/29/04 | 579 | 22 | 14.6006 | 144.7775 | Northeast-Southwest structure of the fault. | | | R783-004 |
| 12:15:20 Mar/29/04 | 577 | 23 | 14.6006 | 144.7776 | It looks like we're transiting over a north-south structure. There are big fractures going north-east south-west. | | | |
| 12:19:11 Mar/29/04 | 578 | 5 | 14.6014 | 144.7773 | ROPOS is turning around to head south of the cage. | | | |
| 12:24:14 Mar/29/04 | 566 | 36 | 14.6003 | 144.7768 | ROPOS is turning around and heading NW so we don't get too far from the cage. | | | |
| 12:28:41 Mar/29/04 | 576 | 208 | 14.6013 | 144.7772 | ROPOS is turning around and heading for the Fault Shrimp. We'll close the larval nets just before we reach the vent. | | | |
| 12:30:04 Mar/29/04 | 571 | 171 | 14.6009 | 144.7773 | Larval nets are closed. | | | |
| 12:33:11 Mar/29/04 | 577 | 334 | 14.6008 | 144.7773 | We're looking for Fault Shrimp. | | | |
| 12:37:49 Mar/29/04 | 579 | 79 | 14.6008 | 144.7773 | Shrimp while heading north along fault. | | | R783-005 |
| 12:38:03 Mar/29/04 | 580 | 88 | 14.6008 | 144.7773 | We're at Fault Shrimp. We'll start sampling once a good site is located. | | | |
| 12:44:46 Mar/29/04 | 581 | 65 | 14.6008 | 144.7773 | Still looking for a good site to sample. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 12:45:53 Mar/29/04 | 583 | 77 | 14.6008 | 144.7773 | Fault shrimp and sulfur in top left corner. | | | R783-006 |
| 12:46:20 Mar/29/04 | 583 | 77 | 14.6008 | 144.7773 | There is a problem with the fluid sampler. We're cycling power to see if it will start to work. | | | |
| 12:49:02 Mar/29/04 | 583 | 77 | 14.6008 | 144.7773 | Shrimp and talus (breccia?) sulfur with 10 cm scale. | | | R783-007 |
| 12:51:02 Mar/29/04 | 583 | 90 | 14.6008 | 144.7773 | Fault shrimp and sulfur. | | | R783-008 |
| 12:51:19 Mar/29/04 | 583 | 88 | 14.6008 | 144.7773 | Talus pile or perhaps breccia in-filled with sulfur? | | | R783-009 |
| 12:51:33 Mar/29/04 | 583 | 87 | 14.6007 | 144.7773 | We're in an area with a lot of shrimp and shimmering water. Dealing with microphone problems. | | | |
| 12:55:06 Mar/29/04 | 583 | 87 | 14.6008 | 144.7773 | We're seeing sulfur matrix binding much of the talus. Diffuse fluids are going through the talus and overlying sediments. There seems to be a strong association between sulfur and algal mats. | | | |
| 12:57:04 Mar/29/04 | 583 | 87 | 14.6007 | 144.7773 | Temperature probe in the sediment. | | | R783-010 |
| 12:57:06 Mar/29/04 | 583 | 87 | 14.6008 | 144.7773 | Checking temperatures with temp probe. No change between background and sediment temperature. | | | |
| 12:59:28 Mar/29/04 | 583 | 109 | 14.6008 | 144.7773 | We're not getting any higher temperature than 8. There isn't a difference with the background temperature. | | | |
| 13:00:21 Mar/29/04 | 583 | 111 | 14.6008 | 144.7773 | Found a spot with 11.5 temperature reading. | | | |
| 13:02:14 Mar/29/04 | 583 | 110 | 14.6008 | 144.7773 | We're getting higher temperatures (16) around sulfur. | | | |
| 13:05:50 Mar/29/04 | 583 | 108 | 14.6008 | 144.7773 | Finally broke a temperature of 20. We got 21! | | | |
| 13:09:27 Mar/29/04 | 583 | 110 | 14.6007 | 144.7773 | The probe is measuring 21 deg. C at this location. | | | R783-011 |
| 13:11:57 Mar/29/04 | 583 | 110 | 14.6008 | 144.7773 | The valve is not responding on the HFS. | | | |
| 13:12:12 Mar/29/04 | 583 | 110 | 14.6008 | 144.7773 | HFS Filtered bag #11. Start=1312 Stop=1317 T2=17 Tmax=23.1 T1avg= 22.1 Vol=650ml. Z=582.6. [NW Rota 1 - Fault Shrimp]. | R783-HFS-11-0003 | Butterfield | |
| 13:19:07 Mar/29/04 | 583 | 109 | 14.6007 | 144.7773 | Sterivex DNA#13. Start=1319 Stop=1332 T2=16 T1max=22.6 T1avg=20.4 Vol=1204ml. Z=582.7. [NW Rota 1 - Fault Shrimp]. | R783-HFS-13-0004 | Butterfield | |
| 13:22:56 Mar/29/04 | 583 | 110 | 14.6008 | 144.7773 | Fired Gas Tight Bottle (GTB #1) (HIL #9). T=21.5. Z=582.7. [NW Rota 1 - Fault Shrimp]. | R783-GTB-1-0005 | Butterfield | |
| 13:28:08 Mar/29/04 | 583 | 110 | 14.6007 | 144.7773 | Shrimp preferentially gathering on mound. | | | R783-012 |
| 13:28:27 Mar/29/04 | 583 | 108 | 14.6008 | 144.7773 | Focusing on a shrimp mound while sampling. The video will be used for behavioral studies. | | | |
| 13:34:28 Mar/29/04 | 583 | 111 | 14.6008 | 144.7773 | HFS FISH sample #7. Start=1334 Stop=1335 T2=16.0 T1max=21.0 T1avg=20.6 Vol=203ml. Z=582.6. [NW Rota 1 - Fault Shrimp]. | R783-HFS-7-0006 | Butterfield | |
| 13:36:43 Mar/29/04 | 583 | 110 | 14.6008 | 144.7773 | We'll stop looking at the shrimp to check out ROPOS gear/sample bottles. | | | |
| 13:38:21 Mar/29/04 | 583 | 110 | 14.6008 | 144.7773 | HFS piston sample #5. Start=1338 Stop=1343. T2=17 T1max=22.2 T1avg=20.7 Vol=687ml Z=582.7. [NW Rota 1 - Fault Shrimp]. | R783-HFS-5-0007 | Butterfield | |
| 13:39:52 Mar/29/04 | 583 | 110 | 14.6008 | 144.7773 | Back to looking at shrimp during the sample. Ecology highlight tape is on. | | | |
| 13:46:01 Mar/29/04 | 583 | 111 | 14.6007 | 144.7773 | Using HFS temperature probe to probe around where we have been making shrimp behavior observations. | | | |
| 13:47:39 Mar/29/04 | 583 | 109 | 14.6008 | 144.7773 | Relocating the vehicle to make temperature measurements. | | | |
| 13:50:59 Mar/29/04 | 582 | 100 | 14.6008 | 144.7773 | Measured temperature of 9.9 C. | | | R783-013 |
| 13:52:26 Mar/29/04 | 583 | 100 | 14.6008 | 144.7773 | Measured temperature of 9.9 C. | | | R783-014 |
| 13:54:01 Mar/29/04 | 583 | 99 | 14.6008 | 144.7773 | Preparing for suction sampling. | | | |
| 14:00:56 Mar/29/04 | 583 | 100 | 14.6007 | 144.7773 | Massive sulfur as matrix to volcaniclastic rocks at Fault Shrimp. | | | R783-015 |
| 14:02:16 Mar/29/04 | 583 | 102 | 14.6008 | 144.7773 | Shift change. Taking time to orient new watch standers. | | | |
| 14:11:50 Mar/29/04 | 582 | 103 | 14.6008 | 144.7773 | Having trouble catching shrimp for suctioning. | | | |
| 14:12:03 Mar/29/04 | 583 | 102 | 14.6008 | 144.7773 | Sucking up sulfur-rich material from Fault Shrimp site. | | | R783-016 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 14:12:53 Mar/29/04 | 582 | 105 | 14.6008 | 144.7773 | Suctioning yellowish mat material and shrimp in same general location as fluid sampling. Z=582.4. [NW Rota 1 - Fault Shrimp]. | R783-SS-JJ2-0008 | Juniper | |
| 14:19:21 Mar/29/04 | 583 | 101 | 14.6008 | 144.7773 | Discussing picking up a piece of the yellow covered rock for De Ronde. | | | |
| 14:20:18 Mar/29/04 | 583 | 102 | 14.6008 | 144.7773 | There is a Marker in the purse that may be in the way for taking a rock sample. | | | |
| 14:22:35 Mar/29/04 | 583 | 101 | 14.6008 | 144.7773 | Picking up a piece of rock. Still trying to determine if there is a Marker in the purse. | | | |
| 14:24:03 Mar/29/04 | 583 | 101 | 14.6008 | 144.7773 | The homer probe was put in the purse for this dive although it was not on the dive plan. There is a Marker attached to it. | | | |
| 14:27:07 Mar/29/04 | 583 | 100 | 14.6008 | 144.7773 | Putting the HFS intake on the bottom so we can use the arm to open the purse. Temperature down in the sediment where we are putting the intake down is 33 degrees. | | | |
| 14:29:07 Mar/29/04 | 583 | 100 | 14.6008 | 144.7773 | Opening the purse. | | | |
| 14:29:51 Mar/29/04 | 583 | 100 | 14.6008 | 144.7773 | Piece of yellowish-white (sulfur) rock. Two small pieces fell into the bag from the larger piece in the frame grab. Z=582.6. [NW Rota 1 - Fault Shrimp]. | R783-RK-0009 | SROF geo team (De Ronde) | |
| 14:29:51 Mar/29/04 | 583 | 100 | 14.6008 | 144.7773 | A yellowish-white (Sulphur?) rock placed into the purse. | | CdR | R783-017 |
| 14:30:48 Mar/29/04 | 583 | 99 | 14.6008 | 144.7773 | The rock broke while sampling. At least two large chunks made it in the purse. | | CdR | R783-018 |
| 14:33:08 Mar/29/04 | 583 | 102 | 14.6008 | 144.7773 | Probing around with the HFS intake a bit more in the sediment in this area to get temperature. | | | |
| 14:34:51 Mar/29/04 | 583 | 101 | 14.6008 | 144.7773 | We are trying to measure the temperature of the sediments using Dave's probe. | | | R783-019 |
| 14:35:20 Mar/29/04 | 583 | 102 | 14.6008 | 144.7773 | Temperature is slowly going up but pump on fluid sampler is not on. Temperature is leveling off around 22 degrees. | | | |
| 14:37:35 Mar/29/04 | 582 | 99 | 14.6008 | 144.7773 | Temperature max in the sediment is about 24 degrees. | | | |
| 14:37:58 Mar/29/04 | 583 | 101 | 14.6008 | 144.7773 | Running HFS pump in reverse to get sediment out of the intake probe. | | | |
| 14:39:22 Mar/29/04 | 583 | 101 | 14.6008 | 144.7773 | Stowing the HFS intake probe. | | | |
| 14:39:49 Mar/29/04 | 583 | 99 | 14.6008 | 144.7773 | Large chunk of the yellowish/white rock that was being sampled. It is being dropped. | | | R783-020 |
| 14:40:51 Mar/29/04 | 583 | 100 | 14.6008 | 144.7773 | Flushing suction sampler into jar 8. | | | |
| 14:42:48 Mar/29/04 | 583 | 99 | 14.6008 | 144.7773 | Heading to next location - Scarp Top. | | | |
| 14:43:45 Mar/29/04 | 581 | 104 | 14.6007 | 144.7773 | Lifting up - facing to the east as we go up the wall. | | | |
| 14:44:33 Mar/29/04 | 577 | 102 | 14.6008 | 144.7773 | There is a lot of the black sediment up on top this wall that looks similar to what was down below where we were fluid sampling. Flow up here looks stronger than down at the bottom. | | | |
| 14:44:56 Mar/29/04 | 577 | 114 | 14.6008 | 144.7773 | The black sediment seen previously likely fell from here. Also there looks to be high temperature flow from under the ledge. | | | R783-021 |
| 14:46:38 Mar/29/04 | 577 | 129 | 14.6008 | 144.7773 | Try to get temperature reading of the flow up at the top of the ledge above Fault Shrimp sampling site. | | | |
| 14:48:41 Mar/29/04 | 577 | 140 | 14.6008 | 144.7773 | HFS pump is on. Temperature is going up a bit. Moving the probe around in the flow coming out from under the ledge. | | | |
| 14:49:29 Mar/29/04 | 577 | 141 | 14.6008 | 144.7773 | An attempt to measure the temperature of the flow from under the rock ledge. | | | R783-022 |
| 14:51:44 Mar/29/04 | 577 | 143 | 14.6008 | 144.7773 | The highest temperatures seem to be found in the small cleft. | | | R783-023 |
| 14:52:33 Mar/29/04 | 577 | 142 | 14.6008 | 144.7773 | Measured temperature of a little over 15 degrees coming out from under the ledge. Stowing the probe and continuing on. | | | |
| 14:54:59 Mar/29/04 | 574 | 93 | 14.6008 | 144.7774 | Continuing up the fault. More patches of sulfur embedded in the wall. | | | |
| 14:56:05 Mar/29/04 | 566 | 83 | 14.6009 | 144.7774 | Tremendous amount of sulfur seen encrusting the fault scarp as we go up towards Scarp Top. | | | |
| 14:57:12 Mar/29/04 | 560 | 120 | 14.6009 | 144.7775 | Moving SE towards Scarp Top. Lots of sulfur seen either side of the ridge encrusting the sediments and unconsolidated pieces of lava. | | | |
| 14:57:21 Mar/29/04 | 560 | 125 | 14.6009 | 144.7775 | In transit on the way to Scarp Top. There looks to be lots of sulphur along ridge. | | | R783-024 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 15:00:30 Mar/29/04 | 563 | 101 | 14.6009 | 144.7775 | Lots of sulfur encrusting sediments along top of the sediment covered ridge. Tremendous amount of sulfur seen at this locality. Also see white colored rock. Is this alunite bearing? | | | |
| 15:00:59 Mar/29/04 | 562 | 132 | 14.6009 | 144.7775 | Traveling along another ridge that has sulphur encrusting the sediments. | | | R783-025 |
| 15:02:06 Mar/29/04 | 566 | 229 | 14.6009 | 144.7775 | A group of five fish. They look to be rat-tails. | | | R783-026 |
| 15:06:40 Mar/29/04 | 563 | 358 | 14.6008 | 144.7775 | | | | R783-027 |
| 15:06:49 Mar/29/04 | 563 | 357 | 14.6008 | 144.7776 | Bacterial mat seen on top of Scarp Top where lots of sulfur encrustations of the rocks. | | | |
| 15:07:40 Mar/29/04 | 563 | 357 | 14.6008 | 144.7776 | Bacterial mat. | | | R783-028 |
| 15:09:44 Mar/29/04 | 563 | 352 | 14.6008 | 144.7776 | See what appears to be iron oxide staining of rocks on top of ridge slightly NE and higher than Scarp Top. Mostly sulfur encrustations and locally white bacterial mats. | | | |
| 15:09:49 Mar/29/04 | 563 | 355 | 14.6008 | 144.7775 | Some iron oxides seen in the sediments. | | | R783-029 |
| 15:14:24 Mar/29/04 | 565 | 317 | 14.6008 | 144.7775 | At the Scarp Top locality where sulfur sample was taken yesterday. It appears to be a massive mound totally dominated by sulfur with black sediment draped over it in places. | | | |
| 15:14:36 Mar/29/04 | 565 | 317 | 14.6008 | 144.7775 | Some shrimp on "swiss cheese" sulphur. | | | R783-030 |
| 15:22:07 Mar/29/04 | 564 | 207 | 14.6008 | 144.7775 | Taking temperature reading at top of ridge near Scarp Top. 38.5 degrees. | | | |
| 15:22:21 Mar/29/04 | 564 | 208 | 14.6008 | 144.7775 | Dave is sampling the water from Scarp Top. Lots of shrimp and some small crabs in the area. | | | R783-031 |
| 15:23:34 Mar/29/04 | 564 | 208 | 14.6008 | 144.7775 | HFS unfiltered bag #8 Start 1529 Stop 1534 Tmax=39.7 Tavg=39.0 T2=25.8 Vol=625ml Z=563.7. HFS valve sticking. Site is on top large mound of hydrothermal deposits. More vigorous flow. [NW Rota 1 - Scarp Top]. | R783-HFS-8-0010 | Butterfield | |
| 15:35:27 Mar/29/04 | 564 | 210 | 14.6008 | 144.7775 | HFS filtered bag #9. Start 1535 Stop 1541. Tmax=39.5 Tavg=39.2 T2=26.7. Vol=625mls Z=563.8. Temperature is holding pretty stable here. [NW Rota 1 - Scarp Top]. | R783-HFS-9-0011 | Butterfield | |
| 15:42:14 Mar/29/04 | 564 | 208 | 14.6008 | 144.7775 | Firing gas tight bottle #2 (HIL #11). Fired at 1543. Tavg=39 Z=563.7. [NW Rota 1 - Scarp Top]. | R783-GTB-2-0012 | Lupton | |
| 15:44:45 Mar/29/04 | 564 | 209 | 14.6008 | 144.7775 | HFS Sterivex DNA filter #3. Start 1545 Stop 1558 Tmax=39.9 Tavg=38.7 T2=26.0 Z=563.8 Vol=1201ml. There was a slight temperature drop during sampling. Current may have changed direction. [NW Rota 1 - Scarp Top]. | R783-HFS-3-0013 | Butterfield | |
| 15:59:39 Mar/29/04 | 564 | 210 | 14.6008 | 144.7775 | HFS filter #10 for RNA. Start 1600 Stop 1615. Tmax=39.1 Tavg=38.5 T2=26.0 Z=563.8 Vol=1219ml. Temperature was very stable during sampling. [NW Rota 1 - Scarp Top]. | R783-HFS-10-0014 | Butterfield | |
| 16:16:29 Mar/29/04 | 564 | 212 | 14.6008 | 144.7775 | HFS piston #4. Start 1616 Stop 1622. Tmax=39.0 Tavg=38.4 T2=26.0 Z=563.8 Vol=789ml. [NW Rota 1 - Scarp Top]. | R783-HFS-4-0015 | Butterfield | |
| 16:25:17 Mar/29/04 | 564 | 211 | 14.6008 | 144.7775 | Done fluid sampling. We are going to do some suction sampling now. Sampling orifice we were just in fell apart when we removed the HFS intake probe. | | | |
| 16:27:43 Mar/29/04 | 563 | 237 | 14.6008 | 144.7775 | Looking around the area a bit. Looking to suction crabs and shrimp and some substrate. | | | |
| 16:28:21 Mar/29/04 | 563 | 192 | 14.6008 | 144.7775 | Scarp Top. Lots of sulfur encrusting the sediments here. | | | R783-032 |
| 16:30:34 Mar/29/04 | 564 | 96 | 14.6008 | 144.7775 | Scree slope encrusted with sulfur and lots of talus that is covered by sediment. Lots of shrimps and some crabs. | | | |
| 16:32:58 Mar/29/04 | 565 | 83 | 14.6008 | 144.7775 | Sampling for crab at Scarp Top. | | | |
| 16:33:30 Mar/29/04 | 565 | 93 | 14.6008 | 144.7775 | Sampled crabs (3). Later added 3-4 shrimps and some of the yellow material (sulfur) encrusting the sediments in this Scarp Top area. Z=564.8. [NW Rota 1 - Scarp Top]. | R783-SS-J1-0016 | Juniper | |
| 16:37:22 Mar/29/04 | 564 | 89 | 14.6008 | 144.7775 | Crab grab. | | | R783-033 |
| 16:39:50 Mar/29/04 | 564 | 70 | 14.6008 | 144.7775 | Continuing crab sampling at Scarp Top. | | | |
| 16:44:32 Mar/29/04 | 564 | 13 | 14.6008 | 144.7775 | Moving off ridge slightly to find swarm of shrimp to also sample in jar #1. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 16:45:23 Mar/29/04 | 565 | 27 | 14.6008 | 144.7775 | Sulfur deposits at Scarp Top. | | | R783-034 |
| 16:45:41 Mar/29/04 | 565 | 36 | 14.6008 | 144.7775 | Shrimp and crabs at sulfur deposits. | | | R783-035 |
| 16:46:49 Mar/29/04 | 565 | 18 | 14.6008 | 144.7775 | Sampling shrimp near outcropping sulfur covered by black sediment with some rock also exposed. | | | |
| 16:54:26 Mar/29/04 | 565 | 30 | 14.6008 | 144.7775 | Finished sampling 3 crabs and 3-4 shrimps and some of the yellow material (sulfur) encrusting the sediments in this Scarp Top area. | | | |
| 16:55:56 Mar/29/04 | 563 | 317 | 14.6008 | 144.7775 | Scarp Top site. Peak on the left is the site of fluid sampling. Suction sampling was near sulfur deposits on the right. | | | R783-036 |
| 16:55:57 Mar/29/04 | 563 | 317 | 14.6008 | 144.7775 | Off to sample altered rock on top of Scarp Top. | | | |
| 16:57:26 Mar/29/04 | 564 | 86 | 14.6008 | 144.7775 | Near Scarp Top site. | | | R783-037 |
| 17:02:38 Mar/29/04 | 565 | 79 | 14.6008 | 144.7775 | Rock sample number 2 taken from Scarp Top site. | | | R783-038 |
| 17:02:43 Mar/29/04 | 565 | 78 | 14.6008 | 144.7775 | Sampled rock sample #2 at Scarp Top, which is about fist sized and has a white (maybe sulfur?) coating on one edge. | | | |
| 17:05:57 Mar/29/04 | 565 | 79 | 14.6008 | 144.7775 | White crust on side of rock sample number 2. | | | R783-039 |
| 17:06:19 Mar/29/04 | 565 | 80 | 14.6008 | 144.7775 | Sampled rock and put in the purse. It is a vesiculated rock with one side having a coating of sulfur(?) on it. Sample about fist sized. Z=565.1.[NW Rota 1 - Scarp Top]. | R783-RK-0017 | SROF geo team | |
| 17:10:55 Mar/29/04 | 565 | 79 | 14.6008 | 144.7775 | Finished sampling of rock and now decided to move slightly E of Scarp Top to survey new area. Now 563 m depth. | | | |
| 17:12:55 Mar/29/04 | 568 | 70 | 14.6009 | 144.7776 | Turned around and heading back to W and viewing east side of fault scarp and see a volcaniclastic cemented with sulfur. | | | |
| 17:13:12 Mar/29/04 | 569 | 265 | 14.6008 | 144.7776 | Breccias cemented with sulfur. | | | R783-040 |
| 17:15:35 Mar/29/04 | 562 | 286 | 14.6008 | 144.7775 | Moving W and see fault scarp which is quite steep perhaps 15-20 m high. Blocky with lots of talus and covered by sediment. | | | |
| 17:17:53 Mar/29/04 | 578 | 116 | 14.6007 | 144.7774 | Looking back towards SE at fault scarp, which locally is very steep and see brecciated talus slope with sulfur matrix binding the sediment. | | | |
| 17:20:35 Mar/29/04 | 586 | 268 | 14.6006 | 144.7774 | Hummocks of sediments with tops that appear to have sulfur patches outcropping on them. | | | |
| 17:21:53 Mar/29/04 | 587 | 252 | 14.6005 | 144.7773 | Pagoda like structure of lava covered with white deposits. | | | R783-041 |
| 17:22:12 Mar/29/04 | 587 | 251 | 14.6005 | 144.7773 | Pagodas of lavas(?) coated with white material and dark sediments. | | | |
| 17:23:29 Mar/29/04 | 586 | 264 | 14.6005 | 144.7772 | Heading west from Scarp Top to White Mat and Gastros area. | | | R783-042 |
| 17:25:06 Mar/29/04 | 580 | 266 | 14.6005 | 144.7771 | Continue to see pagoda like lavas with what patches which suspect might be sulfur? Covered by black sediments. | | | |
| 17:26:48 Mar/29/04 | 574 | 280 | 14.6005 | 144.7769 | Now closer to Yellow Top and Snow cone and traversing a flat featureless area with lots of sediments and white patches. | | | |
| 17:28:08 Mar/29/04 | 570 | 313 | 14.6006 | 144.7768 | See some small (~1 m) conical depressions in the sediments. Collapse structures in the sediments? Now moving westwards and moving uphill towards White Mat and Gastros. | | | |
| 17:30:10 Mar/29/04 | 564 | 262 | 14.6007 | 144.7766 | Featureless plain with granules of coarser material. See rocky outcrops as we approach White Mats. Near vertical slope of blocky lavas. | | | |
| 17:32:41 Mar/29/04 | 530 | 284 | 14.6008 | 144.7764 | See steep slopes of mostly sediment but stained white in places with some shrimp as we approach White Mats and see shimmering water. See ridge slope with lots of white patches. | | | |
| 17:38:11 Mar/29/04 | 531 | 355 | 14.6007 | 144.7763 | Found a lot of shimmering water at base of steep outcrop. Call site "Iceberg" and will probably sample fluids here. See lots of alteration of the rocks probably sulfur. | | | |
| 17:41:07 Mar/29/04 | 530 | 340 | 14.6007 | 144.7763 | Iceberg site. | | | R783-043 |
| 17:43:04 Mar/29/04 | 530 | 287 | 14.6007 | 144.7763 | Area of shimmering at Iceberg site. Lots of shrimp on the rock face. | | | R783-044 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
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| 17:43:23 Mar/29/04 | 530 | 288 | 14.6008 | 144.7763 | Stopped at base of Iceberg steep slope of outcrop to possibly sample water. See diffuse venting at base percolating up through sediments. Lots of alteration and shrimp. | | | |
| 17:47:47 Mar/29/04 | 530 | 316 | 14.6007 | 144.7763 | Using HFS probe to check temperature at this site. | | | |
| 17:53:55 Mar/29/04 | 530 | 327 | 14.6008 | 144.7762 | Still probing around to find a temperature maximum. | | | |
| 17:55:27 Mar/29/04 | 530 | 324 | 14.6008 | 144.7763 | Dave's water sampler at Iceberg vent. | | | R783-045 |
| 17:55:31 Mar/29/04 | 530 | 327 | 14.6008 | 144.7763 | HFS sample intake is locked off and reading 46 degrees. | | | |
| 17:59:01 Mar/29/04 | 530 | 324 | 14.6008 | 144.7763 | Waiting for the fluid sampler valve to move then we will take some water samples. | | | |
| 18:02:17 Mar/29/04 | 530 | 326 | 14.6008 | 144.7763 | HFS filtered bag #14 Start 1802 Stop 1807 Tmax=46.1 Tavg=45.6 T2=29.0 Vol=662ml Z=530. Temperature remained stable during sampling. [NW Rota 1 - Iceberg]. | R783-HFS-14-0018 | Butterfield | |
| 18:09:16 Mar/29/04 | 530 | 327 | 14.6008 | 144.7763 | HFS filter #12 for RNA. Start 1809 Stop 1823 Tmax=48.3 Tavg=46.0 T2=29.0 Vol=1252ml Z=530. Temperature was stable. [NW Rota 1 - Iceberg]. | R783-HFS-12-0019 | Butterfield | |
| 18:17:38 Mar/29/04 | 530 | 328 | 14.6008 | 144.7763 | Firing gas tight bottle #3 (HIL #7). Fired at 1821. Temperature at firing was 45 degrees and T2 was 29 degrees. Z=529.9. [NW Rota 1 - Iceberg]. | R783-GTB-3-0020 | Lupton | |
| 18:24:27 Mar/29/04 | 530 | 328 | 14.6008 | 144.7763 | HFS Sterivex DNA filter #21. Start 1825 Stop 1836. Tmax=52.3 Tavg=51.7 T2=32.0 Vol=1025ml Z=529.7. Pump stopped several times during sampling and had to be restarted. [NW Rota 1 - Iceberg]. | R783-HFS-21-0021 | Butterfield | |
| 18:36:45 Mar/29/04 | 530 | 328 | 14.6008 | 144.7763 | HFS piston #22. Start 1838 Stop 1844. Tmax=51.9 Tavg=49.6 T2=31.0 Vol=701ml Z=529.9. Intermittent particles from the outflow. Temperature is very slowly (gradually) increasing but relatively stable for each sample. [NW Rota 1 - Iceberg]. | R783-HFS-22-0022 | Butterfield | |
| 18:45:10 Mar/29/04 | 530 | 327 | 14.6008 | 144.7763 | HFS filter #2 for FISH. Start 1847 Stop 1848. Tmax=51.7 Tavg=51.5 T2=32.0 Vol=250ml Z=530. [NW Rota 1 - Iceberg]. | R783-HFS-2-0023 | Butterfield | |
| 18:47:20 Mar/29/04 | 530 | 328 | 14.6008 | 144.7763 | A group of shrimp at Iceberg Vent. | | | R783-046 |
| 18:49:41 Mar/29/04 | 530 | 330 | 14.6007 | 144.7762 | Close in shot of the shrimp at Iceberg vent. | | | R783-047 |
| 18:50:35 Mar/29/04 | 530 | 327 | 14.6007 | 144.7763 | Observing shrimp and looking at what may be some copepods. | | | |
| 18:51:56 Mar/29/04 | 530 | 330 | 14.6008 | 144.7763 | Done with fluid sampling for this site. Looking for some rocks to sample from this location. | | | |
| 18:53:03 Mar/29/04 | 530 | 329 | 14.6008 | 144.7763 | Hydrothermally altered vesiculated lava taken from same spot as fluid sampling. Piece is about fist sized with sulfur on it. Going into the purse. Z=529.9. [NW Rota 1 - Iceberg]. | R783-RK-0024 | SROF geo team (De Ronde) | |
| 18:58:39 Mar/29/04 | 530 | 328 | 14.6008 | 144.7762 | A sample of vesiculated hydrothermally altered lava taken from Iceberg vent. | | | R783-048 |
| 18:58:52 Mar/29/04 | 530 | 329 | 14.6007 | 144.7763 | Another view of the sample of vesiculated and altered lava taken from Iceberg vent. | | | R783-049 |
| 19:00:19 Mar/29/04 | 530 | 331 | 14.6008 | 144.7763 | Backing away to clear out the HFS intake probe. | | | |
| 19:03:05 Mar/29/04 | 530 | 309 | 14.6008 | 144.7763 | One last frame grab of the vesiculated lava from Iceberg. | | CdR | R783-050 |
| 19:04:37 Mar/29/04 | 530 | 289 | 14.6008 | 144.7763 | Putting away HFS intake probe. Looking around for a place to take a suction sample. | | | |
| 19:08:34 Mar/29/04 | 529 | 282 | 14.6008 | 144.7763 | Moved ROPOS up the face of the Iceberg site and see a crack in the lava with diffuse fluids pouring out of it. Surrounding rock looks highly altered with at least sulfur present. | | | |
| 19:09:57 Mar/29/04 | 529 | 268 | 14.6008 | 144.7763 | Attempt to sample fluids coming out of the crack for their temperature. | | | |
| 19:18:28 Mar/29/04 | 529 | 265 | 14.6008 | 144.7763 | Temperature probe placed in crack. Temperature up to 56.8 C. | | | |
| 19:20:41 Mar/29/04 | 529 | 262 | 14.6008 | 144.7763 | The second site on Iceberg vent where Dave is sampling. | | | R783-051 |
| 19:23:41 Mar/29/04 | 529 | 264 | 14.6008 | 144.7763 | Shrimp on Iceberg vent for the behavioral study. | | Juniper | R783-052 |
| 19:24:21 Mar/29/04 | 529 | 263 | 14.6008 | 144.7763 | HFS piston #24. Start 1924 Stop 1932 Tmax=57.1 Tavg=57.0 T2=37.0 Vol=615ml Z=529.2. Large vertical crack directly above site of previous fluid sampling. [NW Rota 1 - Iceberg]. | R783-HFS-24-0025 | Butterfield | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
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| 19:33:54 Mar/29/04 | 529 | 264 | 14.6008 | 144.7763 | Going to sit here for four more minutes to continue recording shrimp behavior. | | | |
| 19:34:36 Mar/29/04 | 529 | 262 | 14.6008 | 144.7762 | HFS filtered bag #18. Start 1934 Stop 1940 Tmax=57.2 Tavg=56.7 T2=36 Vol=651ml Z=529. Second fluid sampling site at Iceberg. [NW Rota 1 - Iceberg]. | R783-HFS-18-0026 | Butterfield | |
| 19:41:49 Mar/29/04 | 529 | 263 | 14.6008 | 144.7763 | Juniper is done recording for shrimp behavior. | | | |
| 19:44:04 Mar/29/04 | 527 | 278 | 14.6008 | 144.7763 | Retracted temperature probe from crack at Iceberg. Moving around slightly to find suitable place to do a suction sample. | | | |
| 19:48:13 Mar/29/04 | 529 | 284 | 14.6008 | 144.7763 | The planned area for the suction sample. | | CM | R783-053 |
| 19:48:38 Mar/29/04 | 529 | 285 | 14.6008 | 144.7763 | The start of the suction sample. Looking to get the white bacterial mat. | | CM | R783-054 |
| 19:48:38 Mar/29/04 | 529 | 285 | 14.6008 | 144.7763 | Suction sample at Iceberg into jar 5 - from the crack - for bacterial mats into jar 5. Tavg=~58 C. Start 1948. End 1956. Z=529. [NW Rota 1 - Iceberg]. | R783-SS-J5-0027 | Moyer | |
| 19:56:04 Mar/29/04 | 529 | 284 | 14.6008 | 144.7763 | Stop suction on jar 5 moving to jar 6 and continuing at this same spot. | | | |
| 19:56:29 Mar/29/04 | 529 | 285 | 14.6007 | 144.7763 | SS for bacterial mat at Iceberg Vent - from the crack - into jar 6. Tavg=~58. Start 1956. Stop 2006. Z=529. Lots of mat in that sample. [NW Rota 1 - Iceberg]. | R783-SS-J6-0028 | Moyer | |
| 20:01:16 Mar/29/04 | 529 | 282 | 14.6008 | 144.7763 | Continuing to suction sample for bacterial mats. | | | R783-055 |
| 20:06:30 Mar/29/04 | 529 | 289 | 14.6008 | 144.7763 | We're going to the White Mat site next. | | | |
| 20:09:28 Mar/29/04 | 528 | 275 | 14.6008 | 144.7763 | We're on our way to the next site (White Mat) for more suction sampling for Craig. | | | |
| 20:10:04 Mar/29/04 | 527 | 334 | 14.6007 | 144.7762 | Volcaniclastic sediments on the way from Iceberg to White Mat. | | | R783-056 |
| 20:12:56 Mar/29/04 | 527 | 35 | 14.6009 | 144.7760 | Yellow stained rocks on the way to White Mat. | | | R783-057 |
| 20:14:17 Mar/29/04 | 525 | 59 | 14.6009 | 144.7760 | During transit viewing lava outcrops coated with sulfur and surrounded by black to gray sand with various amounts of white and yellowing staining. | | | |
| 20:17:18 Mar/29/04 | 526 | 61 | 14.6008 | 144.7760 | Looking around White Mat and Gastros sites for place to suction and fluid sampling. | | | |
| 20:21:19 Mar/29/04 | 526 | 77 | 14.6008 | 144.7760 | Still searching for a sampling site between Gastro and White Mat. | | | R783-058 |
| 20:22:02 Mar/29/04 | 527 | 101 | 14.6008 | 144.7760 | Shrimp swarm atop a sulfur stained outcrop near Gastro site. | | | R783-059 |
| 20:27:15 Mar/29/04 | 524 | 85 | 14.6009 | 144.7760 | There appear to be two distinct size classes of shrimp in this area. | | | R783-060 |
| 20:28:29 Mar/29/04 | 525 | 70 | 14.6008 | 144.7760 | Gastropods visible as white specks on yellow rock. | | | R783-061 |
| 20:29:41 Mar/29/04 | 525 | 93 | 14.6008 | 144.7760 | Settling in to sample the limpets here near or at Gastros Vent. | | | |
| 20:30:37 Mar/29/04 | 525 | 51 | 14.6008 | 144.7760 | Sulfur stain on lavas - several of which look like pillow lavas. Outcrops surrounded by black sand with white bacterial mats. | | | |
| 20:33:17 Mar/29/04 | 520 | 250 | 14.6008 | 144.7761 | Dropped the probe for the water sampler and are looking for a spot to sit ROPOS down to collect the probe. | | | |
| 20:37:37 Mar/29/04 | 520 | 350 | 14.6009 | 144.7761 | Probe has been picked up and is being held in the claw. | | | |
| 20:38:54 Mar/29/04 | 527 | 36 | 14.6009 | 144.7760 | T=17C in sediment as the probe was sitting there being recovered. | | | |
| 20:42:20 Mar/29/04 | 526 | 59 | 14.6008 | 144.7760 | Still searching for a place to collect a suction sample. | | | R783-062 |
| 20:43:08 Mar/29/04 | 527 | 69 | 14.6008 | 144.7760 | Thin yellow coating on rocks with lots of shrimp; white crabs; and limpets. Unaltered rock can be seen in various places within the yellow mat. | | | |
| 20:43:31 Mar/29/04 | 526 | 42 | 14.6008 | 144.7761 | Closeup of limpets and shrimp on yellow stained outcrop. Laser sights clearly visible. | | | R783-063 |
| 20:45:58 Mar/29/04 | 526 | 95 | 14.6008 | 144.7761 | Lining up suction sampler to collect some limpets. | | | R783-064 |
| 20:46:20 Mar/29/04 | 526 | 95 | 14.6008 | 144.7761 | Attempting to suction limpets from yellow bacterial mat; many shrimp on the mat (large and small). | | | |
| 20:47:46 Mar/29/04 | 527 | 95 | 14.6008 | 144.7760 | Suction for limpets at this site. Start 2047. Moved to a nearby spot. Start 2nd attempt 2056. No limpets collected -but shrimp were collected and put into J2. Stop 2112. Z=526.5. [NW Rota 1 - Gastros]. | R783-SS-J2-0029 | Juniper | |
| 20:51:14 Mar/29/04 | 526 | 95 | 14.6008 | 144.7761 | Closeup shot of two limpets about to be suctioned from rock outcrop. | | | R783-065 |

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| 20:55:50 Mar/29/04 | 525 | 33 | 14.6008 | 144.7761 | Detail shot of some limpets and shrimp on sediment covered rock outcrop. | | | R783-066 |
| 20:56:47 Mar/29/04 | 525 | 25 | 14.6008 | 144.7761 | Lowering the suction sampler to collect more limpets. | | | R783-067 |
| 21:01:34 Mar/29/04 | 524 | 16 | 14.6008 | 144.7761 | The limpets are proving difficult to remove via suction sampling. | | | R783-068 |
| 21:05:18 Mar/29/04 | 524 | 29 | 14.6008 | 144.7760 | Detail shot showing limpets on underside of small rock outcrop. | | | R783-069 |
| 21:06:58 Mar/29/04 | 524 | 22 | 14.6008 | 144.7761 | Another attempt to suction sample some limpets. | | | R783-070 |
| 21:13:36 Mar/29/04 | 525 | 67 | 14.6008 | 144.7760 | Looking for a fluid sampling site in area of Gastros. Yellow coated lavas with some reddish-yellow stain (Fe-oxide) and white mats; lows filled with dark-gray sediment. Pillow lavas are present. | | | |
| 21:16:25 Mar/29/04 | 520 | 6 | 14.6008 | 144.7761 | Giving up on this site and heading for the summit for exploration there. | | | |
| 21:18:46 Mar/29/04 | 522 | 295 | 14.6010 | 144.7759 | Returning to the summit along a steep sediment ridge with occasional outcrops. | | | R783-071 |
| 21:20:11 Mar/29/04 | 522 | 279 | 14.6011 | 144.7759 | Little coatings on rocks in this area of the transit along the ridge. Some staining in the sediment; near the high-flow area. | | | |
| 21:20:48 Mar/29/04 | 520 | 319 | 14.6011 | 144.7758 | Sediment covered outcrops about 20-30m away from the "High Flow" area. | | | R783-072 |
| 21:21:34 Mar/29/04 | 522 | 327 | 14.6011 | 144.7758 | Now very near high-flow vent area. The rocks are again coated with yellow sulfur and white mats. | | | |
| 21:24:01 Mar/29/04 | 517 | 329 | 14.6010 | 144.7756 | Panning along steep rock outcrops near the summit. | | | R783-073 |
| 21:26:10 Mar/29/04 | 516 | 316 | 14.6009 | 144.7756 | We're heading to the High Flow area target now to take a look around. | | | |
| 21:29:00 Mar/29/04 | 520 | 82 | 14.6012 | 144.7755 | We're near the summit now. | | | |
| 21:30:12 Mar/29/04 | 516 | 129 | 14.6011 | 144.7756 | We're at the summit now. Here's the rock with the yellow coating. Kim will show you where the pit is that we sampled yesterday. | | | |
| 21:32:41 Mar/29/04 | 519 | 91 | 14.6010 | 144.7756 | Flow coming from down below here. We're taking a look. | | | R783-074 |
| 21:34:54 Mar/29/04 | 517 | 159 | 14.6011 | 144.7757 | Summit of shimmering vent area. | | | R783-075 |
| 21:43:33 Mar/29/04 | 520 | 111 | 14.6010 | 144.7756 | We're at the High Flow area for fluid sampling. We're about 5 meters south of the Yellow Rock at the summit. | | | |
| 21:46:45 Mar/29/04 | 521 | 114 | 14.6010 | 144.7756 | No comms with the HFS right now. Waiting to get things set up and for communication to start. | | | |
| 21:49:49 Mar/29/04 | 521 | 114 | 14.6010 | 144.7756 | The flush pump is running with a temp of 9C. | | | |
| 21:50:55 Mar/29/04 | 521 | 118 | 14.6010 | 144.7756 | We're taking a background temperature here at High Flow site. We're up to 9C. | | | |
| 21:51:58 Mar/29/04 | 521 | 116 | 14.6010 | 144.7756 | Temp increasing. 15; 20; 25; 26; 22; 26.6; 29; 30; 32.6; 33. | | | |
| 21:53:43 Mar/29/04 | 521 | 122 | 14.6010 | 144.7756 | HFS Filtered Piston#23 Start 2154. Stop=2204 Tmax=30.2 Tavg=26.7 Vol=701ml Z=520.9. [NW Rota - High Flow]. | R783-HFS-23-0030 | Butterfield | |
| 21:53:54 Mar/29/04 | 521 | 122 | 14.6010 | 144.7756 | Fluid sampling at High Flow vent. | | Butterfield | R783-076 |
| 22:03:26 Mar/29/04 | 521 | 122 | 14.6010 | 144.7756 | We're looking for another site to sample. | | | |
| 22:03:37 Mar/29/04 | 521 | 125 | 14.6010 | 144.7756 | Searching for another site to sample fluids. | | | R783-077 |
| 22:05:17 Mar/29/04 | 521 | 122 | 14.6010 | 144.7756 | Same site temperature measurement: 27; 28; 32C. | | | |
| 22:06:04 Mar/29/04 | 521 | 122 | 14.6010 | 144.7756 | HFS unfiltered bag#19 Start 2206 at 36.5C. Stop=2212 Tmax=36.8 Tavg=35.6 Vol=659ml Z=520.9. [NW Rota - High Flow]. | R783-HFS-19-0031 | Butterfield | |
| 22:06:05 Mar/29/04 | 521 | 124 | 14.6010 | 144.7756 | Beginning to collect another fluid sample. | | | R783-078 |
| 22:13:27 Mar/29/04 | 521 | 122 | 14.6010 | 144.7756 | HFS unfiltered bag-16. Start 2213 Stop=2219. Tmax=37.0 Tavg=35.5. Vol=603ml Z=521.0. [NW Rota - High Flow]. | R783-HFS-16-0032 | Butterfield | |
| 22:20:00 Mar/29/04 | 521 | 125 | 14.6010 | 144.7756 | Gas tight bottle #4 (HIL #2). T=35.5-37C. Z=520.9. [NW Rota - High Flow]. | R783-GTB-4-0033 | Lupton | |
| 22:23:42 Mar/29/04 | 521 | 126 | 14.6010 | 144.7756 | Putting the wand in the holder. Finished water sampling here. We have 2 remaining HFS bottles if we find something else to sample. | | | |
| 22:25:52 Mar/29/04 | 518 | 92 | 14.6010 | 144.7755 | We want to go over on the line between F and G. It's a fault. We'll go to F and drive SW towards G. | | | |

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| 22:28:21 Mar/29/04 | 516 | 332 | 14.6011 | 144.7756 | We're moving the ship and leaving the summit. We're going to point F. We'll do a traverse along the fault to point G. | | | |
| 22:29:44 Mar/29/04 | 521 | 329 | 14.6013 | 144.7756 | Leaving summit and heading NW toward the fault that runs to the west. | | | R783-079 |
| 22:29:58 Mar/29/04 | 521 | 326 | 14.6012 | 144.7756 | HFS numbering sequence for this dive is as follows: 1; 2; J2; 4; 5; 6; 7; 8. | | | |
| 22:32:03 Mar/29/04 | 533 | 324 | 14.6014 | 144.7755 | This is a mixture of biogenic (~20%) and volcaniclastic sediments/sands according to Hein. Lots of pockmarks and burrows. | | | |
| 22:36:32 Mar/29/04 | 549 | 323 | 14.6018 | 144.7754 | Still transiting the scarp fault. Prominent furrows visible in the sediment. | | | R783-080 |
| 22:37:13 Mar/29/04 | 553 | 323 | 14.6018 | 144.7754 | Volcaniclastic sediment showing evidence of mass movement; slumps; landslides. Intensely rippled and pockmarked in places; slide scarps and distinct sediment sheets. | | | |
| 22:38:44 Mar/29/04 | 561 | 322 | 14.6019 | 144.7753 | Regular pattern of furrows visible in sediment. | | | R783-081 |
| 22:40:39 Mar/29/04 | 571 | 317 | 14.6020 | 144.7751 | Sediment mounds; block of sulfur resting in the sediment. Some volcaniclastic rock that is thin bedded and has detached slabs that slid down slope. | | | |
| 22:41:27 Mar/29/04 | 575 | 198 | 14.6021 | 144.7751 | Block of sulfur on very steep sediment slope. | | | R783-082 |
| 22:45:55 Mar/29/04 | 602 | 324 | 14.6024 | 144.7748 | Some sort of mats or patches on sandy -gravel sediment slope. | | | R783-083 |
| 22:46:55 Mar/29/04 | 606 | 321 | 14.6025 | 144.7747 | Gravel lag deposit bottom with many fish swimming by; the fish are grenadiers. Finer-grained white particles salt the gravel surface. | | | |
| 22:48:10 Mar/29/04 | 613 | 176 | 14.6026 | 144.7747 | Grenadiers on gravel slope. Appear to be feeding. | | | R783-084 |
| 22:48:21 Mar/29/04 | 613 | 175 | 14.6026 | 144.7747 | Close-up of grenadier on gravely slope. Laser sights visible right over fish. | | | R783-085 |
| 22:48:26 Mar/29/04 | 613 | 174 | 14.6026 | 144.7747 | Close-up of grenadier on gravely slope. Good dorsal view. | | | R783-086 |
| 22:52:46 Mar/29/04 | 639 | 309 | 14.6030 | 144.7744 | Seafloor covered with relatively smooth sediment; but with pockmarks; small mounds; and subdued ripples. More rat-tail fish. Visibility decreasing at 645 m. | | | |
| 22:53:44 Mar/29/04 | 644 | 351 | 14.6031 | 144.7743 | Possible evidence of burrow mounds in gravel bottom? | | | R783-087 |
| 22:56:56 Mar/29/04 | 662 | 342 | 14.6037 | 144.7744 | Scouring occurs around rocks sitting on sediment surface. Area where rocks occupy depressions created by scouring. | | | |
| 22:57:26 Mar/29/04 | 663 | 346 | 14.6038 | 144.7744 | Current scouring around rocks on gravel bottom. | | | R783-088 |
| 22:58:46 Mar/29/04 | 666 | 344 | 14.6040 | 144.7742 | A different (more eel-like) fish approaching from the right across the sediment. | | | R783-089 |
| 22:59:19 Mar/29/04 | 666 | 50 | 14.6041 | 144.7742 | First outcrop noted during later part of this transit. Yellowish-colored layered lava. Rocks have clearly broken from this outcrop and moved down slope. | | | |
| 22:59:29 Mar/29/04 | 666 | 36 | 14.6041 | 144.7742 | A grenadier and another eel-like fish near an outcrop. | | | R783-090 |
| 23:00:43 Mar/29/04 | 667 | 37 | 14.6042 | 144.7743 | Large outcrop covered with sediment and sulfur-staining. | | | R783-091 |
| 23:02:51 Mar/29/04 | 672 | 230 | 14.6044 | 144.7743 | The yellowish rock-stain is not due to sulfur stain. Species of fish we are seeing is conger Maedia abyssalis. Going up slope toward the western fault scarp. | | | |
| 23:03:06 Mar/29/04 | 673 | 271 | 14.6044 | 144.7743 | Close-up of what was tentatively identified as a conger eel. | | | R783-092 |
| 23:04:58 Mar/29/04 | 667 | 315 | 14.6046 | 144.7742 | Pocked marked sediment surface going upslope toward fault. Area of yellow-sulfur stained sediment just below ridge outcrop of yellow sulfur-stained? rocks; 645 m. | | | |
| 23:05:43 Mar/29/04 | 655 | 316 | 14.6047 | 144.7741 | Yellow covered pillow lavas with grenadier. | | | R783-093 |
| 23:06:47 Mar/29/04 | 646 | 294 | 14.6048 | 144.7739 | Yellow to brown outcrops of massive lava flows surrounded by black to gray sand. Frame grab of sponges or hydroids hanging off the rocks and moving with the current. | | | |
| 23:07:01 Mar/29/04 | 640 | 295 | 14.6047 | 144.7739 | Another conger eel on an outcrop. | | | R783-094 |
| 23:07:37 Mar/29/04 | 635 | 312 | 14.6048 | 144.7738 | Some sort of arborescent sponges or hydroids growing on underside of large outcrop. Also another grenadier. | | | R783-095 |

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| 23:08:29 Mar/29/04 | 636 | 295 | 14.6048 | 144.7738 | Some sort of arborescent sponges or hydroids growing on underside of large outcrop. | | | R783-096 |
| 23:08:58 Mar/29/04 | 632 | 301 | 14.6048 | 144.7738 | Conger eel on top of sediment slope in front of large outcrops. | | | R783-097 |
| 23:09:31 Mar/29/04 | 631 | 307 | 14.6048 | 144.7738 | Moving along a narrow ridge with massive; thick lave flows many meters thick. Many shrimp noted. Highly fractured lavas in places. Lavas are yellowish. | | | |
| 23:10:21 Mar/29/04 | 621 | 302 | 14.6047 | 144.7737 | Very steep sediment covered slope. | | | R783-098 |
| 23:10:52 Mar/29/04 | 618 | 317 | 14.6048 | 144.7736 | Dorsal view of large shrimp on outcrop. | | | R783-099 |
| 23:11:49 Mar/29/04 | 615 | 346 | 14.6048 | 144.7736 | Some sort of large shrimp on gravel slope. | | | R783-100 |
| 23:11:54 Mar/29/04 | 615 | 342 | 14.6047 | 144.7736 | Looking closely at hydroids for which a frame grab was taken. They are embedded in the sediment. Others are attached to rocks. Cf amphipods are seen within the hydroids. | | | |
| 23:12:13 Mar/29/04 | 615 | 345 | 14.6048 | 144.7736 | More arborescent hydroids in sediment. | | | R783-101 |
| 23:13:37 Mar/29/04 | 616 | 356 | 14.6048 | 144.7736 | Close-up of hydroids showing individual polyps. | | | R783-102 |
| 23:15:06 Mar/29/04 | 616 | 358 | 14.6048 | 144.7736 | Hydroids with amphipods on branches. | | | R783-103 |
| 23:17:09 Mar/29/04 | 615 | 340 | 14.6048 | 144.7736 | Continuing transit upslope with yellowish outcrops embedded in mottled black/gray sand. Meters-thick cliffs of massive lava. Many hydroids and salmon-colored soft coral attached to cliff. Fish are feeding along the cliff; many shrimp present. | | | |
| 23:17:43 Mar/29/04 | 611 | 332 | 14.6048 | 144.7736 | Yellowish colored lava flows protruding from sand. More hydroids too. | | | R783-104 |
| 23:20:28 Mar/29/04 | 606 | 223 | 14.6049 | 144.7735 | Anemone of some sort on side of rock outcrop with more hydroids. | | | R783-105 |
| 23:22:53 Mar/29/04 | 606 | 224 | 14.6049 | 144.7735 | Close-up of large red shrimp on same outcrop as the anemone. | | | R783-106 |
| 23:23:48 Mar/29/04 | 603 | 263 | 14.6049 | 144.7735 | Moving back to the ROPOS cage for tether management. | | | |
| 23:31:12 Mar/29/04 | 572 | 300 | 14.6053 | 144.7736 | Finished tether management and moving back to slope for upslope transit to the western fault. | | | |
| 23:34:45 Mar/29/04 | 613 | 209 | 14.6051 | 144.7736 | Back on bottom with yellowish outcrops and west side of summit. Will go to summit and then traverse to SW. | | | |
| 23:36:20 Mar/29/04 | 607 | 258 | 14.6049 | 144.7736 | Rocky outcrops near top of fault slope. | | | R783-107 |
| 23:36:23 Mar/29/04 | 607 | 258 | 14.6049 | 144.7736 | Abundant hydroids on cliff face; fish and shrimp also noted. | | | |
| 23:37:50 Mar/29/04 | 604 | 267 | 14.6049 | 144.7734 | Exploring west along fault slope and up toward summit. | | | R783-108 |
| 23:38:04 Mar/29/04 | 605 | 275 | 14.6049 | 144.7734 | We're driving west up the fault slope. Going to the summit. The highlight tape has 55 minutes on it now. | | | |
| 23:38:55 Mar/29/04 | 603 | 268 | 14.6049 | 144.7733 | Rocky scarp with two grenadiers and two large red shrimp. | | | R783-109 |
| 23:39:32 Mar/29/04 | 602 | 252 | 14.6049 | 144.7733 | Heading west over rocky outcrop along fault slope. | | | R783-110 |
| 23:40:28 Mar/29/04 | 601 | 233 | 14.6049 | 144.7733 | Large shrimp posturing on rock outcrop. | | | R783-111 |
| 23:41:53 Mar/29/04 | 599 | 240 | 14.6049 | 144.7733 | Big-eyed silvery fish above rocky outcrop. First time we've seen this one. | | | R783-112 |
| 23:43:49 Mar/29/04 | 597 | 243 | 14.6049 | 144.7732 | Large area of Rocky outcrops with abundant soft corals and fish. | | | R783-113 |
| 23:44:57 Mar/29/04 | 597 | 243 | 14.6049 | 144.7732 | Rocky crevice with anemones; corals fish and shrimp. | | | R783-114 |
| 23:47:38 Mar/29/04 | 597 | 223 | 14.6049 | 144.7732 | Biological observations in this non-venting area. Lots of biology here. Up to the summit now after a biological detour. | | | |
| 23:48:50 Mar/29/04 | 594 | 239 | 14.6049 | 144.7732 | Continuing up the steep sides of this volcano. Reached the summit at 1149. | | | |
| 23:49:00 Mar/29/04 | 593 | 252 | 14.6049 | 144.7732 | Climbing sediment slope to summit. | | | R783-115 |
| 23:49:25 Mar/29/04 | 591 | 267 | 14.6048 | 144.7732 | Highlights off. | | | |
| 23:51:05 Mar/29/04 | 592 | 252 | 14.6049 | 144.7732 | We're just hanging around here at the summit momentarily. We're going to move between F and G at 0.2 kts. Zigzagging from E to W going up and down the slopes. | | | |

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| 23:53:32 Mar/29/04 | 593 | 153 | 14.6048 | 144.7732 | We were at ~590 m at the top. We're moving down the east side of the fault eight now. | | | |
| 23:56:06 Mar/29/04 | 602 | 324 | 14.6047 | 144.7732 | Moving the ship. We will make a zig-zag pattern across the western fault. Large jellyfish floated by. Back to outcrop of yellowish rock with lots of shrimp. | | | |
| 23:56:28 Mar/29/04 | 604 | 319 | 14.6047 | 144.7732 | Jellyfish in plankton above rocky outcrop. | | | R783-116 |
| 00:00:59 Mar/30/04 | 606 | 320 | 14.6047 | 144.7731 | Descending a steep wall on a large outcrop. | | | R783-117 |
| 00:01:03 Mar/30/04 | 606 | 323 | 14.6047 | 144.7731 | Thick yellowish lava flows covered with black sand. Halting operation for tether management. | | | |
| 00:09:04 Mar/30/04 | 605 | 141 | 14.6049 | 144.7733 | Back on bottom over a vertical wall (following some tether management). | | | R783-118 |
| 00:09:09 Mar/30/04 | 605 | 141 | 14.6049 | 144.7733 | Back on bottom after tether management and moving the ship. | | | |
| 00:10:22 Mar/30/04 | 605 | 294 | 14.6049 | 144.7732 | Hydroids growing underneath overhang on sedimented outcrop. | | | R783-119 |
| 00:11:39 Mar/30/04 | 603 | 262 | 14.6048 | 144.7731 | Close-up of hydroids growing underneath overhang on sedimented outcrop. | | | R783-120 |
| 00:12:04 Mar/30/04 | 603 | 316 | 14.6048 | 144.7732 | Continuing transit along fault. | | | |
| 00:14:21 Mar/30/04 | 611 | 312 | 14.6046 | 144.7730 | Descending large rocky wall with lots of yellow staining. | | | R783-121 |
| 00:16:16 Mar/30/04 | 622 | 279 | 14.6044 | 144.7730 | Traversing a heavily sedimented rocky outcrop. | | | R783-122 |
| 00:17:16 Mar/30/04 | 628 | 293 | 14.6044 | 144.7730 | Continuing along fault with yellowish outcrops and talus from the outcrops that have moved down slope. Outcrops highly fractured in places. Some columnar jointing. | | | |
| 00:18:38 Mar/30/04 | 638 | 297 | 14.6042 | 144.7729 | Rock outcrop with a lot of columnar jointing. | | | R783-123 |
| 00:18:55 Mar/30/04 | 638 | 332 | 14.6042 | 144.7729 | Highly fractured and jointed outcrop with sulfur in the fractures and cementing fragments together. Hydroids on cliff faces. | | | |
| 00:18:56 Mar/30/04 | 638 | 332 | 14.6042 | 144.7729 | Traversing a heavily fractured and jointed rock face. | | | R783-124 |
| 00:20:24 Mar/30/04 | 642 | 287 | 14.6041 | 144.7729 | Passing in front of a steep columnar outcrop. | | | R783-125 |
| 00:20:53 Mar/30/04 | 642 | 339 | 14.6041 | 144.7728 | Sulfur filling many cracks and fractures in outcrop. | | | |
| 00:21:25 Mar/30/04 | 643 | 285 | 14.6040 | 144.7728 | At 640 m continuing SW. Sandy bottom between outcrops of stacked lava flows. Steep outcrops with sediment at the base. Outcrops still strongly fractured. | | | |
| 00:22:11 Mar/30/04 | 643 | 237 | 14.6039 | 144.7728 | Three grenadiers tucked into underside of large vertical outcrop wall. | | | R783-126 |
| 00:24:27 Mar/30/04 | 632 | 277 | 14.6038 | 144.7726 | Venus flytrap-like anemone on top of rock outcrop. | | | R783-127 |
| 00:24:27 Mar/30/04 | 632 | 277 | 14.6038 | 144.7726 | Fractures in outcrop filled with sulfur which is coming up from below rather than a coating the rocks. Many anemones and rat-tail fish. | | | |
| 00:24:35 Mar/30/04 | 632 | 281 | 14.6038 | 144.7726 | Close-up of anemone on top of rock outcrop. | | | R783-128 |
| 00:27:22 Mar/30/04 | 616 | 270 | 14.6037 | 144.7724 | Five grenadiers up against crevices in vertical wall. | | | R783-129 |
| 00:28:21 Mar/30/04 | 602 | 302 | 14.6035 | 144.7724 | At about 600 m a salp (blue with orange spots and looks like a snake); a colonial jellyfish like organism. Highlights on. Susan had to reboot the tracking computer. | | | |
| 00:28:48 Mar/30/04 | 602 | 308 | 14.6035 | 144.7724 | Large salp chain in plankton. | | | R783-130 |
| 00:29:38 Mar/30/04 | 603 | 324 | 14.6035 | 144.7724 | Large salp chain in plankton. | | | R783-131 |
| 00:30:28 Mar/30/04 | 605 | 351 | 14.6035 | 144.7724 | Large salp chain in plankton. | | | R783-132 |
| 00:31:48 Mar/30/04 | 606 | 269 | 14.6035 | 144.7723 | Continuing up steep slope of thick lava flows that are covered with hydroids and other biota and many fish swimming by. Outcrops strongly fractured and jointed. | | | |
| 00:36:26 Mar/30/04 | 607 | 237 | 14.6031 | 144.7721 | Descending another vertical wall. | | | R783-133 |
| 00:37:32 Mar/30/04 | 617 | 270 | 14.6030 | 144.7721 | Descending steep sediment covered slope on fault scarp. | | | R783-134 |
| 00:40:46 Mar/30/04 | 630 | 265 | 14.6029 | 144.7720 | Very heavily sedimented steep slope on rocky outcrop. | | | R783-135 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 00:40:57 Mar/30/04 | 631 | 272 | 14.6029 | 144.7720 | Continuing zig-zag along fault with sandy seafloor alternating with steep outcrops that are generally strongly fractured. | | | |
| 00:42:07 Mar/30/04 | 636 | 274 | 14.6028 | 144.7720 | Fine ripples on sandy slope. We seem to have exited the rocky scarp region. | | | R783-136 |
| 00:42:38 Mar/30/04 | 636 | 270 | 14.6027 | 144.7720 | Traversed over ridge at 636 m and going down slope into sediment with oscillation ripples and degraded ripples. | | | |
| 00:44:13 Mar/30/04 | 637 | 264 | 14.6027 | 144.7720 | Suction sample into jar 3. Search for fauna in sediment. Sediment at base of west fault. Z=636.9. [NW Rota 1 - Western Fault Scarp]. | R783-SS-J3-0034 | Juniper | |
| 00:46:17 Mar/30/04 | 637 | 253 | 14.6027 | 144.7720 | Preparing to suck up a sand sample. | | | R783-137 |
| 00:47:48 Mar/30/04 | 637 | 275 | 14.6027 | 144.7720 | Sucking up a sand sample at the base of the west fault. | | | R783-138 |
| 00:49:52 Mar/30/04 | 634 | 282 | 14.6026 | 144.7719 | Continuing SW along base of fault and we see a huge salp that looks different than the previous one. This one looks more jellyfish like. | | | |
| 00:51:08 Mar/30/04 | 628 | 318 | 14.6026 | 144.7718 | Salp in plankton above sandy slope. | | | R783-139 |
| 00:51:42 Mar/30/04 | 631 | 336 | 14.6027 | 144.7717 | Salp in plankton above sandy slope. | | | R783-140 |
| 00:51:45 Mar/30/04 | 632 | 337 | 14.6027 | 144.7717 | Salp in plankton above sandy slope. | | | R783-141 |
| 00:55:24 Mar/30/04 | 645 | 187 | 14.6026 | 144.7714 | The slope is now to the west. We want to go closer to the cage. We're seeing some of the slope from the summit now. | | | |
| 00:55:30 Mar/30/04 | 645 | 186 | 14.6026 | 144.7714 | Ripples in gravel/sand on a western leading slope. | | | R783-142 |
| 00:56:33 Mar/30/04 | 634 | 193 | 14.6025 | 144.7713 | Climbing large vertical wall of fault. Hydroids and fish and anemone under overhang. | | | R783-143 |
| 00:56:50 Mar/30/04 | 631 | 199 | 14.6025 | 144.7714 | The banding represents different lava flows. The dark bands are indications of weathering between the flows. | | | |
| 00:57:55 Mar/30/04 | 623 | 189 | 14.6023 | 144.7714 | We're going to continue on this course for now. | | | |
| 00:59:06 Mar/30/04 | 612 | 136 | 14.6023 | 144.7715 | We're going up the fault on the NW side of the summit - sort of in the saddle. | | | |
| 00:59:24 Mar/30/04 | 610 | 135 | 14.6022 | 144.7715 | Approaching top of a sandy ridge. | | | R783-144 |
| 01:04:12 Mar/30/04 | 630 | 189 | 14.6021 | 144.7717 | Traversing a steep heavily sedimented slope and heading to the SW. | | | R783-145 |
| 01:04:24 Mar/30/04 | 630 | 224 | 14.6020 | 144.7717 | We're dropping to the southwest again. More of the same types of sediment. | | | |
| 01:05:20 Mar/30/04 | 631 | 236 | 14.6018 | 144.7716 | Out of the rock outcrops and into sediment covered slope here. | | | |
| 01:06:08 Mar/30/04 | 629 | 270 | 14.6017 | 144.7716 | Here's an outcrop. Yellow coated lavas. Fish abundant here. Some shrimp and hydroids too. | | | |
| 01:06:29 Mar/30/04 | 627 | 263 | 14.6016 | 144.7715 | Five grenadiers on yellow rock outcrop. | | | R783-146 |
| 01:07:45 Mar/30/04 | 621 | 226 | 14.6015 | 144.7715 | Climbing vertically along a high overhanging wall and above a sandy slope. | | | R783-147 |
| 01:08:19 Mar/30/04 | 614 | 240 | 14.6015 | 144.7715 | Large rock outcrop here near the top. Some sap corals here. | | | |
| 01:08:57 Mar/30/04 | 613 | 290 | 14.6014 | 144.7715 | Descending other side or wall along a slope of rocky outcrops and sand. | | | R783-148 |
| 01:10:12 Mar/30/04 | 616 | 280 | 14.6013 | 144.7714 | Out of the outcrop now. Strips of darker and lighter sediments in the ripples. The currents are winnowing the sand. The darker sands here are coarser and seem to be in the deeper areas. | | | |
| 01:10:20 Mar/30/04 | 616 | 279 | 14.6013 | 144.7713 | Traversing a sediment slope with ripples underlying what appears to be newer sediment that may have recently overflowed the sediments. | | | R783-149 |
| 01:12:21 Mar/30/04 | 619 | 255 | 14.6013 | 144.7714 | Preparing to grab a rock off this outcrop. Will try to keep it in claw during ascent. | | | R783-150 |
| 01:12:45 Mar/30/04 | 618 | 238 | 14.6013 | 144.7714 | We're going to try to grab a piece of this yellow-colored rock and come up with it in the claw. | | | |
| 01:17:37 Mar/30/04 | 618 | 290 | 14.6012 | 144.7713 | Collecting an unaltered volcanic rock. We're on the western fault near the summit. Z=618.1. [NW Rota 1]. | R783-RK-0035 | SROF geo team (Hein) | |
| 01:17:45 Mar/30/04 | 618 | 289 | 14.6012 | 144.7713 | Grabbing rock to carry back in claw on ascent. | | | R783-151 |
| 01:18:23 Mar/30/04 | 618 | 290 | 14.6013 | 144.7713 | Close-up of rock before ascent. Appears to have hydroids and possibly even a limpet. | | | R783-152 |
| 01:19:47 Mar/30/04 | 613 | 218 | 14.6012 | 144.7713 | Ascending another rocky outcrop. | | | R783-153 |

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|---|---|---|---|---|---|---|---|---|
| 01:20:22 Mar/30/04 | 606 | 219 | 14.6012 | 144.7713 | Some sort of bright yellow dots on rocks. | | | R783-154 |
| 01:20:30 Mar/30/04 | 604 | 220 | 14.6012 | 144.7713 | We're on the top again. The top - heading down that western fault to the SW. | | | |
| 01:25:03 Mar/30/04 | 614 | 344 | 14.6010 | 144.7712 | Approaching vertical wall with lots of blocky fractured lava flows. | | | R783-155 |
| 01:27:52 Mar/30/04 | 626 | 328 | 14.6009 | 144.7711 | We're still moving along looking for some hot water. A nice altered basalt would be good too. The rocks are less yellowed here. More gray. | | | |
| 01:28:52 Mar/30/04 | 632 | 322 | 14.6008 | 144.7710 | Large yellow block atop an otherwise grey rocky outcrop. | | | R783-156 |
| 01:29:58 Mar/30/04 | 633 | 314 | 14.6007 | 144.7709 | ROPOS is almost at point G. After we get there we will head back to the east to point B. | | | |
| 01:31:56 Mar/30/04 | 641 | 32 | 14.6006 | 144.7709 | We're turning east to head for point B. | | | |
| 01:32:56 Mar/30/04 | 642 | 68 | 14.6006 | 144.7710 | Slope mostly sand covered with angular blocks sticking through. They don't look like they're in place. Probably fell down slope. | | | |
| 01:32:57 Mar/30/04 | 642 | 65 | 14.6006 | 144.7710 | Ascending a sandy slope with occasional angular blocks. | | | R783-157 |
| 01:33:21 Mar/30/04 | 641 | 70 | 14.6007 | 144.7710 | Steep rippled sand slope bracketed on both sides by slumps of darker sand. | | | R783-158 |
| 01:34:19 Mar/30/04 | 641 | 84 | 14.6006 | 144.7711 | Traversing rocky outcrops. Unlike most of the others seen today these ones are not stained yellow. | | | R783-159 |
| 01:35:33 Mar/30/04 | 636 | 78 | 14.6007 | 144.7711 | Moving upslope amongst sandy sedimented outcrops topped by hydroids. | | | R783-160 |
| 01:36:18 Mar/30/04 | 633 | 84 | 14.6007 | 144.7712 | Heading west and relatively deep compared to where the hydrothermal sites were found. Steep sediment-covered slope with ripples in places and degraded ripples in other places; trending NW-SE. | | | |
| 01:37:28 Mar/30/04 | 637 | 82 | 14.6008 | 144.7713 | Traversing a section of sand waves on steep slope. Ripples trending north-south. | | | R783-161 |
| 01:39:21 Mar/30/04 | 625 | 28 | 14.6010 | 144.7714 | Heading more to the north now. Yellowish fractured outcrops on steep slopes are surrounded by gray sand. Hydroids and other biota cling to cliff faces. | | | |
| 01:39:24 Mar/30/04 | 625 | 29 | 14.6010 | 144.7714 | Ascending over steep outcrop with numerous (at least six) grenadiers. | | | R783-162 |
| 01:40:49 Mar/30/04 | 605 | 292 | 14.6011 | 144.7714 | Trend of the scarp is to the NE. | | | |
| 01:45:47 Mar/30/04 | 637 | 155 | 14.6008 | 144.7715 | Rippled sediment surface has concentrations of white material in the troughs. Moving upslope heading E to intersect track line 1. Black sand uniform in color when recently mobilized; and mottled (winnowed) when more stable. | | | |
| 01:46:28 Mar/30/04 | 635 | 96 | 14.6008 | 144.7716 | Going upslope again toward the east. Lots of overhangs. | | | R783-163 |
| 01:47:09 Mar/30/04 | 629 | 103 | 14.6008 | 144.7717 | Beautiful example of an extrusion of mushroom shaped lava flow. | | | R783-164 |
| 01:48:02 Mar/30/04 | 628 | 112 | 14.6008 | 144.7718 | Section of lavas containing some pillows and stacked lava sheets. Black sand drapes over the lava. Now talus debris and broken pillows form rubble piles. | | | |
| 01:48:44 Mar/30/04 | 626 | 103 | 14.6008 | 144.7719 | Traversing a section of "primary extrusive forms" coated with a black sandy sediment layer. | | | R783-165 |
| 01:49:22 Mar/30/04 | 622 | 105 | 14.6007 | 144.7720 | Traversing broken talus and pillows. | | | R783-166 |
| 01:50:36 Mar/30/04 | 606 | 83 | 14.6007 | 144.7722 | Another series of pillow lavas have broken flow fronts. Now more massive; thick lavas. White spiny crab sitting on rock. Many fish can also be seen. | | | |
| 01:51:26 Mar/30/04 | 597 | 43 | 14.6006 | 144.7722 | Spiny crab on pillow boulder. | | | R783-167 |
| 01:51:40 Mar/30/04 | 597 | 12 | 14.6006 | 144.7723 | Spiny crab on pillow boulder. | | | R783-168 |
| 01:52:13 Mar/30/04 | 596 | 17 | 14.6007 | 144.7723 | Pillow flows alternating with lava sheets. Many pillows are fragmented. Still dusting of black sand on outcrops. | | | |
| 01:54:56 Mar/30/04 | 589 | 41 | 14.6008 | 144.7725 | Continuing upslope. Sediment. | | | |
| 01:56:10 Mar/30/04 | 588 | 37 | 14.6009 | 144.7726 | Ascending a sandy rippled slope. | | | R783-169 |
| 01:58:50 Mar/30/04 | 574 | 99 | 14.5859 | 144.7766 | Encounter with unusual fish. | | | R783-170 |
| 02:03:21 Mar/30/04 | 566 | 56 | 14.5859 | 144.7766 | Volcaniclastics with pretty good layering. | | | |
| 02:03:37 Mar/30/04 | 565 | 69 | 14.5863 | 144.7778 | Volcaniclastics on edge of ridge. | | | R783-171 |

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|---|---|---|---|---|---|---|---|---|
| 02:05:19 Mar/30/04 | 565 | 57 | 14.5967 | 144.7747 | NAVIGATION STARTED TO DIE AT 0157 AND WAS TOTALLY GONE AT 0205 - DUE TO A LOSS TO CHARGE IN THE BATTERIES. | | | |
| 02:07:20 Mar/30/04 | 569 | 60 | 14.6001 | 144.7738 | Volcaniclastics with vivid yellow staining; no active venting. | | | |
| 02:08:45 Mar/30/04 | 561 | 20 | 14.5963 | 144.7752 | Yellow veins on big pillows. | | | |
| 02:11:09 Mar/30/04 | 558 | 14 | 14.5977 | 144.7746 | Volcaniclastic dune ridge. | | | |
| 02:12:58 Mar/30/04 | 561 | 4 | 14.6005 | 144.7741 | No sub navigation now. | | | |
| 02:15:55 Mar/30/04 | 560 | 31 | 14.6013 | 144.7737 | Pillow with yellow staining; white bacterial mat. | | | |
| 02:18:06 Mar/30/04 | 559 | 29 | 14.5928 | 144.7759 | Dark sand; streaked with light streaks. | | | |
| 02:19:26 Mar/30/04 | 559 | 36 | 14.5928 | 144.7759 | White staining on top of pillows (coating). | | | |
| 02:21:00 Mar/30/04 | 559 | 25 | 14.5928 | 144.7759 | Big pillow. | | | |
| 02:23:13 Mar/30/04 | 559 | 30 | 14.5928 | 144.7759 | Lava; crusty. Moving NE. | | | |
| 02:24:09 Mar/30/04 | 558 | 18 | 14.5928 | 144.7759 | Outcrop near contact between ash fall and earlier flow. | | | R783-172 |
| 02:26:07 Mar/30/04 | 558 | 25 | 14.5946 | 144.7784 | Pillow with white staining on top; Loose volcaniclastic sands on top. | | | |
| 02:26:12 Mar/30/04 | 558 | 31 | 14.5946 | 144.7784 | Vertically extruded pillow. | | | R783-173 |
| 02:28:32 Mar/30/04 | 557 | 29 | 14.5946 | 144.7784 | Top of ridge (loose volcaniclastic dune). | | | |
| 02:30:35 Mar/30/04 | 559 | 30 | 14.5946 | 144.7784 | Ripples on side of south side of ridge. Light portion is finer grained; dark is coarser volcanic fragments. | | | |
| 02:33:07 Mar/30/04 | 563 | 83 | 14.5946 | 144.7784 | Ripples go all the way down the east side of the ridge. | | | |
| 02:37:20 Mar/30/04 | 585 | 95 | 14.5946 | 144.7784 | Traveling south along sedimented ridge. Ripple marks are clearly visible. | | | |
| 02:41:25 Mar/30/04 | 582 | 90 | 14.5946 | 144.7784 | Outcrop near top of ridge. | | | |
| 02:43:49 Mar/30/04 | 582 | 87 | 14.5946 | 144.7784 | Sedimented slope of ridge with a few knobby golf - ball-size rocks. | | | |
| 02:46:46 Mar/30/04 | 581 | 111 | 14.5965 | 144.7777 | Left knobby sediments; not sure if this was outcrop or loose. Now we are back in the loose sediments. | | | |
| 02:48:32 Mar/30/04 | 575 | 106 | 14.5965 | 144.7777 | Outcrop of pillow lavas; overlain by coarser sediments. It appears that we are getting closer to vent. | | | |
| 02:49:07 Mar/30/04 | 574 | 110 | 14.5965 | 144.7777 | Outcrop with pillows. | | | R783-174 |
| 02:51:41 Mar/30/04 | 571 | 119 | 14.5965 | 144.7777 | Course volcaniclastic material. Coming from above. | | | R783-175 |
| 02:51:51 Mar/30/04 | 571 | 120 | 14.5965 | 144.7777 | Very coarse material is very loose. This is almost certainly coming from upslope. | | | |
| 02:54:58 Mar/30/04 | 566 | 69 | 14.5965 | 144.7777 | We move upslope along a big loose volcaniclastic debris chute. | | | |
| 02:55:15 Mar/30/04 | 565 | 68 | 14.5965 | 144.7777 | Size differential contact. ~45 degree slope. | | | R783-176 |
| 02:58:04 Mar/30/04 | 556 | 45 | 14.5965 | 144.7777 | Dark debris chutes of different sized clasts of volcanics are observed. | | | |
| 03:00:01 Mar/30/04 | 546 | 52 | 14.5965 | 144.7777 | Moving up a debris chute. The coarse dark fragments are up to vent size. | | | |
| 03:01:30 Mar/30/04 | 544 | 56 | 14.5965 | 144.7777 | Outcropping pillows. Sulphur on the pillow lavas. Coarse volcaniclastics are coming from above the pillows. | | | |
| 03:01:50 Mar/30/04 | 544 | 54 | 14.5965 | 144.7777 | Yellow stained outcrop with coarse volcaniclastic. | | | R783-177 |
| 03:05:14 Mar/30/04 | 530 | 63 | 14.5965 | 144.7777 | Finer sediments on slope show ripples. We continue up the SW slope of the central cone. | | | |
| 03:06:32 Mar/30/04 | 523 | 103 | 14.5965 | 144.7777 | On top of ESE=trending ridge. Nice ripples on top. | | | |
| 03:10:53 Mar/30/04 | 517 | 195 | 14.5965 | 144.7777 | We approach the summit region of the central cone. Large outcrops (10=20m) of volcanics. | | | |
| 03:15:00 Mar/30/04 | 542 | 143 | 14.5965 | 144.7777 | On SW side of ridge. We see outcrops of lava and loose Volcaniclastics with small (~1cm) yellow (sulphur?) balls. | | | |
| 03:17:40 Mar/30/04 | 541 | 50 | 14.5965 | 144.7777 | Pillow outcrops. | | | |

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|---|---|---|---|---|---|---|---|---|
| 03:21:00 Mar/30/04 | 528 | 61 | 14.5965 | 144.7777 | Pillow lavas with intense yellow staining. Lots of loose volcaniclastics are observed. | | | |
| 03:23:24 Mar/30/04 | 517 | 173 | 14.5965 | 144.7777 | Just below central cone; very steep rock outcroppings; lots of staining | | | |
| 03:25:36 Mar/30/04 | 533 | 94 | 14.5965 | 144.7777 | Huge cliff of lava; shimmering water. | | | |
| 03:27:32 Mar/30/04 | 536 | 54 | 14.5965 | 144.7777 | Bleached white rock and dark grey rock. | | | |
| 03:29:00 Mar/30/04 | 537 | 83 | 14.5965 | 144.7777 | Shimmering water at base of debris slope; everyone is very excited. | | | |
| 03:30:24 Mar/30/04 | 539 | 117 | 14.5965 | 144.7777 | High flow area. Shimmering water over a very large area. | | | R783-178 |
| 03:32:14 Mar/30/04 | 539 | 109 | 14.5965 | 144.7777 | Flow of shimmering water above gravelly shimmering sand (shimmering sand sites). | | | |
| 03:34:49 Mar/30/04 | 539 | 110 | 14.5965 | 144.7777 | We're moving the probe. | | | |
| 03:36:30 Mar/30/04 | 539 | 111 | 14.5965 | 144.7777 | Tavg=10.3. We didn't take a sample yet. We're about 10-20cm above the sediment interface. Tmax=11.5. We're not going to sample here because you can't stick the probe in the sediments. | | | |
| 03:43:27 Mar/30/04 | 539 | 111 | 14.5965 | 144.7777 | Taking the temperature with the SS alien probe. It doesn't seem to be working. A huge amount of shimmering water coming out of this area. Is the flow coming up out of the sediments? | | | |
| 03:47:03 Mar/30/04 | 539 | 110 | 14.5965 | 144.7777 | Getting up to 69C temperatures from the sediments. Talien: 85; 87;97;100;102. This is a huge area of diffuse flow. Tmax so far is 87. Only about 5cm deep. Tmax=102. | | | |
| 04:01:40 Mar/30/04 | 539 | 74 | 14.5965 | 144.7777 | We're right downslope of the High Flow vent - the first vent we found. We see some major venting in the distance. Looks like the mother lode. Could be the sulfur or the aleonite. | | | |
| 04:02:26 Mar/30/04 | 539 | 154 | 14.5965 | 144.7777 | More shimmering water. | | | R783-179 |
| 04:04:19 Mar/30/04 | 540 | 178 | 14.5965 | 144.7777 | On the edge of??? | | | R783-180 |
| 04:04:40 Mar/30/04 | 540 | 208 | 14.5965 | 144.7777 | This place is totally smoky. It looks like an inferno. The ambient water is ~10C. | | | |
| 04:07:46 Mar/30/04 | 542 | 87 | 14.5965 | 144.7777 | Moving deeper to get beneath the dense particulate plume. | | | |
| 04:09:00 Mar/30/04 | 548 | 86 | 14.5965 | 144.7777 | We have moved through the plume and will now come back up from the base. | | | |
| 04:10:33 Mar/30/04 | 547 | 91 | 14.5965 | 144.7777 | Sand with light colored material salting the surface derived from plume fallout. Now rock outcrop consisting of slabby lava. Then back to sediment and sediment slides. | | | |
| 04:15:02 Mar/30/04 | 540 | 12 | 14.5965 | 144.7777 | Looking for base of plume. We are at 540 m; same as where the fluids are venting form the sediment. | | | |
| 04:16:45 Mar/30/04 | 541 | 121 | 14.5965 | 144.7777 | Back into the particle plume with intense shimmering water. The plume looks much like a cloud or dense smoke. | | | |
| 04:18:52 Mar/30/04 | 544 | 98 | 14.5965 | 144.7777 | Particle plume seems to be issuing from a specific area rather than diffuse flow; but cannot clearly see the source. | | | |
| 04:22:20 Mar/30/04 | 545 | 108 | 14.5965 | 144.7777 | Lots of particulates. | | | R783-181 |
| 04:22:52 Mar/30/04 | 545 | 70 | 14.5965 | 144.7777 | Ambient temperature in particle plume is 10C and near the plume it is 7C. | | | |
| 04:23:38 Mar/30/04 | 547 | 93 | 14.5965 | 144.7777 | Big smoker. | | | R783-182 |
| 04:25:46 Mar/30/04 | 552 | 62 | 14.5965 | 144.7777 | Scree slope just beneath plume. | | | |
| 04:27:17 Mar/30/04 | 549 | 37 | 14.5965 | 144.7777 | Big smoke. | | | R783-183 |
| 04:28:24 Mar/30/04 | 551 | 22 | 14.5965 | 144.7777 | Remarkably big plume billowing in the water. | | | |
| 04:30:28 Mar/30/04 | 557 | 11 | 14.5965 | 144.7777 | Plume temperature is 14C! | | | |
| 04:31:46 Mar/30/04 | 557 | 12 | 14.5965 | 144.7777 | We are in a pit with a 15-20m diameter. | | | |
| 04:33:54 Mar/30/04 | 559 | 12 | 14.5965 | 144.7777 | We are in a pit crater with a 15m diameter where water temperature is up to 31C in a plume! | | | |
| 04:37:00 Mar/30/04 | 566 | 2 | 14.5965 | 144.7777 | HFS bag #17 Start=4:37 End=4:41 Tmax=29.8 Tavg=25.8 T2=26. Vol=500ml Z=565.5. On south side of central ridge. [NW Rota 1 - Pit Crater]. | R783-HFS-17-0036 | Butterfield | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R783 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 05:03:45 Mar/30/04 | 541 | 89 | 14.5965 | 144.7777 | We are going back to resample water. | | | |
| 05:07:17 Mar/30/04 | 551 | 52 | 14.5965 | 144.7777 | We are at the edge of the plume; resting on the edge of the pit crater. | | | |
| 05:11:11 Mar/30/04 | 553 | 12 | 14.5965 | 144.7777 | Rock fell out of the claw. | | | |
| 05:13:13 Mar/30/04 | 555 | 43 | 14.5965 | 144.7777 | Plume temperature at 540m is 36C. | | | |
| 05:18:06 Mar/30/04 | 548 | 96 | 14.5965 | 144.7777 | Putting intake nozzle into particle plume on edge of Rota Pit Crater. Highlights off. | | | |
| 05:19:37 Mar/30/04 | 548 | 113 | 14.5965 | 144.7777 | Holding nozzle in particle plume and temperature is going up. | | | |
| 05:22:28 Mar/30/04 | 549 | 112 | 14.5965 | 144.7777 | HFS filtered piston#20. Start=0522 Stop=0526. T1avg=12.8 T1max=16.7 T2avg= 12 T2max= 16.7 Vol=712ml Z=548.6. Temp varying due to billowing floc obscuring the view. [NW Rota 1 - Pit Crater]. | R783-HFS-20-0037 | Butterfield | |
| 05:44:30 Mar/30/04 | 551 | 52 | 14.5965 | 144.7777 | Off bottom. End of dive. | | | |
| 06:34:50 Mar/30/04 | 41 | 301 | 14.5965 | 144.7777 | ROPOS is at the surface. | | | |
| 06:34:50 Mar/30/04 | 41 | 301 | 14.5965 | 144.7777 | ROPOS is back on deck. | | | |

## 8.3 R784 Dive Log: NW Rota-1

| **R784: Northwest Rota-1** |
|---|
| wet time (UTC): 3/30 1312 - 3/31 0106. JD 90-91. 11.9 hrs. |
| bottom time (UTC): 3/30 1350 - 2323. 9.51 hrs. [9 samples]<br>**[Imagenex survey: 3/30 1613 – 2137. ~ 30 m off bottom]** |
| **R784 DSC information:** There were 61 original DSCs taken and 53 final ones were kept starting with R784_DSC_033004_141537_00061.jpg and ending with R784_DSC_033104_001319_00119.jpg |
| Biology/Geology dive at NW Rota-1. Began the dive at the area formerly called "Nice Colony" - it was re-named "**Cnidaria**". 3 biological samples collected in the Cnidaria area: (2 suctions and 1 bio/geo including soft coral, hydroids and an anemone). Next we completed an Imagenex survey of the summit of the volcano. Sampled with the McLane pump and plankton nets during the survey. At the end of the dive went to **Brimstone Pit** to explore, sampling 2 rocks. There we witnessed an eruptive event and terminated the dive in order to determine ship/ROPOS safety. Suctioned the top of the biobox to collect particulates from the eruptive plume. |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R784 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 11:41:01 Mar/30/04 | 2 | 300 | 14.5946 | 144.7784 | Verena in magenta. | | | R784-001 |
| 12:33:42 Mar/30/04 | 1 | 261 | 14.5946 | 144.7784 | ROPOS is in the water at 12:33:42. | | | |
| 12:45:10 Mar/30/04 | 102 | 128 | 14.6049 | 144.7731 | ROPOS is too heavy. It needs to come to the surface and re-ballast. | | | |
| 12:56:54 Mar/30/04 | 1 | 186 | 14.6049 | 144.7734 | ROPOS is at the surface. | | | |
| 13:01:15 Mar/30/04 | 2 | 250 | 14.6049 | 144.7734 | ROPOS on deck. | | | |
| 13:12:33 Mar/30/04 | 2 | 251 | 14.6049 | 144.7734 | ROPOS in water. | | | |
| 13:49:47 Mar/30/04 | 587 | 176 | 14.6048 | 144.7732 | Bottom is in sight. | | | |
| 13:51:39 Mar/30/04 | 588 | 61 | 14.6048 | 144.7731 | About a minute after reaching bottom. | | | R784-002 |
| 13:55:44 Mar/30/04 | 600 | 83 | 14.6049 | 144.7734 | Looking around Cnidaria - the spot formally know as "Nice Colony." | | | |
| 13:57:11 Mar/30/04 | 603 | 80 | 14.6049 | 144.7735 | The colony formerly known as "Nice Colony!". Now known as "Cnidaria". | | | R784-003 |
| 13:59:30 Mar/30/04 | 604 | 317 | 14.6049 | 144.7735 | Approaching the Cnidaria area NW of the summit along the western fault. Visited here on the dive yesterday so will sample some non-vent biology seen at that time. | | | |
| 13:59:37 Mar/30/04 | 604 | 305 | 14.6049 | 144.7735 | Cnidaria area. | | | R784-004 |
| 14:07:01 Mar/30/04 | 601 | 265 | 14.6049 | 144.7734 | See ridge of sediments covered in what appears to be patches of altered material - probably sulfur. | | | |
| 14:11:42 Mar/30/04 | 604 | 285 | 14.6048 | 144.7735 | Continuing to try and find the Cnidaria area. See large (~1 m) boulders of altered material sticking out of the sediment-covered ridge. | | | |
| 14:13:25 Mar/30/04 | 606 | 77 | 14.6049 | 144.7735 | Going to collect an anemone sitting on top of a rock. | | | |
| 14:13:27 Mar/30/04 | 606 | 76 | 14.6049 | 144.7735 | Anemone being sampled and placed in biobox. | | | R784-005 |
| 14:15:40 Mar/30/04 | 606 | 75 | 14.6049 | 144.7734 | We are grabbing the rock that the anemone is resting on. | | | R784-006 |
| 14:17:23 Mar/30/04 | 606 | 77 | 14.6049 | 144.7735 | Collected an anemone attached to a rock and placed it in the biobox. This is non-venting area. Z=606.0. [NW Rota 1 - Cnidaria]. | R784-Bio/Rk-0001 | Juniper | |
| 14:19:48 Mar/30/04 | 606 | 76 | 14.6049 | 144.7735 | Some small hydroids on the rock that the anemone was attached to. | | | R784-007 |
| 14:20:46 Mar/30/04 | 606 | 76 | 14.6049 | 144.7734 | A second close up view of the hydroids. | | | R784-008 |
| 14:21:27 Mar/30/04 | 606 | 69 | 14.6048 | 144.7734 | Slope here at fault scarp - NW fault - is dominated by dark volcanic sediments with occasional outcropping volcanic rock. Still see alteration patches, which are likely sulfur. | | | |
| 14:24:50 Mar/30/04 | 604 | 284 | 14.6049 | 144.7734 | Looking to sample hydroids that are sitting on top of rocks in this area. | | | |
| 14:26:44 Mar/30/04 | 602 | 261 | 14.6049 | 144.7733 | Rocky outcrop with jumbled lavas that are hydrothermally altered and covered by hydroids surrounded by black volcanic sediments. Will sample for hydroids here. | | | |
| 14:26:51 Mar/30/04 | 602 | 250 | 14.6049 | 144.7733 | Several groups of nice long hydroids. Kim wants to sample these with the suction sampler. | | | R784-009 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R784 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 14:28:26 Mar/30/04 | 601 | 202 | 14.6049 | 144.7733 | Another angle on the hydroids before they are sampled. | | | R784-010 |
| 14:34:19 Mar/30/04 | 601 | 213 | 14.6049 | 144.7733 | Suction sample of hydroids into jar #1. Suctioning rock were previous sample was collected. Z=601.2. [NW Rota 1 - Cnidaria]. | R784-SS-J1-0002 | Juniper | |
| 14:37:01 Mar/30/04 | 601 | 207 | 14.6049 | 144.7733 | ROPOS is repositioning during the suction sampling of the hydroids. | | Juniper | R784-011 |
| 14:40:05 Mar/30/04 | 601 | 205 | 14.6049 | 144.7733 | Moving ROPOS slightly up the slope to continue to sample hydroids into Jar #1. | | | |
| 14:42:04 Mar/30/04 | 601 | 190 | 14.6049 | 144.7732 | ROPOS has moved to another location close by to sample more hydroids. | | | R784-012 |
| 14:46:56 Mar/30/04 | 601 | 193 | 14.6049 | 144.7733 | Turned off navigation pinger during suction sampling to save battery. | | | |
| 14:49:59 Mar/30/04 | 600 | 245 | 14.6049 | 144.7733 | Taking DSC photos of the outcrops and hydroids. Also close-up of a shrimp. | | | |
| 14:50:15 Mar/30/04 | 600 | 235 | 14.6049 | 144.7733 | Shrimp and hydroids at Cnidaria. | | | R784-013 |
| 14:51:17 Mar/30/04 | 600 | 257 | 14.6049 | 144.7733 | A large shrimp at Cnidaria. | | | R784-014 |
| 14:53:05 Mar/30/04 | 600 | 250 | 14.6049 | 144.7732 | Continuing to sample hydroids into jar #1. | | | |
| 14:56:27 Mar/30/04 | 600 | 253 | 14.6049 | 144.7732 | Rocks here look highly altered and are of a brownish color with yellowish tinges. The rock is very fragile when touched by the ROPOS arm and easily broken into smaller pieces. | | | |
| 14:57:22 Mar/30/04 | 600 | 248 | 14.6049 | 144.7732 | Another location where the hydroids are being sampled. | | Juniper | R784-015 |
| 15:01:59 Mar/30/04 | 600 | 248 | 14.6049 | 144.7732 | Continuing to move around in same general area to collect further hydroids. Saw a squat lobster and took DSC photo. | | | |
| 15:05:14 Mar/30/04 | 600 | 269 | 14.6049 | 144.7732 | Hydroids and a soft coral just before sampling. | | Juniper | R784-016 |
| 15:10:42 Mar/30/04 | 600 | 271 | 14.6049 | 144.7732 | Going to sample some soft corals in the same general area in jar #2. | | | |
| 15:13:43 Mar/30/04 | 600 | 268 | 14.6049 | 144.7732 | We are attempting to suction sample a soft coral. | | Juniper | R784-017 |
| 15:14:39 Mar/30/04 | 600 | 268 | 14.6049 | 144.7732 | Sampled soft coral into Jar #2. Z=599.5. [NW Rota 1 - Cnidaria]. | R784-SS-J2-0003 | Juniper | |
| 15:19:32 Mar/30/04 | 599 | 322 | 14.6049 | 144.7732 | Taking additional DSC photographs of hydroids. | | | |
| 15:19:58 Mar/30/04 | 599 | 323 | 14.6049 | 144.7732 | We are doing some DSC close ups of some hydroids. | | | R784-018 |
| 15:22:54 Mar/30/04 | 600 | 275 | 14.6049 | 144.7732 | Attempting to suction sample a shrimp. | | Juniper | R784-019 |
| 15:23:54 Mar/30/04 | 600 | 273 | 14.6049 | 144.7732 | Attempted to suck large shrimp into Jar #2 but unsuccessful. | | | |
| 15:27:08 Mar/30/04 | 597 | 240 | 14.6049 | 144.7732 | Saw a big crab and attempted to take DSC photograph. | | | |
| 15:31:28 Mar/30/04 | 597 | 223 | 14.6049 | 144.7732 | Took series (8) of DSC photographs of the large crab under a rock ledge and one of a shrimp in same area. | | | |
| 15:36:04 Mar/30/04 | 597 | 187 | 14.6050 | 144.7732 | Taking some DSC photographs (3) of soft corals. | | | |
| 15:36:21 Mar/30/04 | 597 | 188 | 14.6050 | 144.7732 | A field of soft corals. | | Juniper | R784-020 |
| 15:38:35 Mar/30/04 | 597 | 218 | 14.6050 | 144.7732 | Another view of the group of soft corals. | | Juniper | R784-021 |
| 15:40:04 Mar/30/04 | 597 | 220 | 14.6049 | 144.7731 | Now to start the Imagenex survey. Changed navigation pinger back to one ping every 10 seconds. | | | |
| 15:49:10 Mar/30/04 | 602 | 225 | 14.6043 | 144.7730 | Heading off towards point 'A' of Imagenex survey. Logging as we go with altitude of 30 m off the bottom. Speed is 0.5 knots. | | | |
| 16:11:55 Mar/30/04 | 630 | 273 | 14.6029 | 144.7712 | Opening Port and Stbd plankton nets at 1618. Towed during Imagenex survey at ~30m above the bottom. Zmin=537 Zmax=665 Zavg=~600. Start 1618 (start Line A) Stop 2113 (end Line L). [logged post-dive] | R784-net-stbd-0008 | Metaxas | |
| 16:13:30 Mar/30/04 | 625 | 108 | 14.6027 | 144.7712 | Changed navigation pinger to ping every 5 seconds. Moving on to start Imagenex survey line 1 between point 'A' and point 'B' bearing 105 degrees. | | | |
| 16:15:53 Mar/30/04 | 603 | 108 | 14.6026 | 144.7717 | Begin McLane pump run. 5 liters/min. Stbd pump. Altitude 30m above bottom. Total 1250 liters filtered. Filtered throughout entire Imagenex survey. Z=603. [NW Rota 1 - Imagenex Survey]. | R784-MP-0009 | Juniper | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R784 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 16:18:08 Mar/30/04 | 607 | 95 | 14.6025 | 144.7720 | Opening Port and Stbd plankton nets. Towed during Imagenex survey at ~30m above the bottom. Zmin=537 Zmax=665 Zav g=~600. Start 1618 (start Line A) Stop 2113 (end Line L). (stbd net sample R784-0008). [NW Rota 1 - Imagenex Survey]. | R784-net-port-0004 | Metaxas | |
| 16:24:56 Mar/30/04 | 590 | 98 | 14.6024 | 144.7727 | Begin recording on black S-VHS deck of plankton distribution along Imagenex lines. | | | |
| 17:16:03 Mar/30/04 | 573 | 93 | 14.6008 | 144.7783 | EOL A-B. Turning south to line C-D. | | | |
| 17:22:11 Mar/30/04 | 564 | 6 | 14.6002 | 144.7782 | Finished first Imagenex line a 5 or so minutes ago. Paused S-VHS tape until start of next line. | | | |
| 17:25:39 Mar/30/04 | 517 | 2 | 14.5999 | 144.7781 | Stopped McLane pump during TETHER MANAGEMENT operation. Now at cage at 506m depth. Pumped 227 liters. | | | |
| 17:35:12 Mar/30/04 | 580 | 49 | 14.6003 | 144.7782 | Tether management terminated. Back down to 30m altitude. Resumed McLane pumping. Programmed for 400 liters. | | | |
| 17:36:24 Mar/30/04 | 580 | 282 | 14.6003 | 144.7782 | SOL C-D (after tether management between lines). | | | |
| 17:37:42 Mar/30/04 | 588 | 294 | 14.6002 | 144.7779 | Resumed recording with S-VHS deck for plankton distribution. Recording time along first line was 52 minutes. | | | |
| 18:33:36 Mar/30/04 | 607 | 287 | 14.6022 | 144.7708 | EOL C-D - turning south. Paused video tape (at 1:48:57). | | | |
| 18:36:05 Mar/30/04 | 607 | 200 | 14.6020 | 144.7707 | McLane pump at 288 liters (plus 227 liters from previous session). Still between lines 2 and 3. | | | |
| 18:40:04 Mar/30/04 | 614 | 115 | 14.6018 | 144.7704 | SOL E-F. Restarting video tape. Start of third Imagenex line (line E-F). | | | |
| 18:52:40 Mar/30/04 | 603 | 104 | 14.6014 | 144.7719 | Changing video tape. Tape 2 begins. | | | |
| 19:02:09 Mar/30/04 | 538 | 103 | 14.6009 | 144.7734 | McLane pump finished 400 liter session. Reprogrammed for 373 liter session to make total of 1000 liters. Such volume! | | | |
| 19:03:30 Mar/30/04 | 556 | 98 | 14.6009 | 144.7736 | Brief interruption of video view to look at gauges. | | | |
| 19:36:09 Mar/30/04 | 606 | 107 | 14.5995 | 144.7780 | EOL E-F. End of third Imagenex line (Line E-F). Pausing S-VHS tape. McLane pump at 167 liters. | | | |
| 19:41:21 Mar/30/04 | 632 | 266 | 14.5990 | 144.7780 | Start of line GH. Video restarted. | | | |
| 20:22:45 Mar/30/04 | 577 | 289 | 14.6006 | 144.7724 | Reached 1000 liters on McLane pump. Programmed additional 500 liters. Pump restarted. | | | |
| 20:37:08 Mar/30/04 | 614 | 288 | 14.6011 | 144.7705 | EOL G-H. End of 4th Imagenex line. Video (S-VHS) paused. | | | |
| 20:41:13 Mar/30/04 | 610 | 92 | 14.6005 | 144.7704 | Start of Imagenex line I-J. Restarted video. | | | |
| 21:05:27 Mar/30/04 | 666 | 107 | 14.5997 | 144.7735 | Tape change for S-VHS recorder. Begin tape #3.Will continue taping as we break away from fifth line and cross other lines on way to Brimstone Pit. | | | |
| 21:13:41 Mar/30/04 | 638 | 103 | 14.5993 | 144.7748 | Breaking off Imagenex line I-J (about half way down) and turning onto Imagenex line K-L which runs perpendicular to the other lines and will go right over the crater near the summit. We are closing the plankton net and turning off the McLane pump. | | | |
| 21:16:06 Mar/30/04 | 617 | 12 | 14.5996 | 144.7750 | We will continue the video up this last Imagenex line. The first 5 Imagenex lines were more or less east-west. This last line is more or less north-south. Total water volume pumped was 1250 liters. | | | |
| 21:37:36 Mar/30/04 | 565 | 13 | 14.6025 | 144.7758 | EOL K-L. Imagenex off. Video off. Tether management. | | | |
| 21:48:41 Mar/30/04 | 505 | 117 | 14.6025 | 144.7756 | Still above bottom having terminated Imagenex survey and done some tether management we are transiting to descent point 40-50m directly down slope from the pit crater. | | | |
| 22:01:51 Mar/30/04 | 498 | 52 | 14.6004 | 144.7747 | Descending to seafloor downslope of pit crater. | | | |
| 22:05:49 Mar/30/04 | 566 | 54 | 14.6005 | 144.7749 | Plankton (swimmers) at the top of the visible hydrothermal plume at 20m above bottom. | | | |
| 22:06:27 Mar/30/04 | 573 | 54 | 14.6005 | 144.7750 | Bottom in site. | | | |
| 22:06:46 Mar/30/04 | 578 | 54 | 14.6005 | 144.7750 | Steep slope of white sand and rock debris. Moving up slope. | | | |
| 22:06:56 Mar/30/04 | 576 | 41 | 14.6005 | 144.7751 | Ascending steep slope towards pit crater. Lots of talus. | | | R784-022 |
| 22:08:08 Mar/30/04 | 570 | 18 | 14.6006 | 144.7751 | Rock outcrop while ascending toward pit crater. | | | R784-023 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R784 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 22:08:12 Mar/30/04 | 569 | 23 | 14.6006 | 144.7751 | Light colored rocky outcrop. Steep wall. | | | |
| 22:08:55 Mar/30/04 | 567 | 36 | 14.6007 | 144.7752 | Passing upward over altered volcanic dikes. | | | R784-024 |
| 22:09:58 Mar/30/04 | 562 | 54 | 14.6007 | 144.7752 | Sediment mixed with outcrop. Moving up and across slope vectoring toward Rota Pit Crater site. | | | |
| 22:10:01 Mar/30/04 | 562 | 53 | 14.6007 | 144.7752 | The slope is becoming more heavily sedimented as we climb toward the pit. | | | R784-025 |
| 22:11:02 Mar/30/04 | 558 | 23 | 14.6007 | 144.7752 | Patches of white and yellow sulfurous deposit on rock. Still moving up. | | | |
| 22:11:11 Mar/30/04 | 557 | 22 | 14.6007 | 144.7752 | White staining on rocks as we continue to climb. | | | R784-026 |
| 22:12:00 Mar/30/04 | 551 | 24 | 14.6008 | 144.7752 | Emerging upward to the edge of the out crater plume. | | | R784-027 |
| 22:12:02 Mar/30/04 | 551 | 23 | 14.6008 | 144.7752 | Smoke plume visible off to starboard. | | | |
| 22:12:44 Mar/30/04 | 550 | 20 | 14.6007 | 144.7753 | Digital stills of smoke plume. | | | |
| 22:14:24 Mar/30/04 | 550 | 334 | 14.6008 | 144.7753 | Yellowish smoke and particulate sulfur. More digital stills. | | | |
| 22:14:28 Mar/30/04 | 551 | 337 | 14.6008 | 144.7753 | Plume billowing up from pit crater (Brimstone Pit). | | | R784-028 |
| 22:14:30 Mar/30/04 | 551 | 339 | 14.6008 | 144.7753 | Plume billowing up from pit crater (Brimstone Pit). | | | R784-029 |
| 22:14:37 Mar/30/04 | 551 | 347 | 14.6007 | 144.7753 | Plume billowing up from pit crater (Brimstone Pit). | | | R784-030 |
| 22:15:32 Mar/30/04 | 552 | 334 | 14.6008 | 144.7753 | Plume turning yellow. | | | R784-031 |
| 22:16:05 Mar/30/04 | 557 | 352 | 14.6008 | 144.7753 | Small rocks coming up in plume now. | | | R784-032 |
| 22:16:36 Mar/30/04 | 555 | 57 | 14.6008 | 144.7753 | Vehicle in the plume. Up to photo number 7 on DSC. | | | |
| 22:17:37 Mar/30/04 | 535 | 29 | 14.6008 | 144.7752 | Larger particulates coming up out of plume now. | | | R784-033 |
| 22:19:25 Mar/30/04 | 558 | 61 | 14.6006 | 144.7752 | Pulled back from smoke plume. Now back on seafloor exploring adjacent geological features. | | | |
| 22:20:38 Mar/30/04 | 561 | 77 | 14.6007 | 144.7752 | Altered rocks below the pit crater. | | | R784-034 |
| 22:21:24 Mar/30/04 | 561 | 72 | 14.6007 | 144.7752 | DSC of rock outcrop near crater. | | | |
| 22:21:52 Mar/30/04 | 561 | 37 | 14.6007 | 144.7752 | More altered rocks below pit. | | | R784-035 |
| 22:23:48 Mar/30/04 | 562 | 19 | 14.6007 | 144.7752 | Fractured block showing white stained crack below pit crater. | | | R784-036 |
| 22:24:27 Mar/30/04 | 562 | 11 | 14.6006 | 144.7752 | Digital photo of fracture with hydrothermal alteration. | | | |
| 22:26:02 Mar/30/04 | 562 | 11 | 14.6007 | 144.7752 | Closer detail of fractured block (prior to an attempt to sample the block). | | | R784-037 |
| 22:27:23 Mar/30/04 | 562 | 12 | 14.6007 | 144.7752 | Grabbing fractured block sample. | | | R784-038 |
| 22:27:42 Mar/30/04 | 562 | 8 | 14.6007 | 144.7752 | Attempting rock sample of altered material in fracture. | | | |
| 22:31:38 Mar/30/04 | 562 | 37 | 14.6007 | 144.7753 | Gave up sampling attempt. Looking for another target. | | | |
| 22:33:09 Mar/30/04 | 562 | 36 | 14.6007 | 144.7752 | Collecting a piece of highly fractured and altered rock below the pit crater. | | | R784-039 |
| 22:33:42 Mar/30/04 | 562 | 40 | 14.6007 | 144.7752 | Close up of rock sample. | | | R784-040 |
| 22:36:05 Mar/30/04 | 562 | 39 | 14.6007 | 144.7752 | Fist-sized piece of highly fractured and altered rock collected from below the pit crater. Port side biobox. Z=561.9. [NW Rota 1 - Brimstone Pit]. | R784-RK-0005 | SROF geo team (Hein) | |
| 22:37:58 Mar/30/04 | 555 | 50 | 14.6007 | 144.7752 | Climbing rubble pile of talus debris to deploy marker at Rota Pit Crater. | | | |
| 22:38:43 Mar/30/04 | 552 | 76 | 14.6008 | 144.7752 | Spatter pile of small ejected rocks on rim of crater. | | | R784-041 |
| 22:38:48 Mar/30/04 | 552 | 84 | 14.6008 | 144.7752 | Sulfurous fallout from crater coating adjacent rocks. | | | |
| 22:39:49 Mar/30/04 | 552 | 103 | 14.6008 | 144.7752 | More detail of the spatter pile on rim of crater. | | | R784-042 |
| 22:40:19 Mar/30/04 | 551 | 88 | 14.6008 | 144.7752 | Rim of crater with plume in background. | | | R784-043 |
| 22:40:25 Mar/30/04 | 551 | 87 | 14.6008 | 144.7752 | See enormous amounts of sulfur rained out of the plume from the Rota pit crater lying on the sediments and rocks encircling the pit. | | | |

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| 22:41:04 Mar/30/04 | 551 | 71 | 14.6008 | 144.7752 | Preparing to collect some of the spatter at crater rim. | | | R784-044 |
| 22:41:39 Mar/30/04 | 551 | 71 | 14.6009 | 144.7752 | Spatter collapsing as we try to collect it. Seems to be very friable. | | | R784-045 |
| 22:43:18 Mar/30/04 | 551 | 72 | 14.6008 | 144.7752 | Putting a piece of spatter into the portside biobox. | | | R784-046 |
| 22:43:43 Mar/30/04 | 551 | 73 | 14.6008 | 144.7752 | Sampled rock near Rota crater rim in the port side bio box. | | | |
| 22:44:14 Mar/30/04 | 552 | 74 | 14.6008 | 144.7752 | Sampled rock (spatter) from the edge of the Rita pit crater rim. Less altered block of lava from area of mostly ash. Portside biobox. Z=551.5. [NW Rota 1 - Brimstone Pit]. | R784-RK-0006 | SROF geo team | |
| 22:44:54 Mar/30/04 | 551 | 75 | 14.6008 | 144.7752 | Approaching the rim of the crater pit to take a digital still. | | | R784-047 |
| 22:50:19 Mar/30/04 | 551 | 89 | 14.6008 | 144.7752 | Two digital photos taken of sulfur particles on rim of crater. | | | |
| 22:51:03 Mar/30/04 | 552 | 88 | 14.6008 | 144.7752 | Moving a little closer to the edge of the pit. | | | R784-048 |
| 22:52:29 Mar/30/04 | 551 | 89 | 14.6008 | 144.7752 | Switching highlights video recorder (DVCam) to SIT camera feed to document billowing cloud from crater. | | | |
| 22:53:48 Mar/30/04 | 551 | 43 | 14.6008 | 144.7752 | Moving around and into the crater to observe plume from inside. Plume appears to be issuing from a single source in elongated fracture in the northeastern area of pit. | | | |
| 22:55:12 Mar/30/04 | 547 | 54 | 14.6008 | 144.7752 | Moving out over the pit to look down on the flow. | | | R784-049 |
| 22:56:08 Mar/30/04 | 552 | 352 | 14.6008 | 144.7753 | Plume appears to be coming from a single fracture in the pit. | | | R784-050 |
| 22:57:30 Mar/30/04 | 555 | 331 | 14.6008 | 144.7753 | Base of smoke plume now distinguishable. Appears similar in diameter to ROV. | | | |
| 22:59:25 Mar/30/04 | 551 | 35 | 14.6008 | 144.7752 | Descending into pit toward fracture from which plume is flowing. | | | R784-051 |
| 23:00:00 Mar/30/04 | 551 | 354 | 14.6008 | 144.7752 | Fixing nav point as submersible maneuvers around source of plume - which has been named "Brimstone". The larger feature that surrounds the vent opening has been named "Rota Pit". The pit is approx. 2-3 meters in diameter. | | | |
| 23:02:34 Mar/30/04 | 554 | 356 | 14.6008 | 144.7753 | True depth of edge of plume opening - 554m. | | | |
| 23:05:10 Mar/30/04 | 554 | 356 | 14.6008 | 144.7753 | Preparing to deploy Marker #25 at edge of Rota Pit. | | | |
| 23:07:11 Mar/30/04 | 548 | 39 | 14.6007 | 144.7752 | View of the pit margin. | | | R784-052 |
| 23:10:09 Mar/30/04 | 539 | 134 | 14.6009 | 144.7753 | Climbing slope above pit to find place to deploy marker. | | | R784-053 |
| 23:10:51 Mar/30/04 | 540 | 104 | 14.6009 | 144.7753 | Site where we will deploy the marker and take a digital pic. [The marker was never deployed] | | | R784-054 |
| 23:11:18 Mar/30/04 | 540 | 100 | 14.6009 | 144.7753 | Shimmering water emerging through sand near a sulfur stack. | | | R784-055 |
| 23:11:49 Mar/30/04 | 540 | 101 | 14.6009 | 144.7753 | Digital still of sulfurous pellets on volcaniclastic sediment and sulfur stained outcrop. | | | |
| 23:14:05 Mar/30/04 | 540 | 108 | 14.6009 | 144.7753 | Close-up of sulfur chimney. | | | R784-056 |
| 23:14:53 Mar/30/04 | 540 | 106 | 14.6009 | 144.7753 | Digital still close-ups of highly altered outcrop. | | | |
| 23:15:15 Mar/30/04 | 540 | 106 | 14.6009 | 144.7753 | Approaching a sulfur chimney. | | | R784-057 |
| 23:15:53 Mar/30/04 | 540 | 104 | 14.6009 | 144.7753 | Here comes the plume. The current has changed and is blowing across ROPOS. | | | R784-058 |
| 23:17:19 Mar/30/04 | 540 | 102 | 14.6009 | 144.7753 | Huge amounts of ash falling out of the plume. | | | R784-059 |
| 23:17:23 Mar/30/04 | 540 | 101 | 14.6009 | 144.7753 | Huge burst of ash fallout from plume. Pulling back vehicle to safer vantage point. At 12m above bottom ash particles still falling out. | | | |
| 23:23:13 Mar/30/04 | 489 | 225 | 14.6007 | 144.7751 | Back up at cage thinking about what to do next. | | | |
| 23:26:19 Mar/30/04 | 491 | 164 | 14.6007 | 144.7750 | Moving ship 500m south as a precaution. | | | |
| 23:26:19 Mar/30/04 | 491 | 164 | 14.6007 | 144.7750 | Moving to dive site to a parasitic cone - 2km to the southeast. | | | |
| 00:01:21 Mar/31/04 | 615 | 88 | 14.5961 | 144.7750 | We're trying to determine if there is any of the plume material on the sub. We're looking at the top of the biobox. | | | |
| 00:02:14 Mar/31/04 | 615 | 90 | 14.5961 | 144.7750 | Looking at some of the debris that rained down on the biobox. | | Embley | R784-060 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R784 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 00:02:48 Mar/31/04 | 615 | 88 | 14.5960 | 144.7751 | Other side of the biobox. | | Embley | R784-061 |
| 00:04:49 Mar/31/04 | 601 | 298 | 14.5960 | 144.7754 | We're going to suction the top of the biobox for sulfur and ash. | | | |
| 00:08:26 Mar/31/04 | 609 | 96 | 14.5961 | 144.7764 | Suctioning the top of the biobox to try to collect some particles from the plume (into jar 5). Mostly sulfur plus some small pieces of rock and lapilli (ash). 202 micron Nytex double wrap mesh (Moyers). Stop 0017. Z=608.7. [NW Rota 1 - Brimstone Pit]. | R784-SS-J5-0007 | SROF geo team | |
| 00:13:24 Mar/31/04 | 609 | 114 | 14.5960 | 144.7770 | Suction sample of the biobox lid to get what is left of the debris that rained down on ROPOS. | | | R784-062 |
| 00:22:13 Mar/31/04 | 612 | 94 | 14.5959 | 144.7770 | Transiting to a small cone on the E/SE flank of the volcano. | | | |
| 00:27:18 Mar/31/04 | 591 | 91 | 14.5960 | 144.7784 | Change in plan. Terminate the dive. We'll take some time to think about whether or not it's safe to return to this site. | | | |
| 00:59:38 Mar/31/04 | 144 | 327 | 14.5957 | 144.7812 | ROPOS in cage. | | | |
| 01:06:56 Mar/31/04 | 4 | 202 | 14.5956 | 144.7812 | ROPOS on deck. Dive terminated. Phew. | | | |

## 8.4 R785 Dive Log: W Rota

| **R785: West Rota** |
|---|
| wet time (UTC): 3/31 1007 -3/31 2237. JD 91. 12.5 hrs. |
| bottom time (UTC): 3/31 1131 - 3/31 1950. 8.32 hrs. [12 samples] |
| Missing 30 minutes navigation at end of dive. The original nav fix file ended at 1920. No navigation after that point. |
| **R785 DSC information:** There were 133 original DSCs taken and 103 final ones were kept starting with R785_DSC_033104_085803_00120.jpg and ending with R785_DSC_033104_181904_00252.jpg |
| Exploratory dive on W Rota, mainly observing the geologic features of the volcano. West Rota geological traverse from the caldera bottom up to the top of the east rim. Lots of pumice down in the caldera. Traversing up the east rim saw numerous bands of pyroclastic flows. Samples: 10 rocks and 2 plankton nets. ROPOS was halted on the ascent at Z=200 for over 2 hours due to winch problems. |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R785 Comments: W Rota | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 10:07:12 Mar/31/04 | 1 | 203 | 14.5956 | 144.7812 | ROPOS is in the water at 10:07. | | | |
| 11:25:20 Mar/31/04 | 1213 | 28 | 14.3335 | 144.8492 | ROPOS stopped descent before reaching for the bottom. We are checking gauges. | | | |
| 11:31:29 Mar/31/04 | 1248 | 89 | 14.3339 | 144.8495 | We are on the bottom. | | | |
| 11:32:07 Mar/31/04 | 1249 | 86 | 14.3338 | 144.8494 | Looks like a sandy bottom. | | | |
| 11:33:02 Mar/31/04 | 1252 | 87 | 14.3339 | 144.8495 | Sandy bottom of West Rota. Perhaps some pumice as well. | | | R785-001 |
| 11:33:48 Mar/31/04 | 1251 | 86 | 14.3339 | 144.8495 | It is a steep sediment-covered slope with sparse rock talus on the surface. | | | |
| 11:35:39 Mar/31/04 | 1251 | 81 | 14.3339 | 144.8495 | We can see few ripples and not many organisms. We see some white spots which may be pumice. | | | |
| 11:36:50 Mar/31/04 | 1247 | 87 | 14.3340 | 144.8497 | White rocks are probably altered. The amount of talus debris on the sediment is increasing up slope. | | | |
| 11:37:44 Mar/31/04 | 1245 | 76 | 14.3340 | 144.8497 | Large variety of rock types. | | | |
| 11:38:01 Mar/31/04 | 1242 | 84 | 14.3341 | 144.8497 | Could be a debris flow of highly altered rocks that failed. | | | |
| 11:38:38 Mar/31/04 | 1242 | 87 | 14.3340 | 144.8497 | Taking digital camera shots. | | | |
| 11:40:18 Mar/31/04 | 1241 | 87 | 14.3341 | 144.8498 | Debris flow - variety of colors: black; white; and yellow at bottom. | | | R785-002 |
| 11:40:38 Mar/31/04 | 1242 | 84 | 14.3341 | 144.8498 | Some rocks are highly altered. | | | |
| 11:43:00 Mar/31/04 | 1243 | 82 | 14.3340 | 144.8497 | We have stopped and considering collecting a rock. We will look at the rock and most of them are 10-20 cm's in diameter. | | | |
| 11:44:06 Mar/31/04 | 1243 | 84 | 14.3341 | 144.8498 | We are switching the video feed from the cage to the SIT. | | | |
| 11:45:18 Mar/31/04 | 1243 | 82 | 14.3340 | 144.8498 | The rock seems like a piece of pumice which is altered through. Most rocks are likely iron stained pumice. | | | |
| 11:46:08 Mar/31/04 | 1243 | 83 | 14.3340 | 144.8497 | Picking up a red rock. It is very light and difficult to pick up through a pumice pile. | | | |
| 11:46:43 Mar/31/04 | 1243 | 83 | 14.3341 | 144.8498 | Pumice pile at bottom. We originally thought they were altered. | | | R785-003 |
| 11:47:39 Mar/31/04 | 1243 | 81 | 14.3340 | 144.8498 | Trying picking up a third rock which is most likely iron stained. It was pumice. Trying a third black rock which appears not to be pumice. It appears to contain crystals and is quite strong. | | | |
| 11:50:10 Mar/31/04 | 1243 | 81 | 14.3340 | 144.8498 | Seems to be fresh sample among pumice. | | | R785-004 |
| 11:54:04 Mar/31/04 | 1243 | 81 | 14.3341 | 144.8498 | We have no video feed from SIT or DSC. | | | |
| 11:55:01 Mar/31/04 | 1243 | 67 | 14.3340 | 144.8498 | We now have DSC video feed. Perhaps temporarily. Taking a digital picture of variably stained pumice. | | | |
| 11:55:06 Mar/31/04 | 1243 | 68 | 14.3340 | 144.8498 | Fresh rock among pile of pumice. | | | R785-005 |
| 11:57:02 Mar/31/04 | 1241 | 86 | 14.3340 | 144.8497 | The question is where is all this pumice coming from. | | | |
| 12:00:13 Mar/31/04 | 1238 | 75 | 14.3340 | 144.8499 | We are still wandering around the debris field. We are observing some interference ripples. Appears to be current scouring around the rocks and lag deposits. No evidence of biological activity. Haven't seen a single fish. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R785 Comments: W Rota | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 12:02:24 Mar/31/04 | 1233 | 81 | 14.3340 | 144.8500 | Pumice lies atop darker deposit. | | | R785-006 |
| 12:02:43 Mar/31/04 | 1233 | 79 | 14.3340 | 144.8500 | 6 digital pictures are moved over. | | | |
| 12:03:24 Mar/31/04 | 1232 | 84 | 14.3340 | 144.8501 | Fish. | | | R785-007 |
| 12:04:11 Mar/31/04 | 1232 | 83 | 14.3339 | 144.8501 | We are entering an area of fine-grained black sediment. | | | |
| 12:05:05 Mar/31/04 | 1231 | 80 | 14.3340 | 144.8501 | We are seeing oscillation ripple marks on the sediment perhaps indicating stronger currents. | | | |
| 12:05:14 Mar/31/04 | 1230 | 79 | 14.3340 | 144.8501 | Ripple marks reflect bottom currents. | | | R785-008 |
| 12:07:15 Mar/31/04 | 1228 | 85 | 14.3339 | 144.8503 | Taking DSC images of the rippled sediment and very fine pumice fragments. | | | |
| 12:08:22 Mar/31/04 | 1226 | 87 | 14.3339 | 144.8503 | 2 DSC images of ripple marks mov ed over. | | | |
| 12:08:44 Mar/31/04 | 1224 | 82 | 14.3339 | 144.8504 | Extensive current ripples; are they symmetrical? | | | R785-009 |
| 12:09:31 Mar/31/04 | 1223 | 82 | 14.3339 | 144.8505 | A sea whip on a rocky outcrop. | | | |
| 12:11:49 Mar/31/04 | 1220 | 85 | 14.3339 | 144.8507 | Ripples maintain same lineation. | | | R785-010 |
| 12:12:26 Mar/31/04 | 1218 | 83 | 14.3338 | 144.8508 | We are seeing the first coral. | | | |
| 12:12:41 Mar/31/04 | 1218 | 86 | 14.3338 | 144.8508 | A lone coral decorates the horizon. | | | R785-011 |
| 12:13:23 Mar/31/04 | 1217 | 84 | 14.3338 | 144.8508 | A big boulder is in sight. Huge talus blocks are also scattered on the sediment. | | | |
| 12:14:25 Mar/31/04 | 1217 | 76 | 14.3338 | 144.8509 | Crinoid on rock. | | | R785-012 |
| 12:14:29 Mar/31/04 | 1217 | 76 | 14.3338 | 144.8509 | We are taking a DSC image of a crinoid. | | | |
| 12:16:52 Mar/31/04 | 1217 | 90 | 14.3337 | 144.8509 | 6 DSC images of the crinoid moved over. | | | |
| 12:17:14 Mar/31/04 | 1217 | 90 | 14.3338 | 144.8510 | Crinoid closer. | | | R785-013 |
| 12:18:11 Mar/31/04 | 1217 | 92 | 14.3337 | 144.8509 | We are marking the site on the navigation system as Outcrop 1. | | | |
| 12:18:55 Mar/31/04 | 1217 | 90 | 14.3337 | 144.8509 | In an attempt to collect the rock that the crinoid was on we destroyed both rock and crinoid. It appears that this rock was pumice. | | | |
| 12:19:05 Mar/31/04 | 1217 | 91 | 14.3338 | 144.8509 | Mashing the rock. | | | R785-014 |
| 12:20:35 Mar/31/04 | 1217 | 90 | 14.3338 | 144.8509 | Post-destruction sample site. | | | R785-015 |
| 12:20:41 Mar/31/04 | 1217 | 91 | 14.3338 | 144.8509 | Taking DSC image of smashed pumice that harbored the crinoid. | | | |
| 12:22:48 Mar/31/04 | 1217 | 80 | 14.3338 | 144.8510 | Piece of pumice with yellow/brown iron staining. Two pieces were taken: one from exterior - one from interior. The in situ rock was ~0.5m in diameter. Portside biobox. Z=1216.8m. [W Rota - Outcrop 1]. | R785-RK-0001 | SROF geo team (Stern) | |
| 12:22:58 Mar/31/04 | 1217 | 80 | 14.3338 | 144.8510 | R785-RK-0001 sample. | | | R785-016 |
| 12:25:41 Mar/31/04 | 1217 | 64 | 14.3337 | 144.8509 | We are attempting to collect more of the pumice interior which is white and include it with the rest of the rock samples. | | | |
| 12:26:15 Mar/31/04 | 1217 | 64 | 14.3337 | 144.8509 | R785-RK-0001 part 2. | | | R785-017 |
| 12:27:49 Mar/31/04 | 1217 | 61 | 14.3337 | 144.8509 | Pocking the seafloor underneath the big pumice rock we discover sheets of pumice below. | | | |
| 12:28:35 Mar/31/04 | 1217 | 60 | 14.3336 | 144.8509 | Poked crust with claw and it easily breaks to show an iron-stained surface. | | | R785-018 |
| 12:30:08 Mar/31/04 | 1217 | 61 | 14.3337 | 144.8510 | Piece of pumice with Fe crust. The Fe crust on the seafloor covers many square m's and is several cm's thick. Crust is brown in the middle and black on the outside. Z=1217m. [W Rota - Outcrop 1]. | R785-RK-0002 | SROF geo team (Hein) | |
| 12:30:26 Mar/31/04 | 1217 | 60 | 14.3337 | 144.8510 | R785-RK-0002 is iron-stained crust. | | | R785-019 |
| 12:32:17 Mar/31/04 | 1216 | 90 | 14.3335 | 144.8510 | 2 DSC images of crinoid rock and one of rock sample 2. | | | |
| 12:32:51 Mar/31/04 | 1215 | 94 | 14.3336 | 144.8510 | We are continuing to climb up the slope. The crust pavement is covering a large area. | | | |
| 12:34:17 Mar/31/04 | 1213 | 89 | 14.3336 | 144.8511 | We are moving the ship 100 m along the line towards WP2. | | | |
| 12:35:49 Mar/31/04 | 1213 | 90 | 14.3337 | 144.8510 | Scouring around base of pumice boulder. | | | R785-020 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R785 Comments: W Rota | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 12:38:44 Mar/31/04 | 1214 | 85 | 14.3336 | 144.8510 | We picked up an iron stained rock which is not pumice and we put it down again and moved on. | | | |
| 12:40:47 Mar/31/04 | 1214 | 64 | 14.3335 | 144.8509 | 4 DSC images of pumice field moved over. | | | |
| 12:42:41 Mar/31/04 | 1212 | 89 | 14.3335 | 144.8511 | Block with "columnar cooling" (saith Bob Stern). | | | R785-021 |
| 12:44:13 Mar/31/04 | 1209 | 93 | 14.3335 | 144.8512 | We are getting into a rubble debris chute. | | | |
| 12:46:15 Mar/31/04 | 1202 | 85 | 14.3335 | 144.8514 | We are seeing a big pile of cobble size pumice. | | | |
| 12:46:19 Mar/31/04 | 1201 | 86 | 14.3335 | 144.8515 | Large block. | | | R785-022 |
| 12:46:34 Mar/31/04 | 1200 | 86 | 14.3335 | 144.8515 | Pumice talus. | | | R785-023 |
| 12:47:38 Mar/31/04 | 1200 | 80 | 14.3335 | 144.8516 | Pumice talus close. | | | R785-024 |
| 12:48:51 Mar/31/04 | 1200 | 79 | 14.3334 | 144.8515 | A clean piece of pumice collected in the big field of cobble sized pumice. Starboard biobox. Z=1199.8. (54 m east of Outcrop 1). [W Rota]. | R785-RK-0003 | SROF geo team (Stern) | |
| 12:50:48 Mar/31/04 | 1200 | 78 | 14.3335 | 144.8515 | R785-RK-0003. | | | R785-025 |
| 12:51:30 Mar/31/04 | 1200 | 79 | 14.3334 | 144.8515 | 2 DSC images of the pumice sampling site moved over. | | | |
| 12:54:05 Mar/31/04 | 1193 | 83 | 14.3335 | 144.8516 | We are approaching a fairly steep slope. We see columnar jointing in pumice - which is quite unusual. | | | |
| 12:54:54 Mar/31/04 | 1188 | 85 | 14.3335 | 144.8516 | Sea of pumice. | | | R785-026 |
| 12:58:31 Mar/31/04 | 1178 | 63 | 14.3333 | 144.8518 | We are still moving up slope and seeing pumice of a remarkable array of colors. | | | |
| 12:58:36 Mar/31/04 | 1178 | 63 | 14.3334 | 144.8518 | Variety in pumice. | | | R785-027 |
| 13:05:53 Mar/31/04 | 1161 | 56 | 14.3332 | 144.8522 | We are stopping to take pictures and frame grabs of the pumice field. There are some very coarse pieces of pumice. | | | |
| 13:06:55 Mar/31/04 | 1161 | 53 | 14.3333 | 144.8523 | More pumice. | | | R785-028 |
| 13:07:15 Mar/31/04 | 1161 | 52 | 14.3332 | 144.8523 | We are checking to confirm that the material is indeed pumice and crashes under claw pressure. And it is pumice. Rhyolite. | | | |
| 13:09:52 Mar/31/04 | 1160 | 56 | 14.3332 | 144.8522 | 3 DSC images of the coarse pumice field moved over. | | | |
| 13:10:27 Mar/31/04 | 1160 | 52 | 14.3332 | 144.8522 | Yes - it's pumice. | | | R785-029 |
| 13:12:19 Mar/31/04 | 1160 | 55 | 14.3331 | 144.8523 | R7858-RK-0004. | | | R785-030 |
| 13:12:34 Mar/31/04 | 1160 | 54 | 14.3332 | 144.8523 | Rhyolite collected from the field of coarse pumice. Placed in the boot. Z=1160.3m. [W Rota]. | R785-RK-0004 | SROF geo team (Stern) | |
| 13:14:27 Mar/31/04 | 1155 | 57 | 14.3332 | 144.8523 | 1 DSC image of sample 0004 moved over. | | | |
| 13:14:48 Mar/31/04 | 1154 | 56 | 14.3333 | 144.8524 | Continuing to move up slope. | | | |
| 13:16:18 Mar/31/04 | 1151 | 56 | 14.3333 | 144.8524 | The pumice appears to be getting denser and coarser. | | | |
| 13:16:31 Mar/31/04 | 1150 | 55 | 14.3334 | 144.8524 | Size disparity. | | | R785-031 |
| 13:17:20 Mar/31/04 | 1145 | 58 | 14.3334 | 144.8525 | Moving the ship. | | | |
| 13:18:03 Mar/31/04 | 1143 | 55 | 14.3334 | 144.8525 | We have just seen some black rocks amidst the pumice that appear different (perhaps denser). We are attempting to pick one up and it does not crush. | | | R785-032 |
| 13:20:11 Mar/31/04 | 1143 | 56 | 14.3334 | 144.8526 | R785-RK-0005. | | | R785-033 |
| 13:20:24 Mar/31/04 | 1144 | 58 | 14.3334 | 144.8526 | Black fist-size rock. This rock does not crush. Port biobox. Z=1143.5. [W Rota]. | R785-RK-0005 | SROF geo team (Stern) | |
| 13:21:37 Mar/31/04 | 1144 | 75 | 14.3334 | 144.8526 | 2 DSC pictures of grey weathered rock moved over. It is falling apart very easily. It seems heavy. | | | |
| 13:22:56 Mar/31/04 | 1144 | 69 | 14.3334 | 144.8527 | R785-RK-0006. | | | R785-034 |
| 13:23:31 Mar/31/04 | 1144 | 67 | 14.3334 | 144.8526 | Grey rock that is very friable. When placed in the boot it falls apart. Z=1143.6. [W Rota]. | R785-RK-0006 | SROF geo team (Stern) | |
| 13:25:15 Mar/31/04 | 1144 | 64 | 14.3335 | 144.8527 | 1 more DSC image of grey rock moved over. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R785 Comments: W Rota | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 13:25:59 Mar/31/04 | 1139 | 40 | 14.3334 | 144.8526 | Geology appears to be changing. More black rocks mixed in with the pumice. We are at what looks almost like an outcrop. It is covered with talus. | | | |
| 13:27:15 Mar/31/04 | 1130 | 73 | 14.3335 | 144.8527 | We are approaching a very steep cliff and a thick bank of pumice with some black rocks scattered throughout. We are coming up the ridge. | | | |
| 13:27:32 Mar/31/04 | 1127 | 65 | 14.3335 | 144.8528 | Perhaps approaching base of cliff. | | | R785-035 |
| 13:29:30 Mar/31/04 | 1117 | 81 | 14.3336 | 144.8530 | Stalked crinoid. | | | R785-036 |
| 13:30:54 Mar/31/04 | 1117 | 54 | 14.3335 | 144.8530 | 4 DSC pictures of stalked crinoid moved over. | | | |
| 13:31:38 Mar/31/04 | 1117 | 87 | 14.3336 | 144.8530 | Crinoid forest. | | | R785-037 |
| 13:32:08 Mar/31/04 | 1117 | 47 | 14.3336 | 144.8530 | We are in a crinoid forest. | | | |
| 13:35:25 Mar/31/04 | 1116 | 8 | 14.3336 | 144.8530 | Smiling crinoid. | | | R785-038 |
| 13:42:32 Mar/31/04 | 1110 | 94 | 14.3336 | 144.8532 | We are continuing up slope. The rocks are looking different. The big blocks of pumice are no longer present and what is left is finer. We are starting to see a different type of rock. | | | |
| 13:43:53 Mar/31/04 | 1111 | 107 | 14.3336 | 144.8531 | The new type of rocks do not crush. We are going to collect it. | | | |
| 13:44:17 Mar/31/04 | 1111 | 109 | 14.3337 | 144.8532 | Picture of R785-RK-0007. | | | R785-039 |
| 13:44:18 Mar/31/04 | 1111 | 107 | 14.3337 | 144.8532 | Harder rock than pumice. Collected at the location where the older rocks are starting to show up. Placed in starboard biobox. It is a large rock. Z=1111.1. [W Rota]. | R785-RK-0007 | SROF geo team (Stern) | |
| 13:49:00 Mar/31/04 | 1102 | 100 | 14.3336 | 144.8533 | The substrate is becoming dominated with the older looking rocks. | | | |
| 13:49:37 Mar/31/04 | 1098 | 99 | 14.3336 | 144.8535 | Moving the ship 100 m. | | | |
| 13:49:49 Mar/31/04 | 1097 | 102 | 14.3336 | 144.8535 | Sediment slope. | | | R785-040 |
| 13:50:41 Mar/31/04 | 1093 | 99 | 14.3336 | 144.8535 | We are in area of very fine pumice and a few scattered bigger pieces. | | | |
| 13:56:55 Mar/31/04 | 1081 | 115 | 14.3335 | 144.8539 | See lots of blocks of massive lava at base of caldera walls? Then back into volcaniclastic sediment. | | | |
| 14:02:02 Mar/31/04 | 1078 | 108 | 14.3334 | 144.8541 | Continue to see boulders of banded pumice. Fields of pumice with minor amounts of sediment in between. Outside surfaces of pumice typically weathered and show Fe-oxide staining with white interiors. | | | |
| 14:05:10 Mar/31/04 | 1082 | 45 | 14.3334 | 144.8541 | Picking up a piece of rock to test the strength. | | | R785-041 |
| 14:06:11 Mar/31/04 | 1082 | 57 | 14.3334 | 144.8541 | Inside looks like pumice although this rock was more difficult to break. | | | R785-042 |
| 14:10:00 Mar/31/04 | 1070 | 71 | 14.3335 | 144.8543 | See variety of size pumice boulders as we traverse the lower slopes of the caldera. | | | |
| 14:11:39 Mar/31/04 | 1063 | 96 | 14.3334 | 144.8546 | See both darker and lighter boulders of pumice commonly intermingled. Not sure if represent different eruptions or degree of weathering? | | | |
| 14:18:45 Mar/31/04 | 1040 | 108 | 14.3333 | 144.8551 | We continue to traverse the lower slopes of the caldera talus slope and to this point have come up about 200 m from the deepest part of the dive at the base of the caldera. | | | |
| 14:24:31 Mar/31/04 | 1020 | 116 | 14.3331 | 144.8558 | Lots of sediment no doubt pumice sand. See less of actual rocks in this part of the traverse. | | | |
| 14:28:23 Mar/31/04 | 1008 | 123 | 14.3329 | 144.8560 | Piles of pumice that range in size from sand to cobbles locally. See winnowing of fines at surface of sediments. | | | |
| 14:28:42 Mar/31/04 | 1007 | 123 | 14.3329 | 144.8561 | Seeing a range of sizes of pumice. | | | R785-043 |
| 14:34:04 Mar/31/04 | 985 | 116 | 14.3326 | 144.8566 | Slide of larger grained pumice over older and finer grained material. | | | R785-044 |
| 14:34:21 Mar/31/04 | 984 | 123 | 14.3327 | 144.8566 | Continuing up slope. See range in pumice size that changes over few m. Winnowing of fines in-between larger (few m) patches of boulder size pieces. | | | |
| 14:36:01 Mar/31/04 | 975 | 123 | 14.3330 | 144.8566 | Transitioned from pumice to large dark grey lava with white streaking. | | | R785-045 |
| 14:36:10 Mar/31/04 | 973 | 123 | 14.3330 | 144.8566 | Looks like may see some more solid lava? Dark grey colored and somewhat massive although has lots of vesiculation. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R785 Comments: W Rota | Samples | PI | Frgrab |
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| 14:41:32 Mar/31/04 | 966 | 122 | 14.3326 | 144.8568 | In fact appears to be large block of pumice that has Mn oxide coating on surface. Block must be the size of a small car. Thus not a lava flow at all. | | | |
| 14:42:09 Mar/31/04 | 966 | 119 | 14.3326 | 144.8567 | Coming up over a ridge of larger material that is still pumice but with a dark manganese oxide coating. | | | R785-046 |
| 14:45:53 Mar/31/04 | 956 | 113 | 14.3325 | 144.8569 | See some sort of coral? Sponge? Sea fan? Took DSC of this animal. | | | |
| 14:46:08 Mar/31/04 | 957 | 116 | 14.3325 | 144.8568 | Sea fan or a sponge? | | | R785-047 |
| 14:47:55 Mar/31/04 | 947 | 108 | 14.3325 | 144.8569 | Some fairly steep debris slopes. Locally looks like whitish and possibly yellowish stains to the fines? | | | |
| 14:51:06 Mar/31/04 | 931 | 109 | 14.3324 | 144.8572 | Slopes here appear somewhat steeper. Went up 20 m quite quickly. Took DSC of this slope. | | | |
| 14:51:24 Mar/31/04 | 931 | 110 | 14.3323 | 144.8572 | Slide of fresher pumice over older and finer material. | | | R785-048 |
| 15:06:20 Mar/31/04 | 924 | 108 | 14.3324 | 144.8572 | We're resuming traversing the area. It appears too much of the same: pumice and black rocks. | | | |
| 15:10:21 Mar/31/04 | 891 | 110 | 14.3323 | 144.8579 | More pumice! | | | |
| 15:12:07 Mar/31/04 | 883 | 110 | 14.3321 | 144.8581 | Dark ripples noticed in the pumice. | | | |
| 15:15:16 Mar/31/04 | 876 | 111 | 14.3321 | 144.8584 | On top of a gentle slope with lots of ripple marks. | | | |
| 15:15:55 Mar/31/04 | 877 | 107 | 14.3321 | 144.8584 | Big blocks of rhyolite. | | | |
| 15:19:04 Mar/31/04 | 879 | 112 | 14.3318 | 144.8586 | Big blocks of pumice. | | | |
| 15:24:53 Mar/31/04 | 879 | 114 | 14.3318 | 144.8588 | Anemone on pumice. | | | R785-049 |
| 15:29:03 Mar/31/04 | 867 | 103 | 14.3317 | 144.8592 | Little fish different from other little fish. | | | R785-050 |
| 15:34:59 Mar/31/04 | 843 | 106 | 14.3316 | 144.8598 | As we continue upslope we see a variety of pumice with sizes ranging from sand size through fist size through boulders. Range in weathering with some pieces Mn-oxide coated. | | | |
| 15:35:36 Mar/31/04 | 836 | 105 | 14.3315 | 144.8599 | Pumice. | | | R785-051 |
| 15:38:58 Mar/31/04 | 804 | 107 | 14.3315 | 144.8603 | Now have come about 450 m from base of caldera and finally(?) see a wall several m high of what appears to be lava? | | | |
| 15:40:41 Mar/31/04 | 800 | 110 | 14.3315 | 144.8605 | Base of large vertical wall. Contact of sand and outcrop. | | | R785-052 |
| 15:41:23 Mar/31/04 | 803 | 97 | 14.3314 | 144.8605 | Took DSC photograph of a lava wall and see contact with pumice at base. Lava appears massive with brecciation that may be weathered? | | | |
| 15:41:56 Mar/31/04 | 803 | 113 | 14.3315 | 144.8605 | Wall may be lava with some yellow staining up the face. | | | R785-053 |
| 15:45:34 Mar/31/04 | 789 | 134 | 14.3314 | 144.8605 | Moving up face of lava cliff. Was 803 m at the base. | | | |
| 15:49:43 Mar/31/04 | 789 | 122 | 14.3314 | 144.8605 | Sample of more solid rock (lava?) from part way up vertical wall. This material is less brittle than other samples so far. | | | R785-054 |
| 15:49:53 Mar/31/04 | 789 | 125 | 14.3314 | 144.8605 | Different face of the lava sample from the wall. | | | R785-055 |
| 15:50:25 Mar/31/04 | 789 | 125 | 14.3314 | 144.8605 | Took DSC photo of first piece of lava collected during this traverse. | | | |
| 15:51:04 Mar/31/04 | 789 | 125 | 14.3314 | 144.8605 | Sample of lava from the wall (moving up east side of caldera slope). Port side biobox. Sample is cube shaped and has at least two sides that are weathered by Fe-oxides. Z=788.6. [W Rota]. | R785-RK-0008 | SROF geo team | |
| 15:53:00 Mar/31/04 | 782 | 132 | 14.3314 | 144.8606 | Flow banding of massive lava. See volcaniclastic units intercalated with the lavas. Took DSC photo. | | | |
| 15:55:51 Mar/31/04 | 783 | 106 | 14.3315 | 144.8606 | See some sort of pyroclastic unit here. Quite massive unit here. | | | |
| 15:57:34 Mar/31/04 | 778 | 101 | 14.3314 | 144.8606 | Getting near the top of this pyroclastic flow here at ~780 m so entire face is about 25 m elevation. | | | |
| 16:01:03 Mar/31/04 | 779 | 83 | 14.3313 | 144.8606 | Took DSC of more coarse layers within the pyroclastic unit. | | | |
| 16:04:00 Mar/31/04 | 779 | 92 | 14.3313 | 144.8607 | Sampled large piece of rock sitting at base of pyroclastic unit. Elongate and reddish. Put in the boot. Z=778.6. Taken from the eastern slope. [W Rota]. | R785-RK-0009 | SROF geo team | |
| 16:04:16 Mar/31/04 | 779 | 89 | 14.3313 | 144.8606 | Piece of loose rock from the base of a pyroclastic flow area. Elongate and reddish. Placed in the boot. | | | R785-056 |
| 16:09:32 Mar/31/04 | 776 | 97 | 14.3313 | 144.8607 | Rock sample embedded in the pyroclastic unit. Rock sample number 10- also going in the boot. | | | R785-057 |

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| 16:09:55 Mar/31/04 | 776 | 97 | 14.3313 | 144.8607 | Different face of rock sample number 10. | | | R785-058 |
| 16:10:27 Mar/31/04 | 776 | 96 | 14.3313 | 144.8607 | Collected a piece of rock sitting within the pyroclastic unit. About 15+ cm in size. Placed in the boot. Z=776.4. Taken on eastern caldera wall. [W Rota]. | R785-RK-0010 | SROF geo team | |
| 16:12:47 Mar/31/04 | 770 | 145 | 14.3313 | 144.8607 | Now seeing more of a ridge with lavas(?) covered by sediment. | | | |
| 16:13:38 Mar/31/04 | 767 | 139 | 14.3312 | 144.8607 | See blocky looking lavas associated with this ridge. | | | |
| 16:13:57 Mar/31/04 | 766 | 103 | 14.3312 | 144.8607 | Patch of altered material in rock. | | | R785-059 |
| 16:14:05 Mar/31/04 | 766 | 95 | 14.3312 | 144.8607 | Took DSC of what appears to be an altered clast or rock fragment in the pyroclastic? Is this sulfur? Took two DSC photos of the margin of this clast as shows alteration rim with perhaps a brecciated clast in the middle. | | | |
| 16:14:41 Mar/31/04 | 767 | 89 | 14.3312 | 144.8607 | Yellow clast in lava. May be sulfur and some iron oxide. About 30 cm across? | | | R785-060 |
| 16:16:32 Mar/31/04 | 767 | 105 | 14.3312 | 144.8608 | Close up of yellow clast. | | | R785-061 |
| 16:23:03 Mar/31/04 | 766 | 94 | 14.3312 | 144.8607 | More massive flows that are altered by Fe oxides. Locally very blocky. | | | |
| 16:24:30 Mar/31/04 | 762 | 93 | 14.3312 | 144.8608 | An area of shiny dacite. | | | R785-062 |
| 16:26:15 Mar/31/04 | 758 | 142 | 14.3312 | 144.8608 | Moving up very large blocky flow several m thick. See lots of Fe-oxide alteration on faces of several of the blocks. | | | |
| 16:30:42 Mar/31/04 | 747 | 138 | 14.3312 | 144.8608 | Weathering on surface of large blocky lava. | | | R785-063 |
| 16:31:13 Mar/31/04 | 746 | 131 | 14.3312 | 144.8608 | Weathering on surface of large blocky lava. | | | R785-064 |
| 16:31:24 Mar/31/04 | 747 | 124 | 14.3312 | 144.8608 | Took DSC photos (2) of blocky lava that shows signs of weathering/possible incipient hydrothermal alteration with colors of red and yellow (Fe-oxide staining). | | | |
| 16:34:16 Mar/31/04 | 742 | 130 | 14.3312 | 144.8608 | Massive pile of what appears to be autobrecciated flows? Poorly sorted unit. | | | |
| 16:34:51 Mar/31/04 | 739 | 129 | 14.3312 | 144.8609 | Lava beneath pyroclastic contact. | | | R785-065 |
| 16:35:15 Mar/31/04 | 739 | 128 | 14.3312 | 144.8608 | Took DSC of contact between lava flow and more autobrecciated flow with thin ash unit in-between. | | | |
| 16:38:00 Mar/31/04 | 734 | 135 | 14.3312 | 144.8609 | Continue to see massive lava flows and with other contacts between different units (pyroclastic). | | | |
| 16:39:48 Mar/31/04 | 731 | 138 | 14.3312 | 144.8609 | Banding patterns. | | | R785-066 |
| 16:40:57 Mar/31/04 | 732 | 135 | 14.3312 | 144.8609 | Repeated units on the order of 10's cm thick of pyroclastic unit. Wondered if saw lapilli? Took DSC of these units. | | | |
| 16:42:07 Mar/31/04 | 732 | 116 | 14.3311 | 144.8608 | Biology!!! | | | R785-067 |
| 16:45:28 Mar/31/04 | 725 | 137 | 14.3311 | 144.8609 | Saw a contact between some pyroclastic units. | | | |
| 16:46:33 Mar/31/04 | 727 | 125 | 14.3311 | 144.8609 | Site of contact. | | | R785-068 |
| 16:46:48 Mar/31/04 | 727 | 118 | 14.3311 | 144.8609 | Contact and a brittle star. | | | R785-069 |
| 16:47:00 Mar/31/04 | 727 | 117 | 14.3311 | 144.8609 | More contact. | | | R785-070 |
| 16:47:14 Mar/31/04 | 727 | 117 | 14.3312 | 144.8610 | Took DSC photo of nice contact between some of the pyroclastic units. Another of the contact from wider angle. | | | |
| 16:50:47 Mar/31/04 | 727 | 97 | 14.3311 | 144.8610 | Took a couple of DSC photos of what appears to be a brecciated and perhaps altered clast within the underlying pyroclastic unit. | | | |
| 16:53:40 Mar/31/04 | 726 | 130 | 14.3311 | 144.8609 | Contact between blocky lava and newer flow. | | | R785-071 |
| 16:53:58 Mar/31/04 | 726 | 133 | 14.3311 | 144.8610 | Have a nice DSC photo of contact between underlying more blocky lava unit and overlying more ash rich unit that fines at the base and shows nice layering and then overlain by more coarse layer. Close-up of finely layered and banded unit with faults. | | | |
| 16:54:04 Mar/31/04 | 726 | 130 | 14.3311 | 144.8610 | Banding pattern in contact. | | | R785-072 |
| 16:54:54 Mar/31/04 | 725 | 112 | 14.3312 | 144.8610 | More contact with blocky lava below and banding patterns above. | | | R785-073 |

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| 16:56:00 Mar/31/04 | 725 | 172 | 14.3311 | 144.8610 | Banding pattern in contact. | | | R785-074 |
| 16:56:16 Mar/31/04 | 725 | 171 | 14.3312 | 144.8610 | Banding pattern in contact. | | | R785-075 |
| 16:57:32 Mar/31/04 | 724 | 97 | 14.3311 | 144.8610 | Draping of newer flow over older blocky lava. | | | R785-076 |
| 16:57:34 Mar/31/04 | 724 | 95 | 14.3311 | 144.8610 | Took another photo (2) of the overlying fine ash layer immediately overlying the blocky lava layer. | | | |
| 16:59:09 Mar/31/04 | 720 | 165 | 14.3312 | 144.8610 | Yellow coating on fracture surface that may be iron oxide. | | | R785-077 |
| 16:59:42 Mar/31/04 | 720 | 171 | 14.3311 | 144.8610 | Yellow coating on fracture surface that may be iron oxide. | | | R785-078 |
| 17:00:35 Mar/31/04 | 719 | 164 | 14.3311 | 144.8610 | See bright yellow fracture coating on a piece of lava. Some sort of Fe oxide? | | | |
| 17:04:17 Mar/31/04 | 715 | 94 | 14.3311 | 144.8610 | See a talus slope of predominantly pumice! | | | |
| 17:04:34 Mar/31/04 | 713 | 113 | 14.3311 | 144.8610 | Oh look...it's pumice! | | | R785-079 |
| 17:05:08 Mar/31/04 | 711 | 133 | 14.3311 | 144.8611 | Another point of contact with layering above. | | | R785-080 |
| 17:05:22 Mar/31/04 | 710 | 147 | 14.3311 | 144.8611 | Heavy banding pattern above point of contact. | | | R785-081 |
| 17:05:45 Mar/31/04 | 710 | 133 | 14.3311 | 144.8611 | DSC photos (3) of spectacular ash rich unit that shows many individual eruptions. This unit sitting above a more massive pyroclastic unit and another unit again on top of the layered unit. | | | |
| 17:08:34 Mar/31/04 | 711 | 133 | 14.3310 | 144.8611 | Took another DSC photo of beautifully layered ash fall unit. | | | |
| 17:09:54 Mar/31/04 | 711 | 110 | 14.3310 | 144.8611 | Banding showing possibly 50 different eruptive events over only about 2 meters height. | | | R785-082 |
| 17:10:50 Mar/31/04 | 711 | 108 | 14.3311 | 144.8611 | Took an oblique photo (2) of the nicely laminated ash fall unit. | | | |
| 17:13:26 Mar/31/04 | 704 | 130 | 14.3310 | 144.8612 | Finely banded unit now covered by pumice talus again. Is a unit at least 5 m thick and then unknown as covered by talus. | | | |
| 17:15:24 Mar/31/04 | 705 | 56 | 14.3312 | 144.8612 | Shear wall of finely laminated air fall ash deposit. Took two DSC photos (one zoom) of this unit. Vertical cliffs several m's tall. | | | |
| 17:16:24 Mar/31/04 | 706 | 56 | 14.3312 | 144.8612 | Banded vertical wall approximately 11 meters tall. | | | R785-083 |
| 17:17:12 Mar/31/04 | 711 | 116 | 14.3312 | 144.8612 | Base of banded vertical wall. | | | R785-084 |
| 17:17:41 Mar/31/04 | 702 | 79 | 14.3312 | 144.8612 | Base of unit ~711 m and top about 702 m. See nice boulder deposit on top. | | | |
| 17:19:05 Mar/31/04 | 699 | 65 | 14.3312 | 144.8612 | Took two DSC photos of the unit immediately above the ash fall unit. Spectacular example of larger lava boulders sitting directly on top of the ash fall unit. | | | |
| 17:20:15 Mar/31/04 | 696 | 107 | 14.3312 | 144.8613 | More layering with lighter ash on top. | | | R785-085 |
| 17:24:17 Mar/31/04 | 684 | 121 | 14.3309 | 144.8615 | See a vertical wall of finely laminated ash fall unit. | | | |
| 17:25:15 Mar/31/04 | 676 | 120 | 14.3309 | 144.8616 | Sitting on top of this ash fall unit is coarser looking unit of mostly lava. | | | |
| 17:25:22 Mar/31/04 | 676 | 150 | 14.3309 | 144.8616 | Coarser volcaniclastic lay er under 675m. | | | R785-086 |
| 17:27:18 Mar/31/04 | 667 | 135 | 14.3305 | 144.8616 | Now see pumice talus slope then into coarse autobrecciated unit then perhaps a pyroclastic flow. | | | |
| 17:28:39 Mar/31/04 | 655 | 124 | 14.3305 | 144.8617 | Non-layered pyroclastic flow. | | | R785-087 |
| 17:29:05 Mar/31/04 | 651 | 108 | 14.3305 | 144.8618 | This pyroclastic(?) flow is very thick. 10's of m? | | | |
| 17:31:41 Mar/31/04 | 631 | 122 | 14.3305 | 144.8619 | Thick coarse pyroclastic flow. | | | R785-088 |
| 17:33:00 Mar/31/04 | 623 | 127 | 14.3304 | 144.8620 | Thick massive pyroclastic flow unit about 30 m thick! Have ash fall unit on top then a slope covered by sediment that rippled. | | | |
| 17:34:23 Mar/31/04 | 621 | 172 | 14.3304 | 144.8621 | See noticeably rippled sediments here. | | | |
| 17:37:22 Mar/31/04 | 611 | 168 | 14.3302 | 144.8623 | Massive pyroclastic flow unit. See some broad scale layering otherwise not much internal structure to this massive unit. | | | |
| 17:40:12 Mar/31/04 | 594 | 165 | 14.3300 | 144.8624 | Course silicic pumice blocks in this layered pyroclastic unit. | | | |
| 17:42:08 Mar/31/04 | 576 | 168 | 14.3298 | 144.8625 | Fine-grained pyroclastic interval overlain by a thin coarse interval. Then overlain by a more massive unit. | | | |

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| 17:42:33 Mar/31/04 | 571 | 146 | 14.3298 | 144.8625 | Massive pyroclastics at about 570 meters. | | | R785-089 |
| 17:44:57 Mar/31/04 | 567 | 88 | 14.3299 | 144.8626 | Vertical wall with a distinct layer that has black rocks embedded in it. | | | R785-090 |
| 17:45:01 Mar/31/04 | 567 | 80 | 14.3299 | 144.8626 | Cliff face of this massive pyroclastic unit with black rocks embedded forms a vertical cliff face here. Three DSC images. Some thin coarse units mixed in. | | | |
| 17:46:03 Mar/31/04 | 565 | 87 | 14.3299 | 144.8626 | Vertical wall. Deposits getting much coarser as we go up the wall. | | | R785-091 |
| 17:46:30 Mar/31/04 | 562 | 105 | 14.3299 | 144.8627 | Thick coarse unit with big blocks (DSC images). | | | |
| 17:47:36 Mar/31/04 | 548 | 144 | 14.3299 | 144.8628 | Top of coarse pyroclastic flow unit. Above that is thinly bedded much finer grained and darker. Lots of yellow (coarse) and black (fine) material, which is different from the white unit below. Very distinct layering. | | | |
| 17:48:22 Mar/31/04 | 549 | 146 | 14.3298 | 144.8628 | Farther up on top the wall. More banding and some yellowish staining. | | | R785-092 |
| 17:49:12 Mar/31/04 | 545 | 103 | 14.3298 | 144.8628 | Back into a light-colored coarse pyroclastic flow. Unit above has lots of black glassy material in a yellow matrix. | | | |
| 17:49:31 Mar/31/04 | 542 | 71 | 14.3299 | 144.8628 | Contact with dark glassy material overlying coarser rhyolitic material underneath. | | | R785-093 |
| 17:50:54 Mar/31/04 | 540 | 95 | 14.3299 | 144.8628 | More distinct layering in the wall. | | | R785-094 |
| 17:51:18 Mar/31/04 | 541 | 84 | 14.3299 | 144.8628 | Close up of layers in the wall. Bluish matrix in the upper pyroclastic layer. | | | R785-095 |
| 17:51:24 Mar/31/04 | 540 | 65 | 14.3299 | 144.8628 | Above the yellow and black unit is a thin white band followed by a coarse unit with yellow clasts in a bluish matrix. | | | |
| 17:52:07 Mar/31/04 | 536 | 86 | 14.3300 | 144.8629 | Covered interval with sand and blocks of pumice. | | | |
| 17:53:24 Mar/31/04 | 525 | 126 | 14.3300 | 144.8630 | Big blocks of pumice on talus slope. | | | |
| 17:54:38 Mar/31/04 | 517 | 104 | 14.3300 | 144.8632 | Back into outcrop. Coarse pyroclastic flow. | | | |
| 17:56:43 Mar/31/04 | 514 | 50 | 14.3300 | 144.8633 | Pyroclastic flow is mostly white with some black clasts. Whole unit is pretty massive without much layering. Some variation in clast size as we go up. | | | |
| 17:57:50 Mar/31/04 | 500 | 86 | 14.3301 | 144.8633 | Base of a very coarse unit - coarser than the one below. Contact at bottom is discolored. | | | |
| 17:58:56 Mar/31/04 | 500 | 116 | 14.3300 | 144.8633 | Contact with band of discoloration. | | | R785-096 |
| 18:00:35 Mar/31/04 | 501 | 113 | 14.3302 | 144.8634 | Going up very coarse unit after looking along contact for a bit. | | | |
| 18:01:51 Mar/31/04 | 486 | 116 | 14.3301 | 144.8634 | Still in very coarse pyroclastic flow. Biggest pumice blocks are up to 2 meters across. There are a variety of clast types. | | | |
| 18:05:52 Mar/31/04 | 468 | 132 | 14.3301 | 144.8635 | On a talus slope now with yellow and white pumice blocks. | | | |
| 18:06:41 Mar/31/04 | 465 | 131 | 14.3301 | 144.8636 | Columnar jointed pumice blocks similar to what was seen at the very bottom of the volcano. | | | R785-097 |
| 18:06:42 Mar/31/04 | 464 | 132 | 14.3301 | 144.8636 | The yellow pumice blocks are columnarly jointed like the ones seen at the beginning of the dive. DSC images. | | | |
| 18:08:30 Mar/31/04 | 464 | 150 | 14.3301 | 144.8636 | Urchin. | | | R785-098 |
| 18:09:08 Mar/31/04 | 463 | 168 | 14.3300 | 144.8636 | White soft coral growing on pumice block. DSC image. | | | |
| 18:09:46 Mar/31/04 | 464 | 188 | 14.3300 | 144.8637 | Soft coral. | | | R785-099 |
| 18:12:27 Mar/31/04 | 463 | 121 | 14.3298 | 144.8640 | More coral. | | | R785-100 |
| 18:13:14 Mar/31/04 | 462 | 123 | 14.3298 | 144.8640 | Still in the large yellow pumice blocks on a talus slope. These have sessile animals growing on them. All unconsolidated. | | | |
| 18:17:14 Mar/31/04 | 462 | 201 | 14.3297 | 144.8642 | Slope is covered with big yellow pumice blocks 2-3 meters across. These must have been deposited by the last big eruption here. Getting close to the top of the caldera rim. | | | |
| 18:19:33 Mar/31/04 | 462 | 91 | 14.3296 | 144.8645 | At top of caldera wall. During this traverse up the wall only about 10% was solid lava flows. The rest was all pyroclastic flows. This volcano is obviously very explosive! End of geologic traverse. | | | |

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|---|---|---|---|---|---|---|---|---|
| 18:29:43 Mar/31/04 | 442 | 179 | 14.3295 | 144.8646 | Heading south along the caldera rim. Will drive the ship for about an hour and have the nets about 30 m above the bottom. | | | |
| 18:35:03 Mar/31/04 | 437 | 176 | 14.3295 | 144.8646 | Port and Stbd plankton nets opened. Port net sample good. Stbd net ripped near surface. 30m above bottom. 0.5 kts. Z=437.2. [W Rota]. | R785-net-port-0011 | Metaxas | |
| 18:38:37 Mar/31/04 | 428 | 195 | 14.3292 | 144.8646 | SVHS color video started at 18:37. Tape had 50 minutes left on it. | | | |
| 19:50:32 Mar/31/04 | 388 | 30 | 14.3243 | 144.8640 | Port and Stbd plankton net samples. Port net sample good. Stbd net ripped near surface. Start 1835 Stop 1950. 30m above bottom. 0.5 kts. [W Rota]. | R785-net-stbd-0012 | Metaxas | |
| 20:04:56 Mar/31/04 | 361 | 230 | 14.3250 | 144.8641 | ROPOS is in cage. | | | |
| 20:05:38 Mar/31/04 | 361 | 200 | 14.3251 | 144.8641 | Coming up. | | | |
| 22:22:32 Mar/31/04 | 191 | 326 | 14.3251 | 144.8641 | The winch problem is fixed. They just gave the half hour callout. We've been sitting here with ROPOS at 200 meters for ~2 hours. | | | |
| 22:37:59 Mar/31/04 | 3 | 208 | 14.3251 | 144.8641 | ROPOS is on the deck. End of dive R785. | | | |

# 8.5 R786 Dive Log: NW Rota-1

| **R786: Northwest Rota-1** |
|---|
| wet time (UTC): 4/1 0705 - 4/2 2206. JD 92-93. 19.41 hrs. |
| bottom time (UTC): 4/1 0749 - 4/2 0205. 18.27 hrs. [39 samples]<br>**[Imagenex survey: 4/1 0749 - 4/2 0205. ~30 m off bottom]** |
| **R786 DSC information:** There were 164 original DSCs taken and 110 final ones were kept starting with R786_DSC_040104_101225_00256.jpg and ending with R786_DSC_040204_020530_00415.jpg |
| Biological, geological and HFS sampling dive at NW Rota-1. Transit from Brimstone Pit to Shimmering Sands. Deployed Marker-75 at White Wall. Next on to Fault Shrimp and Gastros, followed by Imagenex mapping and more sampling at Brimstone Pit. Samples: **Brimstone Pit**: 12 HFS, 2 gas tights, 1 rock, 2 plankton nets. **Shimmering Sands**: 9 HFS, 2 gas tights, 1 bio/geo, 1 suction (sediment). **White Wall**: 2 rocks. **Fault Shrimp**: 6 suctions (shrimp). **Gastros**: 1 suction (large shrimp). Imagenex and DSC surveys completed at Brimstone Pit area. |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R786 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 07:05:16 Apr/01/04 | 1 | 271 | 14.3211 | 144.8632 | ROPOS is in the water. Heading down to NW Rota 1 "Brimstone Pit". | | | |
| 07:49:20 Apr/01/04 | 570 | 60 | 14.6003 | 144.7748 | Descent ended - about 30m off bottom. Leave ship lying to south. | | | |
| 07:51:49 Apr/01/04 | 568 | 322 | 14.6003 | 144.7748 | SIT camera is not working. | | | |
| 07:54:13 Apr/01/04 | 577 | 58 | 14.6003 | 144.7748 | Driving northeast. | | | |
| 07:55:22 Apr/01/04 | 589 | 54 | 14.6004 | 144.7749 | Sight bottom: rubble slope with large boulders. | | | |
| 07:56:42 Apr/01/04 | 584 | 29 | 14.6004 | 144.7749 | On the bottom at 583 m. | | | R786-001 |
| 07:57:03 Apr/01/04 | 582 | 45 | 14.6005 | 144.7750 | Climbing scree slope with outcrop. | | | |
| 07:59:18 Apr/01/04 | 566 | 46 | 14.6007 | 144.7751 | We have approximately 40 m to go. | | | |
| 08:01:12 Apr/01/04 | 553 | 46 | 14.6007 | 144.7752 | Approaching the plume. Seems to have calmed down since last dive. | | | R786-002 |
| 08:01:28 Apr/01/04 | 552 | 5 | 14.6007 | 144.7752 | We can see the plume at Brimstone Pit. | | | |
| 08:03:22 Apr/01/04 | 549 | 40 | 14.6008 | 144.7753 | Checking gauges. | | | |
| 08:05:25 Apr/01/04 | 548 | 23 | 14.6008 | 144.7753 | We are circumnavigating the Pit to identify positioning. | | | |
| 08:06:23 Apr/01/04 | 548 | 30 | 14.6008 | 144.7752 | This plume is generating more excitement than the pumice. | | | R786-003 |
| 08:08:45 Apr/01/04 | 552 | 40 | 14.6008 | 144.7753 | Still trying to orient ourselves relative to the Pit. | | | |
| 08:09:40 Apr/01/04 | 553 | 3 | 14.6008 | 144.7753 | Blossoming but not as much as yesterday. | | | R786-004 |
| 08:12:27 Apr/01/04 | 560 | 314 | 14.6008 | 144.7753 | We are on the edge of the Pit. Rocks are coming down. | | | |
| 08:12:29 Apr/01/04 | 561 | 313 | 14.6008 | 144.7753 | Slight activity involving small particle fall-out. | | | R786-005 |
| 08:14:43 Apr/01/04 | 561 | 313 | 14.6009 | 144.7753 | Pipe extended in to the plume for water sampling. | | | R786-006 |
| 08:14:45 Apr/01/04 | 561 | 315 | 14.6009 | 144.7753 | We are trying to find a location to place the hose down into the Pit. | | | |
| 08:16:03 Apr/01/04 | 561 | 317 | 14.6008 | 144.7753 | Same frame as last shot. The temperature has increased to 24 deg after going through about 10 feet of hose. | | | R786-007 |
| 08:17:14 Apr/01/04 | 561 | 317 | 14.6008 | 144.7753 | Temperature has dropped again as we got pulled out of position. | | | |
| 08:18:20 Apr/01/04 | 561 | 314 | 14.6008 | 144.7753 | Still attempting to position the probe as deep as possible. Temperature is increasing again. | | | |
| 08:18:34 Apr/01/04 | 561 | 310 | 14.6008 | 144.7753 | Still measuring water temperature. | | | R786-008 |
| 08:19:26 Apr/01/04 | 561 | 315 | 14.6008 | 144.7753 | Temperature went up to 17 degrees after traveling through the hose. We are re-positioning a little bit and the temperature is at 22 degrees. Rose to 28 degrees. | | | |
| 08:20:20 Apr/01/04 | 561 | 318 | 14.6008 | 144.7753 | HFS Filter-1. The pipe is pointing down at 70-degree angle. T=29 +/-2. Z=560.90. Start=0820. Stop=0827. Tmax=33.8 (at the end) Tavg=24.1(+/-5). T2=20. Vol=504 ml. [NW Rota 1 - Brimstone Pit]. | R786-HFS-1-0001 | Butterfield | |
| 08:20:29 Apr/01/04 | 561 | 313 | 14.6008 | 144.7753 | Pipe is pointed down at a 60 deg. angle. The temperature is around 29C +/- 1 or 2. | | | R786-009 |
| 08:26:07 Apr/01/04 | 561 | 309 | 14.6008 | 144.7752 | We are still taking HFS filter 1. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R786 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 08:26:28 Apr/01/04 | 561 | 312 | 14.6008 | 144.7753 | Now measuring 29 degrees. | | | R786-010 |
| 08:28:26 Apr/01/04 | 561 | 317 | 14.6008 | 144.7752 | HFS FISH Filter-2. Z=560.90. Start=0828. Stop=0830. Tmax=32.6 (at the end) Tavg=30.3 T2=24 Vol=252ml. [NW Rota 1 - Brimstone Pit]. | R786-HFS-2-0002 | Butterfield | |
| 08:31:16 Apr/01/04 | 561 | 310 | 14.6008 | 144.7753 | HFS Sterivex Filter-3. Z=561 Start=0831 Stop=0835 Start again=0837 Stop again=0844 Tmax=29.5 Tavg=19.9 T2=17. Vol=1013 ml. Start again=0913 Stop again=0915 Vol=1279 ml. [NW Rota 1 - Brimstone Pit]. | R786-HFS-3-0003 | Butterfield | |
| 08:34:26 Apr/01/04 | 561 | 319 | 14.6008 | 144.7753 | Gas tight #1 fired (HIL #11). Start=0833 T=27.4 Z=561.1. [NW Rota 1 - Brimstone Pit]. | R786-GTB-1-0004 | Lupton | |
| 08:36:19 Apr/01/04 | 561 | 316 | 14.6008 | 144.7753 | The plume has moved away. Waiting for it to resume. Stopped sampling when temperature dropped. Increasing again. | | | |
| 08:44:50 Apr/01/04 | 561 | 309 | 14.6008 | 144.7753 | HFS Piston-4. Z=561 Start=0845 Stop=0847 Tmax=26.1 Tavg=23.6 +/-1 or 2 T2=18. Vol=390ml. [NW Rota 1 - Brimstone Pit]. | R786-HFS-4-0005 | Butterfield | |
| 08:46:13 Apr/01/04 | 561 | 311 | 14.6008 | 144.7753 | Plume backs off slightly. | | | R786-011 |
| 08:47:25 Apr/01/04 | 561 | 312 | 14.6008 | 144.7753 | Plume quickly drifts back across the arm. | | | R786-012 |
| 08:49:07 Apr/01/04 | 561 | 309 | 14.6008 | 144.7753 | HFS Unfiltered Bag-8. Z=561 Start=0849 Stop=0853 Tmax=27.1 Tavg=23.3 +/-1.6 T2=18. Vol=471ml. [NW Rota 1 - Brimstone Pit]. | R786-HFS-8-0006 | Butterfield | |
| 08:49:52 Apr/01/04 | 561 | 313 | 14.6008 | 144.7753 | Fired gas tight bottle 2 (HIL #9). T=26 Z=561. [NW Rota 1 - Brimstone Pit]. | R786-GTB-2-0007 | Lupton | |
| 08:54:01 Apr/01/04 | 561 | 309 | 14.6008 | 144.7753 | HFS Filtered Bag-11. Z=561 Start=0854 Stop=0858 Tmax=29.5 Tavg=25.5 +/-2.2 T2=21. Vol=476 ml. [NW Rota 1 - Brimstone Pit]. | R786-HFS-11-0008 | Butterfield | |
| 08:59:13 Apr/01/04 | 561 | 311 | 14.6008 | 144.7753 | HFS Filtered bag-14. Z=561 Start=0859 Stop=0902 Tmax=29.5 Tavg=24.9+/-2 T2=20. Vol=472 ml. [NW Rota 1 - Brimstone Pit]. | R786-HFS-14-0009 | Butterfield | |
| 09:03:33 Apr/01/04 | 561 | 313 | 14.6008 | 144.7753 | HFS Piston-5. Z=561. Start=0907 Stop=0912. Tmax=29.4 Tavg=226+/-2.9 T2=18. Vol=518 ml. [NW Rota 1 - Brimstone Pit]. | R786-HFS-5-0010 | Butterfield | |
| 09:07:21 Apr/01/04 | 561 | 308 | 14.6008 | 144.7753 | Re-positioning the hose to find a good location for the next sample. | | | |
| 09:15:52 Apr/01/04 | 550 | 63 | 14.6008 | 144.7753 | Moving on from the Brimstone Pit and onto Shimmering Sands after removing the extension pipe of the HFS. | | | |
| 09:21:28 Apr/01/04 | 535 | 231 | 14.6006 | 144.7750 | We are doing tether management. And moving the ship. | | | |
| 09:42:30 Apr/01/04 | 509 | 111 | 14.6007 | 144.7756 | Still managing tether. | | | |
| 09:45:08 Apr/01/04 | 514 | 219 | 14.6008 | 144.7759 | Starting to head towards the bottom again. | | | |
| 09:47:30 Apr/01/04 | 522 | 272 | 14.6009 | 144.7759 | We are on the bottom again. Moving westwards. It is cloudy. | | | |
| 09:50:28 Apr/01/04 | 527 | 281 | 14.6010 | 144.7757 | Arriving at Shimmering Sands. | | | R786-013 |
| 09:51:00 Apr/01/04 | 527 | 281 | 14.6010 | 144.7757 | Heading towards Brimstone and Shimmering Sands. We are ~ 30 m away heading SW. | | | |
| 09:51:19 Apr/01/04 | 526 | 282 | 14.6010 | 144.7756 | Wall just above Shimmering Sands. Hard to tell if it is flow or pyroclastic breccia. | | | R786-014 |
| 09:52:34 Apr/01/04 | 524 | 229 | 14.6010 | 144.7756 | Checking gauges. | | | |
| 09:53:36 Apr/01/04 | 522 | 248 | 14.6010 | 144.7757 | Flying through the smoke from the Pit. Seeing many shrimp on the seafloor. | | | |
| 09:55:00 Apr/01/04 | 526 | 276 | 14.6009 | 144.7755 | Blocky outcrop around the corner from shimmering sands. | | | R786-015 |
| 09:57:39 Apr/01/04 | 540 | 40 | 14.6008 | 144.7756 | Still looking for Shimmering Sands. | | | |
| 09:58:11 Apr/01/04 | 543 | 36 | 14.6008 | 144.7755 | The white spots may be rising sulfur balls or maybe they are not. | | | R786-016 |
| 10:01:11 Apr/01/04 | 541 | 313 | 14.6008 | 144.7754 | We are at the Shimmering Sands and getting prepared to drop the extension pipe. | | | |
| 10:01:15 Apr/01/04 | 541 | 310 | 14.6008 | 144.7754 | Shimmering Sands with mysterious pipe. | | | R786-017 |
| 10:03:26 Apr/01/04 | 539 | 202 | 14.6009 | 144.7754 | Getting ready to get rid of the pipe. | | | |
| 10:03:55 Apr/01/04 | 539 | 210 | 14.6009 | 144.7754 | Done. | | | |
| 10:08:01 Apr/01/04 | 540 | 208 | 14.6009 | 144.7754 | Pulling the extended tubing off the HFS intake. | | | |
| 10:08:05 Apr/01/04 | 540 | 208 | 14.6009 | 144.7754 | Removing the hose. | | | R786-018 |
| 10:09:29 Apr/01/04 | 540 | 209 | 14.6009 | 144.7754 | Looking around and poking to take some temperatures in the sediment. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R786 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 10:11:30 Apr/01/04 | 538 | 290 | 14.6009 | 144.7755 | Garbage; hose and sampler. | | | R786-019 |
| 10:13:07 Apr/01/04 | 542 | 314 | 14.6009 | 144.7755 | We are seeing some shimmering in the distance. | | | |
| 10:13:36 Apr/01/04 | 541 | 284 | 14.6009 | 144.7754 | Approaching shimmering water just below the white rock. | | | R786-020 |
| 10:14:06 Apr/01/04 | 541 | 272 | 14.6009 | 144.7754 | The shimmering seems to be starting just above the base of the dark area. | | | R786-021 |
| 10:14:31 Apr/01/04 | 541 | 271 | 14.6009 | 144.7754 | Have stopped at a spot where shimmering appears to be coming out of the sediment to measure temperature. | | | |
| 10:15:30 Apr/01/04 | 541 | 281 | 14.6009 | 144.7754 | The shimmering water is coming from the bottom right of the white rock. | | | R786-022 |
| 10:19:46 Apr/01/04 | 541 | 279 | 14.6009 | 144.7754 | Placing intake into the sand. Temperature is 17 degrees. It is a solid rock. | | | |
| 10:20:49 Apr/01/04 | 541 | 277 | 14.6009 | 144.7754 | Measuring 17 degrees at this solid rock. | | | R786-023 |
| 10:21:35 Apr/01/04 | 541 | 277 | 14.6009 | 144.7754 | HFS Unfiltered Bag-9. Z=541 Start=1025 Stop=1029 Tmax=20.8 Tavg=18.9+/-1.5 T2=14. Vol=512ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-9-0011 | Butterfield | |
| 10:24:30 Apr/01/04 | 541 | 278 | 14.6009 | 144.7754 | Trying to do fluid sampling at Shimmering Sands but the sampler is not responding. | | | |
| 10:30:07 Apr/01/04 | 541 | 274 | 14.6009 | 144.7754 | Keep poking in the sand to find another sampling location. Getting 15 degrees. | | | |
| 10:36:05 Apr/01/04 | 541 | 271 | 14.6009 | 144.7754 | Moving a bit to try another location. | | | |
| 10:42:16 Apr/01/04 | 537 | 328 | 14.6010 | 144.7754 | Searching for the hot stuff at shimmering sands. | | | R786-024 |
| 10:42:36 Apr/01/04 | 536 | 41 | 14.6010 | 144.7754 | Appears to be intense alteration. | | | R786-025 |
| 10:44:30 Apr/01/04 | 539 | 32 | 14.6009 | 144.7754 | Side profile of the intensely altered rock. | | | R786-026 |
| 10:46:20 Apr/01/04 | 538 | 20 | 14.6009 | 144.7754 | Still looking for sediment with lots of shimmering. | | | |
| 10:46:53 Apr/01/04 | 537 | 56 | 14.6009 | 144.7754 | Alteration surface. | | | R786-027 |
| 10:49:28 Apr/01/04 | 541 | 114 | 14.6009 | 144.7756 | Fresh rock showing through altered surface. | | | R786-028 |
| 10:52:27 Apr/01/04 | 552 | 222 | 14.6007 | 144.7756 | Still looking for shimmering. | | | |
| 10:55:08 Apr/01/04 | 551 | 102 | 14.6008 | 144.7757 | Sediment slump next to altered layer. | | | R786-029 |
| 10:56:36 Apr/01/04 | 547 | 345 | 14.6007 | 144.7757 | We have ended up east from where we wanted to be. | | | |
| 11:04:16 Apr/01/04 | 539 | 353 | 14.6009 | 144.7754 | Shimmering water coming from all of the gravel in the area. The temperature is 75 deg. C. | | | R786-030 |
| 11:05:26 Apr/01/04 | 539 | 353 | 14.6009 | 144.7754 | Prodding in the sediment at Shimmering Sands and the temperature is 75 degrees. | | | |
| 11:08:29 Apr/01/04 | 539 | 351 | 14.6009 | 144.7754 | HFS Filtered Bag-16. Z=539 Start=1110 Stop=1114 Tmax=75.3 Tavg=71+/-2.4 T2=45. Vol=469 ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-16-0012 | Butterfield | |
| 11:10:02 Apr/01/04 | 539 | 350 | 14.6009 | 144.7754 | View across from temperature probing station. | | | R786-031 |
| 11:14:41 Apr/01/04 | 539 | 338 | 14.6009 | 144.7754 | HFS Sterivex Filter-13. Z=539 Start=1116 Stop=1129 Tmax=69.1 Tavg=65.4+/-1.8 T2=42. Vol=1647 ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-13-0013 | Butterfield | |
| 11:18:47 Apr/01/04 | 539 | 339 | 14.6009 | 144.7754 | 77-degree maximum temperature. | | | R786-032 |
| 11:23:19 Apr/01/04 | 539 | 335 | 14.6009 | 144.7754 | Gas tight bottle #3 (HIL #5). Z=539 Fired=1125 T=62. [NW Rota 1 - Shimmering Sands]. | R786-GTB-3-0014 | Lupton | |
| 11:30:05 Apr/01/04 | 539 | 337 | 14.6009 | 144.7754 | HFS RNA Filter-12. Z=539 Start=1130 Stop=1138 Tmax=66.6 Tavg=65.1+/-0.8 T2=41. Vol=1100 ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-12-0015 | Butterfield | |
| 11:32:10 Apr/01/04 | 539 | 339 | 14.6009 | 144.7754 | RNA Filter 12. | | | R786-033 |
| 11:37:28 Apr/01/04 | 539 | 338 | 14.6009 | 144.7754 | Exhaust of the manifold is clear; no particles. | | | R786-034 |
| 11:38:38 Apr/01/04 | 539 | 335 | 14.6009 | 144.7754 | Rounded pebbles where shimmering water is passing through. | | | R786-035 |
| 11:39:32 Apr/01/04 | 539 | 334 | 14.6009 | 144.7754 | HFS FISH Filter-7. Z=539 Start=1140 Stop=1143 Tmax=66.8 Tavg=65.4+/-0.9 T2=42. Vol=401 ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-7-0016 | Butterfield | |
| 11:39:45 Apr/01/04 | 539 | 337 | 14.6009 | 144.7754 | The size of these balls are on the order of 0.5 cm. | | | R786-036 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R786 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 11:44:28 Apr/01/04 | 539 | 335 | 14.6009 | 144.7754 | HFS Unfiltered Bag-19. Z=539 Start=1145 Stop=1149 Tmax=71.1 Tavg=67.5+/-2.8 T2=44.5. Vol=476 ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-19-0017 | Butterfield | |
| 11:50:17 Apr/01/04 | 539 | 341 | 14.6009 | 144.7754 | We are moving the vehicle to take another series of fluid sample at the same vicinity but at another spot. | | | |
| 11:51:47 Apr/01/04 | 539 | 342 | 14.6009 | 144.7754 | Sub moved within 1 m of previous spot. Measuring temperature which is 85.9. | | | |
| 11:57:29 Apr/01/04 | 539 | 343 | 14.6009 | 144.7754 | Gas Tight Bottle #4 (HIL #12). Fired=1157 T=75.0 Z=538.8. [NW Rota 1 - Shimmering Sands]. | R786-GTB-4-0018 | Lupton | |
| 11:57:29 Apr/01/04 | 539 | 343 | 14.6009 | 144.7754 | HFS Piston with Filter-20. Z=539 Start=1157 Stop=1202 Tmax=86 Tavg=79.7+/-4 T2=47. Vol=739 ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-20-0018 | Butterfield | |
| 11:57:29 Apr/01/04 | 539 | 343 | 14.6009 | 144.7754 | HFS Piston-22. Z=539 Start=1204 Stop=temporarily and moved to reposition. Started again. Stop=1209 Tmax=75.4 Tavg=74.4+/-0.7 T2=50. Vol=548 ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-22-0019 | Butterfield | |
| 11:59:59 Apr/01/04 | 539 | 345 | 14.6009 | 144.7754 | Piston with filter #20. Temperature:75C. | | | R786-037 |
| 12:10:35 Apr/01/04 | 539 | 358 | 14.6009 | 144.7754 | HFS Filtered Bag-18. Z=539 Start=1211 Stop=1215 Tmax=75.1 Tavg=73.7+/-0.8 T2=50.8. Vol=594 ml. [NW Rota 1 - Shimmering Sands]. | R786-HFS-18-0021 | Butterfield | |
| 12:20:07 Apr/01/04 | 538 | 359 | 14.6009 | 144.7754 | Finished HFS for now. We are moving to collect rocks. We are heading towards the base of outcrop with highly altered samples. We will pick them up to see what they look like. | | | |
| 12:23:58 Apr/01/04 | 536 | 4 | 14.6010 | 144.7754 | ROPOS now parked at base of white colored and highly altered wall immediately above the sand (ash) slope that was sampled with shimmering fluid discharge. | | | |
| 12:27:44 Apr/01/04 | 536 | 7 | 14.6010 | 144.7754 | Rock sample. | | | R786-038 |
| 12:34:09 Apr/01/04 | 536 | 8 | 14.6009 | 144.7754 | Deployed mkr-75 at the White Wall that is located immediately above the shimmering sand fluid sampling spot. | | | |
| 12:41:58 Apr/01/04 | 536 | 4 | 14.6010 | 144.7754 | Sampled nice piece of intensely altered rock sampled at the White Wall site. | | | |
| 12:42:42 Apr/01/04 | 535 | 6 | 14.6009 | 144.7754 | Mkr-75 at Shimmering Sands. | | | R786-039 |
| 12:42:56 Apr/01/04 | 534 | 1 | 14.6009 | 144.7754 | Nice piece of intensely altered white rock at the base of the White Wall site which sits immediately above the shimmering sands diffuse vent site. See specs of yellow sulfur and this white material (alunite?). Sample in purse. Z=533.8. [NW Rota 1 - White Wall]. | R786-RK-0022 | SROF geo team | |
| 12:52:36 Apr/01/04 | 535 | 4 | 14.6009 | 144.7754 | Getting ready to take a suction sample near mkr-75. The white cliffs at mkr-75 have a thick coating (1 cm) of white material covering the surface of exposed geology. | | | |
| 12:55:09 Apr/01/04 | 535 | 34 | 14.6010 | 144.7754 | 4 DSC images of white coating on white wall. | | | |
| 12:57:55 Apr/01/04 | 536 | 12 | 14.6010 | 144.7754 | Settling down between mkr-75 and the wall to suction sample. | | | |
| 13:00:38 Apr/01/04 | 536 | 9 | 14.6010 | 144.7754 | 2 DSC of white wall and bacterial mats. Previous DSC images may not have worked out because the camera was staring into the distance. | | | |
| 13:06:03 Apr/01/04 | 535 | 352 | 14.6010 | 144.7754 | Moving up to sulfur-coated wall for slurp sample. | | | R786-040 |
| 13:08:18 Apr/01/04 | 535 | 14 | 14.6010 | 144.7754 | Repositioning the sub because we cannot reach the wall. | | | |
| 13:14:01 Apr/01/04 | 535 | 22 | 14.6010 | 144.7754 | We are at the western contact of the white wall with the black ash. | | | |
| 13:14:23 Apr/01/04 | 535 | 38 | 14.6010 | 144.7754 | The sulfur coated outcrop near mkr-75. | | | R786-041 |
| 13:14:59 Apr/01/04 | 535 | 36 | 14.6010 | 144.7754 | We are trying to find a different outcrop in flow to sample microbial mats. | | | |
| 13:15:55 Apr/01/04 | 534 | 77 | 14.6010 | 144.7753 | Sulfur balls in the water towards mkr-75. | | | R786-042 |
| 13:18:17 Apr/01/04 | 540 | 67 | 14.6008 | 144.7754 | Intensely altered white outcrop along the top of the ridge. | | | R786-043 |
| 13:18:31 Apr/01/04 | 540 | 36 | 14.6008 | 144.7754 | We are at the rim of the crater and see the same white altered material as on the vertical outcrop. | | | |
| 13:19:37 Apr/01/04 | 540 | 5 | 14.6008 | 144.7754 | Shear wall of intensely, hydrothermally altered rock that lines the crater pit. | | | |
| 13:20:39 Apr/01/04 | 539 | 283 | 14.6008 | 144.7755 | Seeing a number of highly altered pinnacles that sit on top of the ash-covered ridge that encircles the vent. See plume in the background as we land the ROPOS to sample one. | | | |
| 13:21:43 Apr/01/04 | 537 | 222 | 14.6009 | 144.7754 | Altered ridge with plume rising in the background. | | | R786-044 |
| 13:22:51 Apr/01/04 | 539 | 217 | 14.6008 | 144.7754 | Outcrop where sample was taken. | | | R786-045 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R786 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 13:23:08 Apr/01/04 | 540 | 215 | 14.6008 | 144.7754 | Approaching altered outcrop for sampling. There may be flow banding. | | | R786-046 |
| 13:25:04 Apr/01/04 | 540 | 197 | 14.6008 | 144.7754 | Attempting to sample hydrothermally altered lava at ridge top. | | | |
| 13:31:52 Apr/01/04 | 540 | 200 | 14.6008 | 144.7754 | Sample; notice character of ridge on the horizon. | | | R786-047 |
| 13:35:19 Apr/01/04 | 540 | 195 | 14.6008 | 144.7754 | Intensely altered rock that sits as a number of pinnacles on top of the ash-covered ridge that surrounds the vent area. It's very white. Acid-altered? Sample in purse. Z=540.1. [NW Rota 1 - White Wall]. | R786-RK-0023 | SROF geo team | |
| 13:38:10 Apr/01/04 | 540 | 194 | 14.6008 | 144.7754 | Took some DSC photos (2) of the highly altered rocks that locally look flow banded(?) that outcrop on top of the ridge that surrounds the vent area. Stark contrast as very white compared to black ash surrounds. | | | |
| 13:44:47 Apr/01/04 | 540 | 219 | 14.6008 | 144.7754 | Close up of flow-banded altered outcrop. Black ash has been deposited on top. | | | R786-048 |
| 13:53:31 Apr/01/04 | 487 | 87 | 14.6007 | 144.7756 | Moving towards Fault shrimp locality. | | | |
| 14:14:44 Apr/01/04 | 565 | 86 | 14.6007 | 144.7768 | Nearing the bottom after the transit to Fault Shrimp. | | | |
| 14:16:38 Apr/01/04 | 570 | 37 | 14.6009 | 144.7772 | Too shallow for Fault Shrimp. Current depth is 566m. | | | |
| 14:18:04 Apr/01/04 | 570 | 93 | 14.6009 | 144.7773 | A rock with limpets? | | | R786-049 |
| 14:18:32 Apr/01/04 | 570 | 76 | 14.6009 | 144.7773 | Looking for Fault Shrimp. | | | |
| 14:20:07 Apr/01/04 | 573 | 90 | 14.6008 | 144.7773 | Search for Fault Shrimp. It is difficult without the Sit camera. | | | R786-050 |
| 14:20:22 Apr/01/04 | 573 | 79 | 14.6008 | 144.7773 | See steep slopes of volcanic rock with slopes of mostly black colored ash that has white patches interspersed. | | | |
| 14:26:06 Apr/01/04 | 581 | 93 | 14.6008 | 144.7773 | See very steep slopes of ash with outcropping volcanics. | | | |
| 14:27:17 Apr/01/04 | 579 | 44 | 14.6007 | 144.7774 | Locally see white/yellow clumps of talus sitting on top of the volcanic talus/ash. Appears to be this same altered rock material +/- sulfur that we see over at the vent and White Wall locality. | | | |
| 14:28:54 Apr/01/04 | 581 | 21 | 14.6007 | 144.7774 | Contact area between sediments and volcanic outcrop. | | | R786-051 |
| 14:30:21 Apr/01/04 | 582 | 15 | 14.6006 | 144.7774 | See shear wall of volcanic outcrop that has some hydrothermal fluids emanating at its base. Completely covered by bacterial mats and shrimps there too. Have ash sediments 'flowing' around outcrop. Some patches of sulfur. | | | |
| 14:30:23 Apr/01/04 | 582 | 15 | 14.6006 | 144.7774 | Sheer wall with the contact area. | | | R786-052 |
| 14:31:42 Apr/01/04 | 582 | 13 | 14.6006 | 144.7774 | A group of shrimp. Are we finally at Fault Shrimp. | | | R786-053 |
| 14:33:41 Apr/01/04 | 582 | 323 | 14.6006 | 144.7774 | Sitting sub down to look around at face of this steep volcanic outcrop, which is covered in shrimp and bacterial mat. | | | |
| 14:34:33 Apr/01/04 | 583 | 339 | 14.6006 | 144.7774 | Took 4 DSC photographs of this general site of steep volcanic face covered with shrimp with very black ash at base. | | | |
| 14:35:47 Apr/01/04 | 583 | 344 | 14.6007 | 144.7774 | Zoomed in view of shrimp. | | | R786-054 |
| 14:37:53 Apr/01/04 | 583 | 340 | 14.6006 | 144.7774 | Close up camera work of the shrimps on the face of the steep volcanic outcrop. Also see some limpets. Shrimps in amongst the bacterial mats. Surface of rock outcrop blocky. Shimmering water. | | | |
| 14:39:47 Apr/01/04 | 583 | 341 | 14.6006 | 144.7774 | Shrimp at Fault Shrimp. | | | R786-055 |
| 14:41:42 Apr/01/04 | 583 | 343 | 14.6006 | 144.7774 | See shimmering water coming out of base of volcanic outcrop and through the black sediments. De Ronde after looking at the whole summit area more thinks all the ash is relatively recently deposited and all from the vent plume! | | | |
| 14:41:50 Apr/01/04 | 583 | 343 | 14.6006 | 144.7774 | Watching the shrimp for the behavioral study. | | Juniper | R786-056 |
| 14:49:46 Apr/01/04 | 583 | 328 | 14.6006 | 144.7774 | ROPOS slide a bit on the steep ash slope it is resting on but close-up work on shrimps continuing. | | | |
| 15:00:23 Apr/01/04 | 583 | 326 | 14.6006 | 144.7774 | Continuing to watch shrimp do their thing. | | | |
| 15:02:09 Apr/01/04 | 583 | 326 | 14.6006 | 144.7774 | Close-up of shrimps show them to be aggressive on occasion. Can also see vesicles of the rock behind them which are unfilled with a white material - possibly sulfur? Some fine strands of bacterial mat on rock too. | | | |
| 15:03:48 Apr/01/04 | 583 | 326 | 14.6006 | 144.7774 | Close in view of shrimp. Possibly a different species than those recovered on R782. | | Juniper | R786-057 |
| 15:04:41 Apr/01/04 | 583 | 327 | 14.6006 | 144.7774 | Another shot of the large shrimp. Notice the well-developed maxilopeds. | | | R786-058 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R786 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 15:08:08 Apr/01/04 | 583 | 324 | 14.6006 | 144.7774 | Close ups of bacterial mats. See glimpse of a scale worm. | | | |
| 15:11:04 Apr/01/04 | 583 | 326 | 14.6006 | 144.7774 | Shrimp feeding on the bacterial mat. | | | |
| 15:17:04 Apr/01/04 | 583 | 327 | 14.6006 | 144.7774 | Stopped close up filming and now will attempt to suction a few shrimps up in a bottle. | | | |
| 15:19:23 Apr/01/04 | 583 | 327 | 14.6006 | 144.7774 | Area where we plan to do the suction sample. | | Tunnicliffe | R786-059 |
| 15:20:22 Apr/01/04 | 583 | 327 | 14.6006 | 144.7774 | More of where we plan to suction sample. | | Tunnicliffe | R786-060 |
| 15:21:29 Apr/01/04 | 583 | 325 | 14.6006 | 144.7774 | Shrimp rock. | | | R786-061 |
| 15:31:29 Apr/01/04 | 583 | 330 | 14.6006 | 144.7774 | Suctioning sampling shrimp at base of steep volcanic cliff - into Jar 2. Z=582.8. [NW Rota 1 - Fault Shrimp]. | R786-SS-J2-0024 | Tunnicliffe | |
| 15:43:32 Apr/01/04 | 582 | 342 | 14.6006 | 144.7774 | Finished shrimp sampling and looking for mat to sample. | | | |
| 15:44:19 Apr/01/04 | 582 | 21 | 14.6006 | 144.7774 | See incredible wall of bacterial mat at same general locality. See nice scalloping of the volcanic rock surface covered by the mats. Diffuse venting at the base of the outcrop. | | | |
| 15:46:30 Apr/01/04 | 583 | 45 | 14.6006 | 144.7774 | Looking for a good location to get a suction sample of the bacterial mat. | | Moyer | R786-062 |
| 15:48:21 Apr/01/04 | 583 | 38 | 14.6006 | 144.7774 | Suction sampling a steep bacterial mat covered wall for bacterial mat into Jar #5. Z=583.6. [NW Rota 1 - Fault Shrimp]. | R786-SS-J5-0025 | Moyer | |
| 15:49:36 Apr/01/04 | 583 | 41 | 14.6006 | 144.7774 | Positioning for the suction sample. | | Moyer | R786-063 |
| 15:55:40 Apr/01/04 | 583 | 74 | 14.6007 | 144.7774 | Suction sample at shrimp fault. Some DSCs were also taken at this location. | | Moyer | R786-064 |
| 16:00:43 Apr/01/04 | 583 | 72 | 14.6006 | 144.7774 | Finished with jar 5. | | | |
| 16:00:51 Apr/01/04 | 583 | 75 | 14.6006 | 144.7774 | Suction sampling of bacterial mat into jar 6 Z=583.4. [NW Rota 1 - Fault Shrimp]. | R786-SS-J6-0026 | Moyer | |
| 16:03:16 Apr/01/04 | 583 | 72 | 14.6007 | 144.7774 | Working on the second suction sample jar at this location. | | Moyer | R786-065 |
| 16:05:23 Apr/01/04 | 583 | 73 | 14.6006 | 144.7774 | Finished with jar-6. | | | |
| 16:05:35 Apr/01/04 | 583 | 72 | 14.6006 | 144.7774 | Begin suction sampling for bacterial mat into jar#7. Z=583.40. [NW Rota 1 - Fault Shrimp]. | R786-SS-J7-0027 | Moyer | |
| 16:08:16 Apr/01/04 | 583 | 73 | 14.6006 | 144.7774 | Working on the third jar at this location. | | Moyer | R786-066 |
| 16:10:22 Apr/01/04 | 583 | 73 | 14.6007 | 144.7774 | Finished with suction sampling jar-7. | | | |
| 16:16:10 Apr/01/04 | 580 | 323 | 14.6006 | 144.7774 | Looking around in same area for possible shrimp samples. | | | |
| 16:22:24 Apr/01/04 | 582 | 11 | 14.6005 | 144.7774 | Still looking. | | | |
| 16:22:33 Apr/01/04 | 582 | 34 | 14.6005 | 144.7774 | Distance view of Fault Shrimp. The location of Craig's suction sample was the bottom left corner. | | | R786-067 |
| 16:28:22 Apr/01/04 | 580 | 346 | 14.6006 | 144.7774 | Still shrimp hunting. | | | |
| 16:28:22 Apr/01/04 | 580 | 346 | 14.6006 | 144.7774 | Looking for more shrimp to sample. | | Tunnicliffe | R786-068 |
| 16:34:57 Apr/01/04 | 576 | 1 | 14.6006 | 144.7774 | Trying to locate an area that has stability AND big shrimp. Right now we're climbing an outcrop that is covered in bacterial mats and higher up sulfur drippings. | | | |
| 16:36:31 Apr/01/04 | 574 | 25 | 14.6007 | 144.7774 | Looking for good sampling site. | | | R786-069 |
| 16:39:02 Apr/01/04 | 572 | 351 | 14.6007 | 144.7774 | Seeing big chunks of sulfur and crabs but no shrimp yet! | | | |
| 16:39:03 Apr/01/04 | 572 | 354 | 14.6007 | 144.7774 | Big chunks of sulphur. Looking for crab shrimp and limpets. | | | R786-070 |
| 16:40:40 Apr/01/04 | 575 | 358 | 14.6007 | 144.7775 | Looking at a bacterial mat covered wall with the occasional crab and some small shrimp. | | | |
| 16:43:33 Apr/01/04 | 584 | 89 | 14.6006 | 144.7774 | We went back to bottom of cliff - same location as where we suctioned the mat. Looking for shrimp. See one that appears to be eating - a worm? Some mat? | | | |
| 16:44:35 Apr/01/04 | 584 | 123 | 14.6006 | 144.7774 | Shrimp feeding again. | | Tunnicliffe | R786-071 |
| 16:45:02 Apr/01/04 | 585 | 123 | 14.6006 | 144.7774 | Shrimp feeding on some type of worm? | | Tunnicliffe | R786-072 |
| 16:51:04 Apr/01/04 | 584 | 121 | 14.6006 | 144.7774 | Sampled a big shrimp into jar-2. Z=584.3. [NW Rota 1 - Fault Shrimp]. | R786-SS-J2-0028 | Tunnicliffe | |
| 16:57:10 Apr/01/04 | 584 | 122 | 14.6006 | 144.7774 | Shrimp food? Little worm in the center of the image. | | Tunnicliffe | R786-073 |

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|---|---|---|---|---|---|---|---|---|
| 16:59:39 Apr/01/04 | 584 | 125 | 14.6006 | 144.7774 | Another big shrimp into jar 2. Z=584.4. [Sample 28 and 29 should have only been one sample - they both went into the same jar.] [NW Rota 1 - Fault Shrimp]. | R786-SS-J2-0029 | Tunnicliffe | |
| 17:04:31 Apr/01/04 | 584 | 123 | 14.6007 | 144.7774 | Stand off between ROPOS and Shrimp. | | Tunnicliffe | R786-074 |
| 17:14:34 Apr/01/04 | 584 | 76 | 14.6006 | 144.7774 | We've stopped shrimp hunting and we're headed west approximately 100m to experience Gastros. | | | |
| 17:26:51 Apr/01/04 | 526 | 217 | 14.6008 | 144.7762 | Swarm of smaller shrimp with the odd large one intermixed. | | | R786-075 |
| 17:30:00 Apr/01/04 | 526 | 351 | 14.6008 | 144.7762 | Close up view of shrimp interactions | | | R786-076 |
| 17:30:03 Apr/01/04 | 526 | 352 | 14.6008 | 144.7762 | Close up view of shrimp interactions | | | R786-077 |
| 17:33:53 Apr/01/04 | 519 | 353 | 14.6008 | 144.7760 | At Gastros and looking around. | | | |
| 17:37:53 Apr/01/04 | 522 | 63 | 14.6009 | 144.7760 | Lots of blocky looking vesiculated lavas. Some are altered by sulfur all are covered with ash. See some white patches also. Lots of shrimp. Rock is probably more of a pyroclastic type than lava? Hard to tell. | | | |
| 17:47:04 Apr/01/04 | 523 | 62 | 14.6009 | 144.7760 | Sampling more large shrimp in the flush jar #8. | | | |
| 17:47:47 Apr/01/04 | 524 | 62 | 14.6009 | 144.7760 | Sampled a large shrimp in flush jar #8. Z=523.5. [NW Rota 1 - Gastros]. | R786-SS-J8-0030 | Tunnicliffe | |
| 17:50:02 Apr/01/04 | 523 | 66 | 14.6008 | 144.7760 | Attempting to sample limpets. | | | |
| 18:01:34 Apr/01/04 | 524 | 337 | 14.6008 | 144.7760 | Picture of rock with limpets on it for a bio-geo sample. | | | R786-078 |
| 18:01:39 Apr/01/04 | 524 | 340 | 14.6008 | 144.7760 | Collected volcaniclastic(?) rock sample for limpets. At least two limpets on rock. Rock ~20 cm long. Put in purse. Z=523.7. [NW Rota 1 - Gastros]. | R786-Bio/geo-0031 | Tunnicliffe | |
| 18:11:25 Apr/01/04 | 523 | 325 | 14.6009 | 144.7760 | Moving off to Shimmering Sand to get sediment sample. | | | |
| 18:17:01 Apr/01/04 | 530 | 277 | 14.6009 | 144.7757 | Incredible alteration seen towards the vent area and around the vent area itself. Lots of white patches of alteration among the volcanic rock outcrops. Lots of ash has fallen upon outcrop. | | | |
| 18:19:14 Apr/01/04 | 530 | 359 | 14.6009 | 144.7755 | See shear cliffs of volcanics along the way. Several m tall. Commonly strongly altered. | | | |
| 18:22:22 Apr/01/04 | 535 | 349 | 14.6010 | 144.7753 | Back at White Wall area above Shimmering Sands where mkr-75 is. | | | |
| 18:30:13 Apr/01/04 | 538 | 19 | 14.6010 | 144.7754 | Suctioning sediment into jar #4. Probe was placed about 3-4 cm into the sediment. Tmax=46. Z=537.6. [NW Rota 1 - Shimmering Sands]. | R786-SS-J4-0032 | SROF geo team (Hein) | |
| 18:31:13 Apr/01/04 | 537 | 16 | 14.6010 | 144.7754 | Shimmering Sands into jar-4. | | | R786-079 |
| 18:39:18 Apr/01/04 | 547 | 54 | 14.6010 | 144.7754 | Transiting from Shimmering Sands to Brimstone Pit. Approaching from north. | | | |
| 18:39:22 Apr/01/04 | 547 | 50 | 14.6010 | 144.7754 | Edge of Brimstone Pit showing billowing smoke. | | | R786-080 |
| 18:40:11 Apr/01/04 | 546 | 83 | 14.6009 | 144.7753 | Going to take a rock sample near Brimstone Pit. We are looking in the wall north of the pit. The pit is 5 m behind us. | | | |
| 18:43:24 Apr/01/04 | 548 | 41 | 14.6009 | 144.7753 | Highly altered rock with sulfur balls. | | | R786-081 |
| 18:44:33 Apr/01/04 | 548 | 14 | 14.6009 | 144.7753 | Sitting in front of light grey altered rock surrounded by darker rocks. Sulfur balls are visible on the rocks. DSC image. | | | |
| 18:47:06 Apr/01/04 | 548 | 25 | 14.6009 | 144.7753 | Grey altered rock from wall just north of Brimstone Pit. ~20cm in length. One side is less coated than the other. Placed in purse. [fourth rock sample in the purse (one has limpets)] Z=547.7. [NW Rota 1 - Brimstone Pit]. | R786-RK-0033 | SROF geo team (de Ronde) | |
| 18:47:31 Apr/01/04 | 548 | 23 | 14.6009 | 144.7753 | Rock sample varying in color from the background material. | | | R786-082 |
| 18:53:03 Apr/01/04 | 548 | 13 | 14.6009 | 144.7753 | Rock sample successfully placed in purse (but sticking out the top a bit). | | | |
| 18:57:17 Apr/01/04 | 548 | 137 | 14.6009 | 144.7753 | Have sampled altered rock on north face of vent (Brimstone Pit) and now will go and get some video of the plume looking in from the crater edge. | | | |
| 18:59:20 Apr/01/04 | 548 | 133 | 14.6009 | 144.7753 | Plume at NW rim of Brimstone Pit. | | | R786-083 |
| 18:59:22 Apr/01/04 | 548 | 134 | 14.6009 | 144.7753 | At the NW rim of Brimstone Pit up against the N wall. | | | |
| 19:01:18 Apr/01/04 | 536 | 139 | 14.6009 | 144.7753 | Going to do some tether management. | | | |
| 19:11:25 Apr/01/04 | 489 | 337 | 14.6006 | 144.7757 | Tether is free again. Going back to the bottom to look at plume from Brimstone Pit. | | | |
| 19:26:37 Apr/01/04 | 553 | 258 | 14.6007 | 144.7755 | Moving around looking for crater and its plume. | | | |

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|---|---|---|---|---|---|---|---|---|
| 19:40:22 Apr/01/04 | 560 | 24 | 14.6007 | 144.7753 | North slope of Brimstone Pit. | | | R786-084 |
| 19:40:23 Apr/01/04 | 560 | 21 | 14.6007 | 144.7752 | Continuing to look for plume at Brimstone vent. Finally found the crater. Think looking in wrong place for past half hour. | | | |
| 19:41:50 Apr/01/04 | 552 | 345 | 14.6008 | 144.7753 | Looking at the north face of the crater rim. | | | R786-085 |
| 19:51:06 Apr/01/04 | 555 | 292 | 14.6007 | 144.7753 | On SE rim of Brimstone Pit looking into pit. Now looking SSW looking straight into pit. Continuing mapping operation. | | | |
| 19:57:08 Apr/01/04 | 559 | 222 | 14.6007 | 144.7753 | Starting to move again from the E rim and looking SW. | | | |
| 20:00:40 Apr/01/04 | 559 | 226 | 14.6006 | 144.7752 | Flying through a diffuse particle plume. | | | |
| 20:02:07 Apr/01/04 | 559 | 337 | 14.6007 | 144.7752 | Turned around heading N and looking at the S-facing slope ahead. Slope consists of rock sitting on sand surface with abundant sulfur spheres. | | | |
| 20:03:59 Apr/01/04 | 555 | 81 | 14.6008 | 144.7752 | Mapping the Brimstone Pit. This is looking SE from the North. | | | R786-086 |
| 20:04:29 Apr/01/04 | 555 | 130 | 14.6008 | 144.7752 | Looking SE now with a steep wall to the W. | | | |
| 20:06:25 Apr/01/04 | 557 | 85 | 14.6008 | 144.7752 | Heading E and moving up a vertical face composed of volcanic spatter. | | | |
| 20:08:02 Apr/01/04 | 553 | 140 | 14.6008 | 144.7753 | Think we are one the W side looking E and moving S along the rim. Thicker particle plume in Brimstone Pit now. Following the rim to the S. | | | |
| 20:09:35 Apr/01/04 | 551 | 95 | 14.6008 | 144.7753 | Looking east from the west side of the crater. | | | R786-087 |
| 20:10:52 Apr/01/04 | 552 | 60 | 14.6007 | 144.7753 | Another shot while looking east from the west side of the crater. | | | R786-088 |
| 20:11:42 Apr/01/04 | 551 | 43 | 14.6007 | 144.7753 | Following the rim to the S and moving counterclockwise around the rim. | | | |
| 20:12:45 Apr/01/04 | 553 | 40 | 14.6007 | 144.7753 | Moving south (clockwise) around the pit rim (looking NE). | | | R786-089 |
| 20:14:20 Apr/01/04 | 557 | 323 | 14.6008 | 144.7753 | The pit is about 5 m wide and 5 m deep. | | | |
| 20:15:45 Apr/01/04 | 558 | 321 | 14.6008 | 144.7754 | We are over the center of Brimstone Pit. The particle plume is dense. | | | |
| 20:16:55 Apr/01/04 | 556 | 325 | 14.6008 | 144.7754 | We're starting to see the rim on the left. We're at 555 meters. We're facing NW. We're losing the rim on the SW. | | | |
| 20:17:33 Apr/01/04 | 557 | 323 | 14.6008 | 144.7754 | The plume seems to be getting a little more active. | | | R786-090 |
| 20:18:12 Apr/01/04 | 556 | 321 | 14.6008 | 144.7754 | The rim is elongated NW/SE. From the SE it's about 5 meters to the bottom. We're hovering over the center so now it looks about 6-8 meters deep. | | | |
| 20:20:54 Apr/01/04 | 555 | 320 | 14.6008 | 144.7753 | Brimstone Pit appears to be 8 meters across 16 meters elongate and 20 meters deep. | | | |
| 20:22:02 Apr/01/04 | 556 | 324 | 14.6008 | 144.7753 | We've been creeping NW. Max depth is ~12 meters. It's funnel shaped when out in the middle. | | | |
| 20:23:07 Apr/01/04 | 556 | 321 | 14.6008 | 144.7754 | We're heading NW a little bit to look at the feature (island) in the middle of this pit. | | | |
| 20:25:23 Apr/01/04 | 554 | 321 | 14.6008 | 144.7753 | We're at the NW corner now. Looks like not much beneath us. It's shallower at the NW part and gets deeper to the SE. | | | |
| 20:27:54 Apr/01/04 | 555 | 321 | 14.6008 | 144.7754 | Highlights were turned off about 10 minutes ago. | | | |
| 20:28:28 Apr/01/04 | 556 | 322 | 14.6008 | 144.7754 | We've been staying at 555 meters. Hovering in the middle of Brimstone Pit just below the rim. Seeing the rim on the sonar. Dimensions of the pit are 16m long 12 m wide. Elliptical. Long axis oriented to NW. Low part of rim on SW. | | | |
| 20:29:47 Apr/01/04 | 556 | 323 | 14.6008 | 144.7754 | The Imagenex says that the diameter is ~8 meters. Maximum depth about 12 meters. We haven't seen any pulses coming out of it (no rocks and sulfur). There's a weak plume. | | | |
| 20:32:13 Apr/01/04 | 554 | 325 | 14.6008 | 144.7753 | We're heading to the north. We're turning on the highlights. Ping rate is 10 seconds. | | | |
| 20:33:35 Apr/01/04 | 544 | 358 | 14.6009 | 144.7753 | Heading to the north. | | | R786-091 |
| 20:34:00 Apr/01/04 | 541 | 350 | 14.6009 | 144.7753 | Ran into a steep wall going N so will come up 15 m. | | | |
| 20:35:23 Apr/01/04 | 539 | 4 | 14.6011 | 144.7753 | Back on the bottom. Lots of shrimp on the sediment. | | | R786-092 |
| 20:35:28 Apr/01/04 | 539 | 3 | 14.6011 | 144.7753 | Back on bottom and heading N at 540 m with lots of shrimp and sandy slope with talus blocks on the surface. | | | |
| 20:38:05 Apr/01/04 | 538 | 171 | 14.6010 | 144.7753 | The particle plume is very quiescent today; no billowing and no black mm+ sized grains in it. | | | |
| 20:40:16 Apr/01/04 | 537 | 180 | 14.6010 | 144.7753 | Heading S to find Brimstone Pit then we will go up until we find a previously seen layer of plankton and then will open the nets. | | | |
| 20:44:42 Apr/01/04 | 553 | 13 | 14.6007 | 144.7753 | Approaching the crater from the south to look for plankton above the plume. | | | R786-093 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R786 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 20:44:52 Apr/01/04 | 552 | 15 | 14.6007 | 144.7753 | At Brimstone rim noting a relatively dense particle plume. We are slowly rising through the plume looking for the plankton layer. | | | |
| 20:48:33 Apr/01/04 | 528 | 14 | 14.6008 | 144.7752 | About 25 m above the bottom and have entered the plankton layer that also includes copepods. | | | |
| 20:50:07 Apr/01/04 | 524 | 7 | 14.6008 | 144.7753 | About 528 m is best depth for plankton; which is about 25 m above the pit. | | | |
| 20:51:31 Apr/01/04 | 530 | 93 | 14.6008 | 144.7752 | Nets are open and starting to collect at 0.5 knots; Z=527 m; height above bottom 27 m. Transect lines are running E-W and are about 30 m long; Start time=2051; end time=2125. [NW Rota 1 - Brimstone Pit]. | R786-net-P-0034 | Metaxas | |
| 20:51:34 Apr/01/04 | 530 | 93 | 14.6008 | 144.7752 | Opening the nets for plankton sampling above the plume. | | | R786-094 |
| 20:52:52 Apr/01/04 | 528 | 87 | 14.6009 | 144.7752 | Approaching the edge of the billowing plume while sampling plankton. | | | R786-095 |
| 20:54:42 Apr/01/04 | 528 | 253 | 14.6008 | 144.7754 | Nets are open and starting to collect at 0.5 knots; Z=527 m; height above bottom 27 m. Transect lines are running E-W and are about 30 m long; Start time=2051; end time=2125. [NW Rota 1 - Brimstone Pit]. | R786-net-S-0035 | Metaxas | |
| 21:13:33 Apr/01/04 | 526 | 86 | 14.6009 | 144.7754 | Still sampling plankton near the top of the plume. | | | R786-096 |
| 21:25:01 Apr/01/04 | 526 | 258 | 14.6008 | 144.7755 | Closed nets at 2125. | | | |
| 21:26:36 Apr/01/04 | 528 | 352 | 14.6009 | 144.7754 | Transiting to start Imagenex. | | | |
| 21:49:05 Apr/01/04 | 564 | 120 | 14.6009 | 144.7724 | Imagenex survey at 0.5 knots 30 m off the bottom. SOL M-N. | | | |
| 22:14:42 Apr/01/04 | 548 | 97 | 14.5998 | 144.7763 | EOL Imagenex Line M-N. | | | |
| 22:25:18 Apr/01/04 | 519 | 286 | 14.6007 | 144.7758 | Started Imagenex Line O-P at 22:22. We got distracted. | | | |
| 22:37:06 Apr/01/04 | 562 | 287 | 14.6010 | 144.7742 | HFS Sterivex filter #21. Start 1037 Stop 1105 Vol=2422ml Z=562. Filter for plume background DNA sample. Start 50-100m W of the pit on line O-P heading from east to west. Following about 30m above the bottom. Stopped on line Q-R about 100m NW of the pit. [NW Rota 1 - Brimstone Pit]. | R786-HFS-21-0036 | Butterfield | |
| 22:42:26 Apr/01/04 | 549 | 288 | 14.6012 | 144.7738 | Stopped getting nav fixes. Stopping Imagenex line temporarily. | | | |
| 22:44:21 Apr/01/04 | 539 | 287 | 14.6012 | 144.7735 | We have nav again. Continuing Imagenex line O-P. | | | |
| 22:49:32 Apr/01/04 | 574 | 289 | 14.6015 | 144.7726 | End of Imagenex line O-P. Turning north. | | | |
| 22:54:12 Apr/01/04 | 580 | 115 | 14.6021 | 144.7728 | Start of Imagenex line Q-R. West to east. | | | |
| 23:06:39 Apr/01/04 | 520 | 93 | 14.6015 | 144.7747 | HFS chemistry filter #15. Start 1106 Stop 1114 Z=519.9. Vol=722 ml. Small temperature anomaly during sampling. Tmax= 7.7 Tavg=7.4. Taken on Imagenex line Q-R. [NW Rota 1 - Brimstone Pit]. | R786-HFS-15-0037 | Butterfield | |
| 23:17:03 Apr/01/04 | 501 | 95 | 14.6012 | 144.7760 | HFS filtered bag #17. Start 1117 Stop 1122. Tmax=7.4 Tavg=7.1 Vol=626ml Z=501.2. Taken on Imagenex line Q-R heading SE. [NW Rota 1 - Brimstone Pit]. | R786-HFS-17-0038 | Butterfield | |
| 23:32:23 Apr/01/04 | 571 | 108 | 14.6005 | 144.7783 | End of Imagenex line Q-R. Turning north. | | | |
| 23:38:45 Apr/01/04 | 586 | 298 | 14.6013 | 144.7783 | Start Imagenex line S-T going east to west. | | | |
| 23:56:29 Apr/01/04 | 545 | 279 | 14.6020 | 144.7757 | HFS RNA filter #10. Start 1156 Stop 1227 Tmax=7.0 Tavg=6.7 Vol=2635ml Z=545. Filtered for plume background. Taken on Imagenex line S-T heading east to west. [NW Rota 1 - Brimstone Pit]. | R786-HFS-10-0039 | Butterfield | |
| 00:26:09 Apr/02/04 | 592 | 325 | 14.6031 | 144.7720 | End of Imagenex line S-T. Turning north. | | | |
| 00:31:30 Apr/02/04 | 571 | 105 | 14.6035 | 144.7721 | Start of Imagenex line U-V. West to east. | | | |
| 01:12:31 Apr/02/04 | 608 | 106 | 14.6016 | 144.7785 | End of Imagenex line and the survey. | | | |
| 01:13:12 Apr/02/04 | 608 | 105 | 14.6017 | 144.7786 | We're moving the ship to Shimmering Sands to get the probe. | | | |
| 01:16:02 Apr/02/04 | 616 | 245 | 14.6018 | 144.7785 | We're traveling to Shimmering Sands to pick up the fluid sampler extender pole at Shimmering Sands. | | | |
| 01:17:06 Apr/02/04 | 619 | 263 | 14.6018 | 144.7784 | Mkr-75 was deployed on this dive upslope of Shimmering Sands. | | | |
| 01:37:08 Apr/02/04 | 550 | 85 | 14.6009 | 144.7753 | Back on the bottom at Brimstone Pit. Looks a little more energetic than earlier (more smoke in water) but nowhere near like when it was erupting on a previous dive. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R786 Comments: NW Rota-1 | Samples | PI | Frgrab |
|---|---|---|---|---|---|---|---|---|
| 01:40:21 Apr/02/04 | 549 | 90 | 14.6009 | 144.7753 | We are at 550 m at the NW edge of the pit. There is ash and small rocks coming out of the plume. Quite a bit more smoke. Cage is in major plume at 60 m. | | | |
| 01:41:32 Apr/02/04 | 549 | 89 | 14.6009 | 144.7753 | Getting more intense. Seems to be pulsating now because small rocks are coming out of the plume. | | | |
| 01:43:22 Apr/02/04 | 549 | 110 | 14.6009 | 144.7753 | Brimstone Pit. | | | R786-097 |
| 01:43:57 Apr/02/04 | 549 | 118 | 14.6009 | 144.7753 | It is definitely puffing now. Earlier we could see down into the pit. Now it is all cloud beyond the rim and sometimes the clouds overflows the pit. | | | |
| 01:45:00 Apr/02/04 | 550 | 143 | 14.6009 | 144.7753 | Brimstone Pit. | | | R786-098 |
| 01:46:36 Apr/02/04 | 549 | 147 | 14.6009 | 144.7753 | Edge of plume has shimmering water. Big puff coming up right now with rocks falling out. | | | |
| 01:47:25 Apr/02/04 | 547 | 153 | 14.6009 | 144.7753 | Brimstone Pit. | | | R786-099 |
| 01:48:27 Apr/02/04 | 542 | 148 | 14.6010 | 144.7753 | Had a great big puff but now it has cleared out a bit and we can see down into the pit. | | | |
| 01:50:19 Apr/02/04 | 541 | 164 | 14.6010 | 144.7753 | We are leaving Brimstone Pit and heading up to Shimmering Sands to recover the HFS pole. | | | |
| 01:50:30 Apr/02/04 | 541 | 163 | 14.6010 | 144.7753 | Brimstone Pit. | | | R786-100 |
| 01:51:23 Apr/02/04 | 538 | 159 | 14.6010 | 144.7754 | Facing SE and we can see the W edge of the pit. We've just backed off the rim a little bit. Seafloor is covered with white material. | | | |
| 01:54:29 Apr/02/04 | 537 | 151 | 14.6009 | 144.7754 | Found the hose. | | | |
| 01:55:07 Apr/02/04 | 538 | 210 | 14.6009 | 144.7754 | Shimmering Sands. | | | R786-101 |
| 01:56:57 Apr/02/04 | 541 | 1 | 14.6009 | 144.7754 | Trying to pick up the extender pole. | | | |
| 01:57:37 Apr/02/04 | 541 | 18 | 14.6009 | 144.7754 | We got it. | | | |
| 01:59:50 Apr/02/04 | 515 | 43 | 14.6009 | 144.7754 | We are leaving the bottom and heading to the cage. | | | |
| 02:05:04 Apr/02/04 | 442 | 192 | 14.6023 | 144.7733 | We're taping the ascent on SVHS. | | | |
| 02:30:55 Apr/02/04 | 4 | 257 | 14.6017 | 144.7733 | ROPOS on deck. | | | |

## 8.6 R787 Dive Log: E Diamante

| **R787: East Diamante** |
|---|
| wet time (UTC): 4/3 0732 -4/4 0034. JD 94-95. 17.03 hrs. |
| bottom time (UTC): 4/3 0753 - 4/4 0001. 16.13 hrs. [31 samples] |
| **R787 DSC information:** The digital still camera was inoperable and no DSCs were taken on this dive. |
| Exploratory dive at E Diamante volcano. Dive began at Barnacle Beach, continued to the Black Forest area (and Diamante Chimney), then to Aquarium. Samples: **AO**: 1 suction (bacterial mat), 1 rock. **Barnacle Beach**: 4 bio/geo, 2 suctions (bacterial mat). **Black Forest**: 3 rocks, 1 sulfide, 1 suction (sediment), 2 plankton nets, 1 McLane. **Diamante Chimney**: 2 sulfides, 7 biology samples (actually 9 snails listed as 7 separate samples), 1 suction (particulates). **Middle Cone**: 1 suction (bio). **Boulder Vent**: 1 suction (bio). **Aquarium**: 1 bio/geo (rock and algae). **Central summit cone:** 1 bio/geo, 1 suction (bio). |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 07:32:40 Apr/03/04 | 0 | 262 | 14.6017 | 144.7733 | ROPOS off the deck. No digital camera. | | | |
| 07:33:46 Apr/03/04 | 0 | 274 | 14.6017 | 144.7733 | ROPOS is in the water. | | | |
| 08:11:29 Apr/03/04 | 465 | 115 | 15.9436 | 145.6833 | We are on the bottom. | | | |
| 08:12:05 Apr/03/04 | 458 | 111 | 15.9436 | 145.6834 | Rocky bottom; big blocks. | | | |
| 08:15:25 Apr/03/04 | 457 | 196 | 15.9435 | 145.6833 | Angular talus and outcrops of talus; these outcrops have a little bit of sediment (light color). We're stopping for a sample. | | | |
| 08:15:48 Apr/03/04 | 457 | 156 | 15.9434 | 145.6833 | Massive lava blocks; very angular; probably dacite at NW corner of resurgent dome. | | | R787-001 |
| 08:17:18 Apr/03/04 | 458 | 169 | 15.9434 | 145.6833 | Lava block approximately 1 meter in length. | | | R787-002 |
| 08:19:38 Apr/03/04 | 458 | 163 | 15.9434 | 145.6833 | Rock sample near point A0. Triangular cross-section. 10cm. Reddish brown coating. Port biobox. Z=457.5 [E Diamante - A0]. | R787-RK-0001 | SROF geo group (Stern) | |
| 08:19:41 Apr/03/04 | 458 | 165 | 15.9434 | 145.6833 | RK-0001 in port biobox. | | | R787-003 |
| 08:21:22 Apr/03/04 | 455 | 205 | 15.9434 | 145.6833 | Talus slope of blocky lava. | | | R787-004 |
| 08:24:59 Apr/03/04 | 453 | 211 | 15.9434 | 145.6832 | Lots of blocky rocks. This is a talus slope but outcrop is not far upslope. | | | |
| 08:27:09 Apr/03/04 | 453 | 212 | 15.9434 | 145.6831 | Outcrop of fractured lavas. These are quite blocky; reminiscent of the way that dacite fractures. White powdery sediment. | | | |
| 08:28:39 Apr/03/04 | 456 | 206 | 15.9433 | 145.6830 | White powdery sediment at the base of the large blocks of lava. There is a fish too. | | | R787-005 |
| 08:32:09 Apr/03/04 | 457 | 204 | 15.9433 | 145.6830 | Stop to sample white powder behind boulder. | | | |
| 08:32:56 Apr/03/04 | 457 | 205 | 15.9433 | 145.6830 | Close up of the powdery sediment along the leeward side of block. | | | R787-006 |
| 08:33:38 Apr/03/04 | 457 | 204 | 15.9433 | 145.6830 | Filamentous bacteria on the rock. Powdery white material on ground. Boulder has a brown Manganese stain about 1 mm thick. | | | |
| 08:36:45 Apr/03/04 | 458 | 182 | 15.9433 | 145.6830 | Doing White balance. | | | |
| 08:39:39 Apr/03/04 | 456 | 178 | 15.9433 | 145.6829 | Suction bacterial mat(?) into jar-5. Small Eh decrease so there could be low-level venting here. Quite viscous. Z=456. Eh still decreasing. No significant temperature anomaly. [E Diamante - A0]. | R787-SS-J5-0002 | Moyer | |
| 08:41:31 Apr/03/04 | 458 | 201 | 15.9433 | 145.6830 | Brown iron manganese oxide coating. | | | R787-007 |
| 08:45:56 Apr/03/04 | 458 | 196 | 15.9433 | 145.6829 | Slurp sampling mat at base of block. | | | R787-008 |
| 08:46:49 Apr/03/04 | 458 | 193 | 15.9433 | 145.6829 | Close up of slurp sample. | | | R787-009 |
| 08:49:07 Apr/03/04 | 458 | 197 | 15.9433 | 145.6829 | Slurp sample placed into bottle 5. | | | R787-010 |
| 08:50:49 Apr/03/04 | 458 | 193 | 15.9433 | 145.6829 | Bacterial mat along bottom left hand corner of rock. | | | R787-011 |
| 08:53:22 Apr/03/04 | 458 | 198 | 15.9433 | 145.6829 | Bubbles escaping around cluster of acicular dark green crystals? | | | |
| 08:54:28 Apr/03/04 | 458 | 198 | 15.9433 | 145.6829 | Bubbles were observed coming out of this little structure in the bottom middle right of the frame. | | | R787-012 |
| 08:59:02 Apr/03/04 | 458 | 192 | 15.9433 | 145.6829 | Stop sampling and look for another site. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 09:00:09 Apr/03/04 | 452 | 196 | 15.9433 | 145.6829 | Continue heading up blocky talus slope. | | | |
| 09:03:33 Apr/03/04 | 434 | 211 | 15.9428 | 145.6829 | Blocky lava; possibly dacite. | | | R787-013 |
| 09:04:18 Apr/03/04 | 429 | 212 | 15.9427 | 145.6829 | Blocky lava is covered with yellow brown sediment. | | | |
| 09:06:51 Apr/03/04 | 435 | 349 | 15.9430 | 145.6826 | Sediment covered slope with yellowish and white patches. | | | |
| 09:06:58 Apr/03/04 | 435 | 332 | 15.9430 | 145.6826 | Outcrop lacking sediment. Slope with white and yellow patches. | | | R787-014 |
| 09:09:12 Apr/03/04 | 440 | 224 | 15.9431 | 145.6826 | Sediment covered slope; sandy grey material covered with yellowish patches; some burrows are suggested by exhumation of fresh sediment into mounds. | | | |
| 09:13:07 Apr/03/04 | 453 | 264 | 15.9428 | 145.6831 | Big yellow area about 1-2 m long covering rocks. Slight temperature anomaly. Rocks covered with barnacles. There are some crabs. This site has been dubbed "Barnacle beach". | | | |
| 09:13:21 Apr/03/04 | 454 | 250 | 15.9428 | 145.6831 | Bacterial mat area with some active low-level venting in the middle. | | | R787-015 |
| 09:14:11 Apr/03/04 | 457 | 248 | 15.9433 | 145.6828 | Limpet and crabs among bacterial mat covered rocks. | | | R787-016 |
| 09:16:24 Apr/03/04 | 457 | 243 | 15.9430 | 145.6831 | Shimmering water; barnacle and bacterial covered rocks. | | | R787-017 |
| 09:16:52 Apr/03/04 | 457 | 243 | 15.9433 | 145.6828 | Close up of barnacle-covered rocks. Shimmering water is also seen. Limpets are found on the periphery. All the surrounding rocks are Mn stained. | | | R787-018 |
| 09:19:20 Apr/03/04 | 457 | 243 | 15.9433 | 145.6828 | Crab amongst the barnacle covered lava blocks. | | | R787-019 |
| 09:20:34 Apr/03/04 | 457 | 242 | 15.9433 | 145.6827 | Barnacle-covered rock from area of diffuse venting and bacterial mat. Z=457. Starboard biobox. [E Diamante - Barnacle Beach]. | R787-Bio/Geo-0003 | Tunnicliffe | |
| 09:21:27 Apr/03/04 | 457 | 244 | 15.9433 | 145.6827 | Sampling barnacle covered rock. | | | R787-020 |
| 09:21:49 Apr/03/04 | 457 | 246 | 15.9433 | 145.6827 | Sample R787-Bio/Geo-0003 in starboard biobox. | | | R787-021 |
| 09:23:53 Apr/03/04 | 457 | 246 | 15.9433 | 145.6828 | Another barnacle-covered baseball-sized rock from this area of diffuse venting and bacterial mat. Starboard biobox. Z=457. [E Diamante - Barnacle Beach]. | R787-Bio/Geo-0004 | Tunnicliffe | |
| 09:24:34 Apr/03/04 | 457 | 243 | 15.9433 | 145.6828 | Sampling R787 Bio/Geo-0004. | | | R787-022 |
| 09:24:49 Apr/03/04 | 457 | 242 | 15.9433 | 145.6828 | R787-Bio/Geo-0004 in starboard biobox. | | | R787-023 |
| 09:26:52 Apr/03/04 | 456 | 233 | 15.9433 | 145.6828 | Frame showing scale of barnacle covered rocks; 10 cm lasers on right side of large block. | | | R787-024 |
| 09:29:13 Apr/03/04 | 455 | 295 | 15.9433 | 145.6828 | Barnacles on the larger rocks. | | | R787-025 |
| 09:30:32 Apr/03/04 | 456 | 286 | 15.9433 | 145.6828 | Barnacles with scale. | | | R787-026 |
| 09:30:53 Apr/03/04 | 456 | 286 | 15.9433 | 145.6828 | Close up of barnacle cirri. | | | R787-027 |
| 09:34:53 Apr/03/04 | 456 | 284 | 15.9433 | 145.6828 | More barnacles. | | | R787-028 |
| 09:40:31 Apr/03/04 | 457 | 209 | 15.9433 | 145.6828 | Barnacles on rock. Into starboard biobox. Z=457. [E Diamante - Barnacle Beach]. | R787-Bio/Geo-0005 | Tunnicliffe | |
| 09:41:14 Apr/03/04 | 457 | 214 | 15.9433 | 145.6828 | Sampling R787 Bio/Geo-0005. | | | R787-029 |
| 09:41:36 Apr/03/04 | 457 | 214 | 15.9433 | 145.6828 | R787 Bio/Geo-0005 in starboard biobox. | | | R787-030 |
| 09:41:46 Apr/03/04 | 457 | 213 | 15.9433 | 145.6828 | R787 Bio/Geo-0005 in a different angle. | | | R787-031 |
| 09:43:52 Apr/03/04 | 457 | 214 | 15.9433 | 145.6828 | Rock with small barnacles and gastropods. Starboard biobox. Z=457. [E Diamante - Barnacle Beach]. | R787-Bio/Geo-0006 | Tunnicliffe | |
| 09:44:28 Apr/03/04 | 457 | 215 | 15.9433 | 145.6828 | Sampling R787-Bio/Geo-0006. | | | R787-032 |
| 09:45:05 Apr/03/04 | 457 | 207 | 15.9433 | 145.6828 | Fourth rock with barnacles in the starboard side bio box. R787-Bio-Geo-0006. | | | R787-033 |
| 09:46:04 Apr/03/04 | 457 | 218 | 15.9433 | 145.6828 | Unique behavior of barnacles. Almost as pretty as the rocks. | | | R787-034 |
| 09:47:16 Apr/03/04 | 457 | 214 | 15.9433 | 145.6828 | Profile of barnacles. | | | R787-035 |
| 09:47:28 Apr/03/04 | 457 | 214 | 15.9433 | 145.6828 | We are seeing a different species of limpet than the one at NW Rota 1. Also seeing a poly chaete. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 09:49:10 Apr/03/04 | 457 | 213 | 15.9433 | 145.6828 | We are going to attempt collecting a crab. | | | |
| 09:49:44 Apr/03/04 | 457 | 213 | 15.9433 | 145.6828 | Doing gauges. | | | |
| 09:52:34 Apr/03/04 | 457 | 255 | 15.9433 | 145.6828 | Massive community of barnacles. | | | R787-036 |
| 09:55:18 Apr/03/04 | 456 | 159 | 15.9433 | 145.6828 | Crab in lower right. | | | R787-037 |
| 09:56:16 Apr/03/04 | 457 | 193 | 15.9433 | 145.6828 | Crab hunting. But no luck. | | | R787-038 |
| 09:58:23 Apr/03/04 | 457 | 152 | 15.9433 | 145.6828 | Red shrimp amongst the barnacles. | | | R787-039 |
| 09:59:41 Apr/03/04 | 457 | 154 | 15.9433 | 145.6828 | Shrimp and barnacles with scale. | | | R787-040 |
| 10:00:35 Apr/03/04 | 457 | 152 | 15.9433 | 145.6828 | We are looking at a shrimp that has been caught in a barnacle. | | | |
| 10:03:01 Apr/03/04 | 457 | 122 | 15.9433 | 145.6828 | Our attempts to capture a crab failed. We are preparing to suction sample some microbial mat. | | | |
| 10:04:43 Apr/03/04 | 453 | 185 | 15.9433 | 145.6828 | We are in a blocky lava flow talus surface. | | | |
| 10:07:32 Apr/03/04 | 457 | 244 | 15.9433 | 145.6828 | We are measuring temperature amongst the rocks with the barnacles. It is a 2.4 degree temperature anomaly. At another location within a few cm's it is 4.3 degrees. It steadied at 4 degrees. | | | |
| 10:10:24 Apr/03/04 | 457 | 244 | 15.9433 | 145.6828 | Highest temperature recorded here was 4.0 degrees. | | | R787-041 |
| 10:13:55 Apr/03/04 | 457 | 235 | 15.9433 | 145.6828 | We have lost camera control. We're initializing the camera. | | | |
| 10:23:50 Apr/03/04 | 456 | 223 | 15.9433 | 145.6828 | The camera is fixed. We are re-positioning to take more temperature measurements and suction microbial mat. | | | |
| 10:25:09 Apr/03/04 | 457 | 219 | 15.9433 | 145.6828 | Suction sample of filamentous mat into jar 6. Z=457. Sampled from a manganese oxide-stained altered lava. [E Diamante - Barnacle Beach]. | R787-SS-J6-0007 | Moyer | |
| 10:25:36 Apr/03/04 | 457 | 218 | 15.9433 | 145.6828 | Bacterial mat about to be slurped. | | | R787-042 |
| 10:26:10 Apr/03/04 | 457 | 218 | 15.9433 | 145.6827 | Slurping the bacterial mat. | | | R787-043 |
| 10:29:19 Apr/03/04 | 457 | 214 | 15.9433 | 145.6828 | Post-slurp with scratches from collector. | | | R787-044 |
| 10:30:54 Apr/03/04 | 456 | 210 | 15.9433 | 145.6827 | Rock post-slurp. | | | R787-045 |
| 10:42:39 Apr/03/04 | 457 | 210 | 15.9433 | 145.6828 | Bacterial mat collected into bottle 6. | | | R787-046 |
| 10:48:36 Apr/03/04 | 457 | 282 | 15.9433 | 145.6828 | Looking for another location to continue sampling of the mat. | | | |
| 10:49:14 Apr/03/04 | 457 | 257 | 15.9433 | 145.6828 | Pre-slurp bacterial mat on rock. | | | R787-047 |
| 10:49:42 Apr/03/04 | 457 | 258 | 15.9434 | 145.6828 | Suction sampling filamentous microbial mat into jar7. Z=457. Some biology also made its way into the jar. [E Diamante - Barnacle Beach]. | R787-SS-J7-0008 | Moyer | |
| 10:50:04 Apr/03/04 | 457 | 257 | 15.9433 | 145.6828 | Slurping mat with keen observer in the background. | | | R787-048 |
| 11:01:20 Apr/03/04 | 457 | 270 | 15.9433 | 145.6828 | Bio sample into bottle 7. | | | R787-049 |
| 11:03:42 Apr/03/04 | 457 | 271 | 15.9433 | 145.6828 | We are finished sampling at Barnacle Beach and are moving on towards A1. | | | |
| 11:07:34 Apr/03/04 | 453 | 103 | 15.9432 | 145.6830 | Moving the ship 100 m. | | | |
| 11:07:41 Apr/03/04 | 453 | 121 | 15.9432 | 145.6830 | More blocky talus and columnar structures. Eh is increasing slightly. | | | |
| 11:08:41 Apr/03/04 | 449 | 111 | 15.9432 | 145.6831 | Blocky talus with occasional columns. | | | R787-050 |
| 11:11:32 Apr/03/04 | 448 | 249 | 15.9431 | 145.6831 | Broken big columns. Talus slope - no sight of venting. | | | |
| 11:12:18 Apr/03/04 | 444 | 248 | 15.9430 | 145.6831 | Pieces of massive lava flows. Dike rock. Blocky and columnar. | | | |
| 11:12:20 Apr/03/04 | 443 | 249 | 15.9430 | 145.6830 | Blocky columnar flow. Possibly a dike. More angular than rocks around Barnacle Beach. | | | R787-051 |
| 11:14:52 Apr/03/04 | 433 | 229 | 15.9427 | 145.6826 | There is a fine layer of sediment on the talus. A bit of staining. | | | |
| 11:15:49 Apr/03/04 | 427 | 229 | 15.9427 | 145.6826 | We are slowing climbing up slopes. | | | |
| 11:16:06 Apr/03/04 | 424 | 228 | 15.9427 | 145.6825 | We have to an area with a lot of sediment. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 11:16:25 Apr/03/04 | 421 | 232 | 15.9426 | 145.6825 | Large column along the way to A1. | | | R787-052 |
| 11:16:43 Apr/03/04 | 418 | 230 | 15.9426 | 145.6825 | Small fish. | | | |
| 11:18:07 Apr/03/04 | 409 | 229 | 15.9425 | 145.6824 | The rocks here more like an outcrop. Vesicular type of lava. Fragmental rock. | | | |
| 11:20:43 Apr/03/04 | 387 | 229 | 15.9423 | 145.6822 | Slight drop in Eh. Some yellow staining on the sediment. | | | |
| 11:21:04 Apr/03/04 | 384 | 230 | 15.9423 | 145.6821 | Moving the ship another 100 m's. | | | |
| 11:21:23 Apr/03/04 | 383 | 233 | 15.9423 | 145.6821 | We are at a depth where the plume was pronounced. | | | |
| 11:22:30 Apr/03/04 | 377 | 247 | 15.9422 | 145.6820 | We are proceeding up slope. Seeing more outcrops - fragmentary rock. Some staining. | | | |
| 11:22:57 Apr/03/04 | 374 | 273 | 15.9422 | 145.6820 | Sulfur along the top of a vesicular lava outcrop. | | | R787-053 |
| 11:23:45 Apr/03/04 | 369 | 263 | 15.9422 | 145.6819 | Some of the rocks are quite large. | | | |
| 11:24:36 Apr/03/04 | 367 | 191 | 15.9421 | 145.6817 | A lot of talus - very blocky. Lava flows with columnar jointing. We see a coral. | | | |
| 11:24:37 Apr/03/04 | 367 | 189 | 15.9421 | 145.6817 | Back to the columnar blocky flows. Not much vesicular outcrops anymore. | | | R787-054 |
| 11:25:32 Apr/03/04 | 367 | 195 | 15.9420 | 145.6817 | Coral up close. | | | R787-055 |
| 11:26:50 Apr/03/04 | 364 | 197 | 15.9419 | 145.6817 | Some massive blocks of lava. Pile of boulders and no sediment cover. We are 25 m's from the top. | | | |
| 11:28:07 Apr/03/04 | 360 | 195 | 15.9418 | 145.6816 | Small white or yellow corals or sponges? | | | R787-056 |
| 11:31:13 Apr/03/04 | 355 | 197 | 15.9414 | 145.6816 | Perhaps little corals. | | | R787-057 |
| 11:32:14 Apr/03/04 | 352 | 182 | 15.9414 | 145.6815 | We are still up within large blocks of lava. Seeing some sediment on the rocks. | | | |
| 11:34:55 Apr/03/04 | 347 | 208 | 15.9410 | 145.6814 | Seeing small corals all the way up the slope. | | | |
| 11:36:00 Apr/03/04 | 346 | 215 | 15.9409 | 145.6813 | Some type of coral and reef fish. | | | R787-058 |
| 11:38:09 Apr/03/04 | 340 | 246 | 15.9409 | 145.6812 | We are continuing towards the top. | | | |
| 11:40:20 Apr/03/04 | 335 | 294 | 15.9408 | 145.6809 | We are starting to see shallow water fish. | | | |
| 11:41:10 Apr/03/04 | 333 | 295 | 15.9408 | 145.6809 | Fish. | | | R787-059 |
| 11:42:43 Apr/03/04 | 331 | 293 | 15.9408 | 145.6809 | A lot more life on the rocks. Lots of little corals and some large coral. A crinoid on top of a "dandelion". Some calcium carbonate tubes on the rocks at high densities. | | | |
| 11:44:04 Apr/03/04 | 330 | 272 | 15.9409 | 145.6808 | Crinoid on a dandelion. | | | R787-060 |
| 11:49:29 Apr/03/04 | 330 | 266 | 15.9409 | 145.6808 | Coral slightly out of focus. | | | R787-061 |
| 11:50:25 Apr/03/04 | 330 | 267 | 15.9409 | 145.6808 | Dead fish. | | | R787-062 |
| 11:51:31 Apr/03/04 | 330 | 266 | 15.9409 | 145.6808 | Hydrozoan. | | | R787-063 |
| 11:52:11 Apr/03/04 | 330 | 266 | 15.9409 | 145.6808 | Looking around at the biology. | | | |
| 11:53:28 Apr/03/04 | 330 | 267 | 15.9409 | 145.6808 | Hydrozoan up close. | | | R787-064 |
| 11:54:24 Apr/03/04 | 330 | 267 | 15.9409 | 145.6808 | Shrimp creeping behind a rock. | | | R787-065 |
| 11:54:50 Apr/03/04 | 330 | 267 | 15.9409 | 145.6808 | Carrying on to the top. | | | |
| 11:56:13 Apr/03/04 | 328 | 279 | 15.9409 | 145.6807 | Crinoid. | | | R787-066 |
| 11:57:08 Apr/03/04 | 324 | 272 | 15.9409 | 145.6807 | Beautiful basket stars. | | | |
| 11:58:28 Apr/03/04 | 317 | 299 | 15.9409 | 145.6806 | Basket stars. | | | R787-067 |
| 11:58:35 Apr/03/04 | 316 | 290 | 15.9409 | 145.6806 | We are in a colony of basket stars. Some anemones are there as well. We are looking at an outcrop. | | | |
| 12:00:03 Apr/03/04 | 319 | 275 | 15.9410 | 145.6806 | Spider crab. | | | R787-068 |
| 12:00:23 Apr/03/04 | 319 | 276 | 15.9410 | 145.6806 | Spider crab. | | | R787-069 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 12:01:44 Apr/03/04 | 319 | 294 | 15.9410 | 145.6806 | Joints in a fan shape in this outcrop. | | | R787-070 |
| 12:02:22 Apr/03/04 | 319 | 277 | 15.9410 | 145.6806 | Layered volcaniclastic with basket star on top. | | | R787-071 |
| 12:02:28 Apr/03/04 | 319 | 278 | 15.9410 | 145.6806 | Basket star on top of volcaniclastic outcrop. | | | R787-072 |
| 12:02:29 Apr/03/04 | 319 | 277 | 15.9410 | 145.6806 | Volcaniclastic outcrops and huge basket stars. | | | |
| 12:07:24 Apr/03/04 | 319 | 315 | 15.9410 | 145.6806 | Trying to pick up a massive piece of volcaniclastic rock - but it is very soft and breaks apart. | | | |
| 12:10:14 Apr/03/04 | 319 | 302 | 15.9410 | 145.6806 | Trying to sample from the outcrop with basket stars cheering us on. | | | R787-073 |
| 12:12:44 Apr/03/04 | 319 | 316 | 15.9410 | 145.6806 | Basket star fish up close. | | | R787-074 |
| 12:13:01 Apr/03/04 | 319 | 318 | 15.9410 | 145.6806 | We are continuing to try for a piece of altered rock. | | | |
| 12:15:30 Apr/03/04 | 319 | 276 | 15.9410 | 145.6806 | Altered volcaniclastic rock with biology (basket star). Z=319. Piece is about 20cm - long triangular. Placed in the boot. [E Diamante]. | R787-RK-0009 | SROF geo group (Stern) | |
| 12:16:48 Apr/03/04 | 319 | 284 | 15.9410 | 145.6806 | Sample R787 rk-0009. | | | R787-075 |
| 12:17:32 Apr/03/04 | 320 | 304 | 15.9410 | 145.6806 | Taking video of the area. | | | |
| 12:22:09 Apr/03/04 | 315 | 222 | 15.9409 | 145.6805 | Basket stars as far as the eye can see. | | | |
| 12:23:05 Apr/03/04 | 313 | 253 | 15.9409 | 145.6804 | Basket star ridge. | | | R787-076 |
| 12:23:29 Apr/03/04 | 314 | 248 | 15.9409 | 145.6805 | Echinoderm heaven (3 classes). | | | |
| 12:23:58 Apr/03/04 | 314 | 250 | 15.9409 | 145.6804 | Crinoid and sea urchin. | | | R787-077 |
| 12:24:18 Apr/03/04 | 314 | 253 | 15.9409 | 145.6805 | Crinoid. | | | R787-078 |
| 12:26:05 Apr/03/04 | 314 | 258 | 15.9409 | 145.6805 | King of the hill basket star. | | | R787-079 |
| 12:26:41 Apr/03/04 | 314 | 258 | 15.9409 | 145.6805 | Fiddle head on a basket star. | | | R787-080 |
| 12:27:58 Apr/03/04 | 312 | 286 | 15.9408 | 145.6805 | The top of the hill is at 312 m. We are going to head north to cover another part of the slope where we saw the vent. | | | |
| 12:30:03 Apr/03/04 | 312 | 1 | 15.9409 | 145.6805 | Moving the ship 100 m ahead of our track. | | | |
| 12:30:42 Apr/03/04 | 316 | 4 | 15.9410 | 145.6806 | Moving ship 100 m N of ROV position. | | | |
| 12:31:30 Apr/03/04 | 319 | 305 | 15.9411 | 145.6806 | Particulate matter in the water with cobble size rocks on sediment surface at 323 m water depth. May be plume near by? | | | |
| 12:34:27 Apr/03/04 | 328 | 348 | 15.9413 | 145.6805 | Heading NW at 328 m water depth. Still particulate matter in water and he is steady at 145 mV. | | | |
| 12:43:05 Apr/03/04 | 338 | 359 | 15.9426 | 145.6807 | We are stopping at the top to collect a rock. | | | |
| 12:44:22 Apr/03/04 | 338 | 142 | 15.9425 | 145.6807 | Picking up a rock approximately 10cm in diameter. Has a small coral on it. Placed it in the boot. Z=338. [E Diamante]. | R787-RK-0010 | SROF geo team (Stern) | |
| 12:46:23 Apr/03/04 | 338 | 128 | 15.9425 | 145.6807 | Grabbing sample RK-0010. | | | R787-081 |
| 12:46:58 Apr/03/04 | 338 | 126 | 15.9425 | 145.6807 | Sample R787 RK-0010. | | | R787-082 |
| 12:48:41 Apr/03/04 | 338 | 130 | 15.9425 | 145.6807 | Another rock (~ 10cm) which is fresher and darker than previous sample. Z=338. In the boot in front of the other rock samples. [E Diamante]. | R787-RK-0011 | SROF geo team (Stern) | |
| 12:52:17 Apr/03/04 | 337 | 120 | 15.9425 | 145.6807 | Sampling RK-0011. | | | R787-083 |
| 12:52:41 Apr/03/04 | 338 | 127 | 15.9425 | 145.6807 | Sample RK-0011. | | | R787-084 |
| 12:53:56 Apr/03/04 | 338 | 129 | 15.9425 | 145.6807 | Boot. | | | R787-085 |
| 12:54:31 Apr/03/04 | 337 | 125 | 15.9425 | 145.6807 | We need to move the ship 100 m north of where the ROV is now and move downslope from there. | | | |
| 12:55:21 Apr/03/04 | 336 | 332 | 15.9425 | 145.6807 | We are on a sediment bench area. Most rocks are broken up. | | | |
| 12:56:31 Apr/03/04 | 336 | 322 | 15.9425 | 145.6806 | Checking gauges. | | | |
| 13:01:09 Apr/03/04 | 346 | 229 | 15.9428 | 145.6805 | That's a nice coral. | | | R787-086 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 13:01:16 Apr/03/04 | 346 | 252 | 15.9428 | 145.6805 | Nice coral. With crinoids and ophiuroids. | | | |
| 13:02:08 Apr/03/04 | 350 | 81 | 15.9430 | 145.6807 | Plenty of yellow staining near the top of the flow. | | | R787-087 |
| 13:02:09 Apr/03/04 | 350 | 83 | 15.9430 | 145.6807 | We are in an area of much yellow staining. | | | |
| 13:02:42 Apr/03/04 | 353 | 98 | 15.9430 | 145.6809 | More rocks downslope. Quite a bit of sediment on the rocks. | | | |
| 13:04:09 Apr/03/04 | 359 | 321 | 15.9432 | 145.6810 | We are encountering more coral. Going down to 370m and then move along the contour. | | | |
| 13:05:09 Apr/03/04 | 361 | 313 | 15.9432 | 145.6809 | As we descend we see more rock with pockets of sediment and scattered coral. Vertically extruded lavas. | | | |
| 13:05:18 Apr/03/04 | 362 | 315 | 15.9432 | 145.6809 | Blocky vesicular flow surrounded by sediment pockets. | | | R787-088 |
| 13:08:04 Apr/03/04 | 371 | 307 | 15.9435 | 145.6808 | We are at 370 meters and we will start going back towards the SE following the contour. | | | |
| 13:12:36 Apr/03/04 | 372 | 135 | 15.9435 | 145.6810 | We are moving on a 140-degree bearing to find the wall with the evidence of venting. | | | |
| 13:12:54 Apr/03/04 | 372 | 140 | 15.9435 | 145.6811 | Anemone. | | | R787-089 |
| 13:14:11 Apr/03/04 | 372 | 136 | 15.9433 | 145.6813 | The same terrain as before. Occasional benches and sedimented areas. | | | |
| 13:16:33 Apr/03/04 | 373 | 152 | 15.9430 | 145.6816 | Seeing some staining and shimmering. More barnacles and limpets. We think we are seeing chimneys. Eh is dropping to 91 mV. | | | |
| 13:17:14 Apr/03/04 | 376 | 207 | 15.9430 | 145.6816 | Community of barnacles. | | | R787-090 |
| 13:18:07 Apr/03/04 | 378 | 223 | 15.9430 | 145.6817 | Red crab and barnacles. | | | R787-091 |
| 13:20:37 Apr/03/04 | 379 | 268 | 15.9429 | 145.6817 | 2-meter tall sulfide chimneys. | | | R787-092 |
| 13:21:41 Apr/03/04 | 380 | 187 | 15.9429 | 145.6817 | 2 m high sulfide chimneys up slope. | | | |
| 13:22:40 Apr/03/04 | 379 | 224 | 15.9429 | 145.6817 | We are going to collect a sample and then do a survey of the area for active chimneys. | | | |
| 13:24:12 Apr/03/04 | 380 | 280 | 15.9428 | 145.6818 | Two groups (10 meters apart) of chimneys orthogonal to the slope - does not appear to be focused venting. White material possibly bacterial mats. | | | |
| 13:25:05 Apr/03/04 | 380 | 210 | 15.9429 | 145.6818 | Chimney structures. | | | R787-093 |
| 13:25:13 Apr/03/04 | 381 | 208 | 15.9429 | 145.6818 | Crab and barnacles at base of chimneys. | | | R787-094 |
| 13:25:58 Apr/03/04 | 380 | 216 | 15.9429 | 145.6817 | The chimneys appear to have limpets and mats on them. They taper at the top to a few cm's. We are going to try sampling them. | | | |
| 13:25:58 Apr/03/04 | 380 | 216 | 15.9429 | 145.6817 | Chimney line. | | | R787-095 |
| 13:26:45 Apr/03/04 | 379 | 220 | 15.9429 | 145.6817 | Piece of sulfide chimney. Placed in port biobox. Z=379. This chimney is ~2m high and ~10cm wide at the top. Looks fairly old with manganese coating on the outside. [E Diamante - Black Forest]. | R787-SF-0012 | SROF geo group (de Ronde) | |
| 13:29:00 Apr/03/04 | 379 | 222 | 15.9429 | 145.6817 | Attempting to pull off top of spire. | | | R787-096 |
| 13:29:41 Apr/03/04 | 379 | 204 | 15.9429 | 145.6817 | Iron Manganese spire top. Sample RK-0012. | | | R787-097 |
| 13:32:33 Apr/03/04 | 380 | 267 | 15.9429 | 145.6818 | Fallen chimneys. | | | R787-098 |
| 13:32:44 Apr/03/04 | 380 | 266 | 15.9429 | 145.6818 | Knocked over chimney. | | | R787-099 |
| 13:33:11 Apr/03/04 | 380 | 266 | 15.9429 | 145.6817 | Close up of base of fallen chimney. | | | R787-100 |
| 13:34:35 Apr/03/04 | 380 | 271 | 15.9429 | 145.6818 | One of the lines of spires is due west. | | | |
| 13:34:39 Apr/03/04 | 380 | 279 | 15.9429 | 145.6818 | Line of spires striking due west. | | | R787-101 |
| 13:35:20 Apr/03/04 | 378 | 261 | 15.9429 | 145.6817 | Moving up slope. We can see evidence of diffuse venting such as microbial mats. We are looking for some active focused venting now. This is big boy. | | | |
| 13:36:28 Apr/03/04 | 376 | 263 | 15.9428 | 145.6817 | Single 2 m spire. | | | R787-102 |
| 13:36:34 Apr/03/04 | 376 | 259 | 15.9428 | 145.6817 | Spires around block. | | | R787-103 |
| 13:37:31 Apr/03/04 | 376 | 259 | 15.9429 | 145.6817 | Spires seem to have grown around this blocky boulder. | | | R787-104 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 13:38:40 Apr/03/04 | 373 | 268 | 15.9428 | 145.6817 | The tallest spire appears to be ~4m tall. Growing around boulders. There are several chimneys. Cornell wants another one. 4 or 5 locations with chimney complexes up to 3-4 m high. Eh is 80 mV. | | | |
| 13:40:12 Apr/03/04 | 371 | 266 | 15.9428 | 145.6817 | Slightly bulbous on top. Almost trying to grow beehive chimneys. | | | R787-105 |
| 13:41:09 Apr/03/04 | 369 | 199 | 15.9428 | 145.6817 | At least 2 m tall group of chimneys. | | | R787-106 |
| 13:41:27 Apr/03/04 | 369 | 231 | 15.9428 | 145.6816 | Can see lamellations on the chimneys. We are seeing very large snails (~5 cm). They appear to be clustered (25-30) right over diffuse flow. | | | |
| 13:42:07 Apr/03/04 | 369 | 218 | 15.9428 | 145.6816 | Giant snails above and below flange at diffuse venting site. | | | R787-107 |
| 13:42:43 Apr/03/04 | 369 | 206 | 15.9428 | 145.6817 | Snails with scale. | | | R787-108 |
| 13:45:45 Apr/03/04 | 365 | 262 | 15.9428 | 145.6816 | It is actually a field of chimneys that used to be very hot. | | | |
| 13:48:04 Apr/03/04 | 354 | 277 | 15.9428 | 145.6815 | Top of a five or six meter chimney (saith Cornell). | | | R787-109 |
| 13:49:33 Apr/03/04 | 349 | 234 | 15.9428 | 145.6815 | We are continuing to see many spires and evidence of hydrothermal venting either diffuse or previously focused. Microbial mats. More large snails. | | | |
| 13:50:22 Apr/03/04 | 349 | 263 | 15.9427 | 145.6814 | Diffuse venting with snails. | | | R787-110 |
| 13:51:51 Apr/03/04 | 349 | 256 | 15.9427 | 145.6815 | These chimneys were heavily active. | | | R787-111 |
| 13:53:05 Apr/03/04 | 346 | 259 | 15.9427 | 145.6814 | Chimney and juvenile twigs. | | | R787-112 |
| 13:53:07 Apr/03/04 | 346 | 260 | 15.9427 | 145.6814 | We have found some focused venting and evidence of the plume in the distance. A whole forest of chimneys and many of them are venting. | | | |
| 13:53:20 Apr/03/04 | 345 | 239 | 15.9427 | 145.6814 | What can I say? | | | R787-113 |
| 13:54:33 Apr/03/04 | 346 | 177 | 15.9428 | 145.6814 | Actively venting chimney. | | | R787-114 |
| 13:56:03 Apr/03/04 | 346 | 179 | 15.9428 | 145.6813 | Fish and chimneys. | | | R787-115 |
| 13:58:20 Apr/03/04 | 345 | 253 | 15.9427 | 145.6815 | We are going back to try and sample the top of one of these chimneys. There are also a large number of snails. | | | |
| 13:59:29 Apr/03/04 | 345 | 253 | 15.9427 | 145.6814 | Diamante Forest chimneys with small fish. | | | R787-116 |
| 14:00:03 Apr/03/04 | 344 | 231 | 15.9427 | 145.6814 | We are in front of quite a large structure with the most vigorous venting we have seen so far. | | | |
| 14:01:51 Apr/03/04 | 344 | 159 | 15.9427 | 145.6814 | Diamante Forest black smoker chimney on the side of a 3-5 meter high structure. | | | R787-117 |
| 14:03:13 Apr/03/04 | 344 | 166 | 15.9427 | 145.6814 | Collecting a triplet of chimney tops. Port biobox. At the most intense flow we have seen in the area. Chimney named Black Diamante(?). ~ 25cm wide before it went into the biobox but broke. Z=344. [E Diamante - Black Forest]. | R787-SF-0013 | SROF geo team (de Ronde) | |
| 14:05:19 Apr/03/04 | 345 | 172 | 15.9427 | 145.6814 | Black Diamante chimney. | | | R787-118 |
| 14:09:42 Apr/03/04 | 345 | 173 | 15.9427 | 145.6814 | Sample from Black Diamante chimney. | | | R787-119 |
| 14:14:21 Apr/03/04 | 348 | 226 | 15.9427 | 145.6814 | Looking at base of chimneys for snails to sample. | | | |
| 14:15:35 Apr/03/04 | 349 | 268 | 15.9427 | 145.6814 | Mat covered sulfide talus. | | | R787-120 |
| 14:15:47 Apr/03/04 | 349 | 244 | 15.9427 | 145.6814 | Bubbles! Tiny bubbles coming from a small vent. We'll call it Don Ho or the Don. | | | |
| 14:17:05 Apr/03/04 | 349 | 235 | 15.9427 | 145.6814 | Taking a closer look at a small vent with a stream of bubbles coming from a "spigot" on top. | | | |
| 14:17:12 Apr/03/04 | 349 | 243 | 15.9427 | 145.6814 | Small venting chimney at the base of a larger structure. | | | R787-121 |
| 14:19:45 Apr/03/04 | 349 | 195 | 15.9427 | 145.6814 | The small vent appears to be a black anhydrite. It has a small black cap. | | | |
| 14:19:49 Apr/03/04 | 349 | 193 | 15.9427 | 145.6814 | Small venting chimney. | | | R787-122 |
| 14:19:55 Apr/03/04 | 349 | 192 | 15.9427 | 145.6814 | Tiny chimney with a stream of bubbles escaping from the top. | | | R787-123 |
| 14:22:21 Apr/03/04 | 349 | 192 | 15.9427 | 145.6814 | Taking a closer look at the lower side of the vent. There is a white mat around it. | | | |
| 14:22:44 Apr/03/04 | 349 | 191 | 15.9427 | 145.6814 | White mat at the base of the tiny bubbling chimney (Don Ho). | | | R787-124 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
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| 14:25:21 Apr/03/04 | 349 | 186 | 15.9427 | 145.6814 | Far away view of area with tiny bubbling chimney. | | | R787-125 |
| 14:28:48 Apr/03/04 | 348 | 203 | 15.9427 | 145.6814 | The snails have spines on their shells. | | | |
| 14:29:52 Apr/03/04 | 348 | 204 | 15.9427 | 145.6814 | Snails at Don Ho chimney. | | | R787-126 |
| 14:30:46 Apr/03/04 | 348 | 203 | 15.9427 | 145.6814 | Seeing what might be mussels. | | | |
| 14:32:37 Apr/03/04 | 349 | 201 | 15.9427 | 145.6814 | Suctioned one spiny snail with the sampler and placed it in the biobox. Z=349. Near Don Ho (Bubbles). [Verena logged samples R787-0014 thru R787-0020 as one sample bio-14]. [E Diamante - Diamante Forest]. | R787-Bio-0014 | Tunnicliffe | |
| 14:35:30 Apr/03/04 | 349 | 201 | 15.9427 | 145.6814 | Another snail suctioned into the biobox. Z=349. Near Don Ho. [E Diamante - Diamante Forest]. | R787-Bio-0015 | Tunnicliffe | |
| 14:37:56 Apr/03/04 | 349 | 205 | 15.9427 | 145.6814 | Two snails in one suction! One spiny and one smooth. Z=349. Near Don Ho. [E Diamante - Diamante Forest]. | R787-Bio-0016 | Tunnicliffe | |
| 14:40:23 Apr/03/04 | 349 | 211 | 15.9427 | 145.6814 | Another smooth snail. Z=348.7. Near Don Ho. [E Diamante - Diamante Forest]. | R787-Bio-0017 | Tunnicliffe | |
| 14:42:53 Apr/03/04 | 349 | 202 | 15.9427 | 145.6814 | Two snails. Z=349. Near Don Ho. [E Diamante - Diamante Forest]. | R787-Bio-0018 | Tunnicliffe | |
| 14:45:07 Apr/03/04 | 349 | 200 | 15.9427 | 145.6814 | One more snail. Z=349. Near Don Ho. [E Diamante - Diamante Forest]. | R787-Bio-0019 | Tunnicliffe | |
| 14:45:22 Apr/03/04 | 349 | 200 | 15.9427 | 145.6814 | Sampling snails at Don Ho chimney. | | | R787-127 |
| 14:47:14 Apr/03/04 | 349 | 200 | 15.9427 | 145.6814 | Another snail. Z=349. Near Don Ho. [E Diamante - Diamante Forest]. | R787-Bio-0020 | Tunnicliffe | |
| 14:49:25 Apr/03/04 | 349 | 202 | 15.9427 | 145.6814 | Close up of snails at Don Ho chimney. | | | R787-128 |
| 15:00:08 Apr/03/04 | 348 | 192 | 15.9427 | 145.6814 | Suction sampling white organic material from around the snails into jar 3. Start=1503 Stop=1507 Z=349. Near Don Ho (Bubbles)- near the base of Diamante Chimney. [E Diamante - Diamante Forest]. | R787-J3-0021 | Juniper | |
| 15:07:43 Apr/03/04 | 348 | 192 | 15.9427 | 145.6814 | Flushing hose of sampler and then we'll continue on the exploration of the vent. | | | |
| 15:10:26 Apr/03/04 | 348 | 110 | 15.9427 | 145.6815 | Tether management first and then we'll return to explore. | | | |
| 15:20:18 Apr/03/04 | 373 | 294 | 15.9427 | 145.6818 | We are back on the bottom after doing some tether management. | | | |
| 15:22:52 Apr/03/04 | 356 | 241 | 15.9428 | 145.6815 | Intersected line of chimneys at 360 m depth and turning to W-SW to follow chimneys upslope. These chimneys are mostly inactive. | | | |
| 15:24:00 Apr/03/04 | 349 | 306 | 15.9427 | 145.6815 | Now we are at the active chimneys. This is Black Diamante chimney. | | | |
| 15:24:46 Apr/03/04 | 352 | 314 | 15.9426 | 145.6815 | We are looking at a small active chimney that is 5 m south of Black Diamante. Lots of shimmering and microbial "popcorn". | | | |
| 15:24:48 Apr/03/04 | 352 | 314 | 15.9426 | 145.6815 | Another venting chimney about 5 meters down slope from Black Diamante and facing north. | | | R787-129 |
| 15:26:56 Apr/03/04 | 351 | 322 | 15.9427 | 145.6815 | Now we are going to head upslope more (where we have not been before). We see lots of chimneys. The whole chimney field is called "Diamante Forest". Black Diamante is ahead and to the right. | | | |
| 15:28:43 Apr/03/04 | 345 | 289 | 15.9426 | 145.6814 | Moving upslope to the west over the top of very tall semi-active chimneys. This chimney spire is 9 m tall. It is very active and is pouring out grey smoke from the top. | | | |
| 15:28:55 Apr/03/04 | 344 | 289 | 15.9426 | 145.6814 | Mosaic up the structure we are calling Five Towers. | | | R787-130 |
| 15:29:08 Apr/03/04 | 342 | 298 | 15.9426 | 145.6814 | Mosaic up the structure we are calling Five Towers. | | | R787-131 |
| 15:29:33 Apr/03/04 | 341 | 304 | 15.9427 | 145.6814 | Mosaic up the structure we are calling Five Towers. | | | R787-132 |
| 15:29:38 Apr/03/04 | 341 | 302 | 15.9427 | 145.6814 | Mosaic up the structure we are calling Five Towers. | | | R787-133 |
| 15:30:08 Apr/03/04 | 340 | 348 | 15.9427 | 145.6814 | There are 5 different towers at the top. They look like beehives. This chimney is called Five Towers. This is a good fluid sampling target. It is the biggest chimney we have seen so far. | | | |
| 15:31:59 Apr/03/04 | 341 | 47 | 15.9427 | 145.6814 | Looking at the other side of Five Towers. | | | |
| 15:32:05 Apr/03/04 | 341 | 45 | 15.9427 | 145.6814 | Back side of Five Towers chimney. | | | R787-134 |
| 15:34:44 Apr/03/04 | 345 | 263 | 15.9426 | 145.6814 | Five Towers is behind us now. We are heading upslope (west) after looking north and south. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 15:35:28 Apr/03/04 | 346 | 284 | 15.9426 | 145.6813 | Seeing little anemones and soft corals on and around inactive chimneys. | | | |
| 15:35:47 Apr/03/04 | 346 | 276 | 15.9427 | 145.6813 | Soft corals on an extinct chimney. | | | R787-135 |
| 15:37:04 Apr/03/04 | 343 | 269 | 15.9426 | 145.6812 | There are lots of small extinct chimneys. Many only a meter high or less. Going to set down and sample and old chimney. | | | |
| 15:38:18 Apr/03/04 | 345 | 276 | 15.9426 | 145.6812 | Extinct chimney. | | | R787-136 |
| 15:39:10 Apr/03/04 | 345 | 273 | 15.9426 | 145.6812 | Sitting in front of a small extinct chimney covered with hydroids and small soft corals. There is a little manganese crust. The sulfide is yellow and red and black. We are going to sample a piece of this. | | | |
| 15:39:22 Apr/03/04 | 345 | 274 | 15.9426 | 145.6812 | Extinct chimney with some soft corals. | | | R787-137 |
| 15:42:07 Apr/03/04 | 345 | 279 | 15.9426 | 145.6812 | Attempting to sample piece of extinct chimney. | | | R787-138 |
| 15:42:12 Apr/03/04 | 345 | 274 | 15.9426 | 145.6812 | Sulfide sample from extinct chimney. Put into boot. 20 cm long and 10cm wide and cone shaped. Weathered knarly and probably pyrite marcasite chimney that is mostly infilled in the center. Some manganese coating. Some yellow stain. Z=274. [E Diamante - Black Forest]. | R787-SF-0022 | SROF geo team (de Ronde) | |
| 15:42:52 Apr/03/04 | 345 | 274 | 15.9426 | 145.6812 | Fresh face of sampled chimney with visible conduit. | | | R787-139 |
| 15:43:48 Apr/03/04 | 345 | 269 | 15.9426 | 145.6812 | Weathered extinct sulfide sample. | | | R787-140 |
| 15:44:59 Apr/03/04 | 345 | 270 | 15.9426 | 145.6812 | Broken face of extinct chimney sample. | | | R787-141 |
| 15:47:35 Apr/03/04 | 345 | 270 | 15.9426 | 145.6812 | We are 24 m west southwest of Black Diamante. | | | |
| 15:48:24 Apr/03/04 | 343 | 274 | 15.9426 | 145.6812 | We are going to continue upslope (west-southwest). | | | |
| 15:49:56 Apr/03/04 | 340 | 283 | 15.9426 | 145.6812 | Looks like we might be out of the line of chimneys. Oh maybe not. There are some more dead chimneys 3-4 m high. | | | |
| 15:51:00 Apr/03/04 | 341 | 284 | 15.9425 | 145.6811 | Continuing upslope. Blocky lava talus. No chimneys in sight. | | | |
| 15:54:05 Apr/03/04 | 338 | 250 | 15.9425 | 145.6810 | Going to move the ship SW 50 m so we can explore the summit of this cone. | | | |
| 15:58:53 Apr/03/04 | 339 | 291 | 15.9424 | 145.6810 | Waiting for the ship to move so we can continue upslope to the top of the cone. | | | |
| 15:59:36 Apr/03/04 | 339 | 269 | 15.9424 | 145.6810 | On this NE slope of the cone the line of dead chimneys seems to extend between 330-370 m and the active chimneys are within 340-350 m. But we haven't yet looked below 370 m along the chimney trend. The line of chimneys is very narrow and linear. | | | |
| 16:03:02 Apr/03/04 | 344 | 239 | 15.9425 | 145.6806 | According to the navigation we are near where a rock sample was taken earlier in the dive. | | | |
| 16:04:13 Apr/03/04 | 340 | 230 | 15.9425 | 145.6805 | Haven't seen any chimneys in a while. Now we see basket stars. The winds are up around 25 knots. Will have to keep an eye on them. Lava flows are almost sheet like up here. | | | |
| 16:06:06 Apr/03/04 | 341 | 263 | 15.9423 | 145.6805 | We are going to turn NE and head downhill now so we can cover some new ground. We plan to go down to 350 m depth find the chimney line again and then follow the chimney line downslope to see how far it extends. | | | |
| 16:12:25 Apr/03/04 | 346 | 45 | 15.9428 | 145.6810 | Still heading downslope. No chimneys in sight. Now going to turn a little more to the east. | | | |
| 16:15:08 Apr/03/04 | 351 | 135 | 15.9430 | 145.6812 | Now we are going to turn to SE at 350 m to intersect the line of chimneys. | | | |
| 16:16:29 Apr/03/04 | 356 | 161 | 15.9429 | 145.6814 | First chimney is sight. It is dead. | | | |
| 16:18:28 Apr/03/04 | 359 | 199 | 15.9427 | 145.6815 | Passing by Five Meter chimney target. Driving north to south across the line of chimneys. See white staining on the chimneys. Keeping at the same depth driving south to see how wide the line of venting is. All diffuse venting here at depth 355-360. | | | |
| 16:20:59 Apr/03/04 | 354 | 217 | 15.9425 | 145.6815 | We seem to be out of the chimneys. Created nav target "South Edge" to mark south edge of chimney line. | | | |
| 16:22:38 Apr/03/04 | 351 | 271 | 15.9424 | 145.6814 | Now we are going to go back to the chimney line and follow it downslope to see how far it goes to the east. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 16:24:21 Apr/03/04 | 354 | 21 | 15.9425 | 145.6814 | Coming back into the chimney field. So we will move the "South Edge" nav target to this location. Now we are turning to head downslope. | | | |
| 16:26:37 Apr/03/04 | 360 | 353 | 15.9426 | 145.6816 | Turning north to get in the middle of the chimney line. Then will follow it downslope. | | | |
| 16:27:45 Apr/03/04 | 356 | 290 | 15.9427 | 145.6815 | We are on the chimney line. Turning to look upslope. There are lots of inactive chimneys here. Depth is 358 m. Now turning to move downslope to the east-northeast. | | | |
| 16:30:18 Apr/03/04 | 367 | 82 | 15.9429 | 145.6816 | See dead chimneys downslope. These are probably ones we have seen before because there are nav targets nearby. Depth is 371 m. This is about where we started seeing them before. | | | |
| 16:33:08 Apr/03/04 | 383 | 64 | 15.9429 | 145.6818 | We are now at 380 m and there is a little diffuse venting down here. The distance between Five Meter Chimney and South Edge is 23 meters. That is width of the chimney line. | | | |
| 16:34:25 Apr/03/04 | 385 | 138 | 15.9428 | 145.6818 | There is a lot of sediment on the slope here. Still some signs of diffuse flow. No chimneys though. | | | |
| 16:36:19 Apr/03/04 | 400 | 55 | 15.9429 | 145.6820 | We are down at 400m. Looks like we are out of the chimneys and the lower limit is 370. So the chimneys are between 330-370 m. The line is narrow and linear so there must be some structural control but it is not obvious what that is. | | | |
| 16:37:59 Apr/03/04 | 401 | 304 | 15.9430 | 145.6819 | Going to set down to take a closer look at the sediment here. | | | |
| 16:41:02 Apr/03/04 | 402 | 306 | 15.9430 | 145.6819 | Sediment looks like gravel of different colors (yellow and white). | | | |
| 16:42:09 Apr/03/04 | 416 | 307 | 15.9430 | 145.6819 | Fish hiding in the sand. | | | R787-142 |
| 16:42:35 Apr/03/04 | 402 | 306 | 15.9430 | 145.6819 | Now we will go back upslope to around 345 m and then we will contour around to the southeast. | | | |
| 16:46:32 Apr/03/04 | 395 | 236 | 15.9429 | 145.6819 | Going upslope back up along the chimney line to 345 m. | | | |
| 16:49:07 Apr/03/04 | 355 | 286 | 15.9427 | 145.6816 | See signs of dead chimneys and diffuse venting now. | | | |
| 16:50:05 Apr/03/04 | 350 | 301 | 15.9427 | 145.6815 | This is the chimney where we collected the snails. | | | |
| 16:51:57 Apr/03/04 | 348 | 306 | 15.9426 | 145.6812 | More dead chimneys. Going upslope a little more. | | | |
| 16:52:45 Apr/03/04 | 345 | 225 | 15.9425 | 145.6811 | Adding target "SW edge" at the upslope extent of the chimneys. We are up at 345 m. We are now trying to stay at this depth facing upslope and lateraling around to the south. | | | |
| 16:54:46 Apr/03/04 | 345 | 184 | 15.9421 | 145.6812 | Got out of the chimneys quickly once we started heading south. | | | |
| 16:56:27 Apr/03/04 | 343 | 226 | 15.9418 | 145.6813 | Going to move the ship to the south and raising the cage a bit. Winds have come down so that is good. | | | |
| 16:58:53 Apr/03/04 | 344 | 248 | 15.9416 | 145.6813 | Repositioning ship. | | | |
| 17:01:09 Apr/03/04 | 344 | 193 | 15.9415 | 145.6813 | Continuing survey moving south at depth of 345 m looking for further chimneys. | | | |
| 17:02:01 Apr/03/04 | 345 | 148 | 15.9414 | 145.6813 | Blocky lavas as talus slope some quite large (2+ m) lightly coated with sediment. | | | |
| 17:04:24 Apr/03/04 | 345 | 262 | 15.9412 | 145.6814 | Following slope around to the south at 345 m depth on a slope of blocky angular talus with some pieces of sheet flow that have columnar jointed sides. No sign of sulfides. | | | |
| 17:08:18 Apr/03/04 | 344 | 186 | 15.9410 | 145.6814 | Further blocky talus slope with blocks up to several m in diameter. Could this be a flow that is broken up and this in-situ? Slope less steep as we go south. | | | |
| 17:12:06 Apr/03/04 | 343 | 185 | 15.9407 | 145.6815 | Large broken blocks of lava covering the slope. Still heading south. Massive lava flows. Blocks typically 1m across. | | | |
| 17:13:24 Apr/03/04 | 343 | 152 | 15.9406 | 145.6818 | At this position are due east of where we saw the basket stars on the summit. Here see 3 m by 1 m size blocks. | | | |
| 17:16:47 Apr/03/04 | 344 | 101 | 15.9407 | 145.6819 | Mostly in place flow surface but broken up. | | | R787-143 |
| 17:16:51 Apr/03/04 | 344 | 99 | 15.9407 | 145.6819 | Here the slope appears to be a broken up flow surface. | | | |
| 17:20:24 Apr/03/04 | 345 | 152 | 15.9407 | 145.6822 | Continue to see blocky lavas with some soft corals on them. Appears to be same lava that have seen from the outset of this traverse. | | | |
| 17:21:47 Apr/03/04 | 346 | 115 | 15.9406 | 145.6823 | Color test without the blue. | | | R787-144 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 17:25:37 Apr/03/04 | 347 | 218 | 15.9402 | 145.6823 | Now looking like talus as opposed to broken lava flows seen up until now. Greater range in size of blocks and smaller too. | | | |
| 17:26:07 Apr/03/04 | 345 | 202 | 15.9401 | 145.6823 | Some smaller talus chunks. | | | R787-145 |
| 17:30:12 Apr/03/04 | 347 | 253 | 15.9398 | 145.6821 | Small blocks of talus on slope. Little animals. Perhaps more sediment between the blocks? Much smaller block size here (10 cm across). Definite talus slope. | | | |
| 17:30:20 Apr/03/04 | 347 | 274 | 15.9398 | 145.6821 | Another slope of small blocks of talus. It seems to be slightly older. | | | R787-146 |
| 17:33:28 Apr/03/04 | 344 | 268 | 15.9396 | 145.6819 | Heading almost west now to the south side of the cone. Talus blocks 0.5-1.0m across. | | | |
| 17:35:47 Apr/03/04 | 345 | 259 | 15.9395 | 145.6817 | Amount of sediment appears to be increasing as we swing around to the west. End of tether so moving ship now. | | | |
| 17:35:54 Apr/03/04 | 344 | 250 | 15.9394 | 145.6817 | Amount of sediment seems to be increasing. | | | R787-147 |
| 17:40:59 Apr/03/04 | 346 | 261 | 15.9395 | 145.6817 | Moving again. Continue to see talus slope with smaller (<10 cm) cobbles on sandy slope. | | | |
| 17:42:09 Apr/03/04 | 345 | 265 | 15.9394 | 145.6816 | See finer sand in the slope here. Appears relatively recent lava flow covering NE side of the slope and south slope more degraded. | | | |
| 17:47:19 Apr/03/04 | 347 | 292 | 15.9393 | 145.6811 | Continuing to follow the slope on the south side of the cone. See talus with more sediment from sand and gravel up to blocks of lava 1 m across. | | | |
| 17:49:34 Apr/03/04 | 346 | 290 | 15.9394 | 145.6810 | Little fish among the talus. | | | R787-148 |
| 17:51:00 Apr/03/04 | 347 | 270 | 15.9394 | 145.6809 | A small rockfish. | | | R787-149 |
| 17:51:52 Apr/03/04 | 347 | 270 | 15.9394 | 145.6809 | See nice red fish in rock. | | | |
| 17:53:24 Apr/03/04 | 345 | 0 | 15.9395 | 145.6807 | Heading is NW so getting around the SW side of the cone heading up the saddle between the cone to the east we have surveyed and another west of here. | | | |
| 17:56:54 Apr/03/04 | 342 | 345 | 15.9397 | 145.6805 | Very steep cliff of massive lava flow. Marked as "Massive lava". | | | |
| 17:56:57 Apr/03/04 | 342 | 351 | 15.9397 | 145.6805 | Large massive flow. A 5m rise or so. | | | R787-150 |
| 17:58:54 Apr/03/04 | 346 | 30 | 15.9399 | 145.6803 | Continue to see massive lava flow. Approx 15 m thick. Very impressive and quite different to earlier with talus and sediment. Heading NE. | | | |
| 18:00:01 Apr/03/04 | 347 | 37 | 15.9400 | 145.6803 | Large and thick lava flow. | | | R787-151 |
| 18:01:13 Apr/03/04 | 345 | 19 | 15.9401 | 145.6803 | Northern end of the massive flow. Then back into thick sediment with few blocks. Lots of sediment here. | | | |
| 18:02:20 Apr/03/04 | 349 | 316 | 15.9401 | 145.6803 | Back into thick sediment past the lava flow. | | | R787-152 |
| 18:08:16 Apr/03/04 | 345 | 313 | 15.9404 | 145.6801 | Thick flow of lava. | | | |
| 18:08:51 Apr/03/04 | 345 | 291 | 15.9404 | 145.6800 | Another thick flow. | | | R787-153 |
| 18:09:30 Apr/03/04 | 347 | 271 | 15.9404 | 145.6800 | Water a bit turbid. See massive lava flows with sediment slope below it. | | | |
| 18:11:05 Apr/03/04 | 348 | 314 | 15.9404 | 145.6799 | Steep wall of outcropping lava. Perhaps 8 m tall. | | | |
| 18:13:44 Apr/03/04 | 346 | 344 | 15.9406 | 145.6797 | Small sponges or corals. | | | R787-154 |
| 18:16:22 Apr/03/04 | 344 | 2 | 15.9408 | 145.6796 | Massive lava outcrop. Heading NW. See lots of blocks and very jointed. | | | |
| 18:16:53 Apr/03/04 | 344 | 37 | 15.9408 | 145.6796 | Another lava outcropping. | | | R787-155 |
| 18:18:54 Apr/03/04 | 347 | 346 | 15.9409 | 145.6795 | Back into slope of mixed sediment and talus blocks. | | | |
| 18:20:49 Apr/03/04 | 345 | 39 | 15.9411 | 145.6796 | Crossing a sediment slope to another lava outcrop. Heading as been due north. | | | |
| 18:22:35 Apr/03/04 | 346 | 348 | 15.9413 | 145.6795 | Now in slope of rippled sediment. | | | |
| 18:26:40 Apr/03/04 | 347 | 308 | 15.9413 | 145.6795 | Yellow hydroid. | | | R787-156 |
| 18:29:02 Apr/03/04 | 344 | 308 | 15.9414 | 145.6795 | Talus slope with more sand here. Coming up on the strike of the chimneys on the western side of the summit. | | | |
| 18:30:47 Apr/03/04 | 348 | 283 | 15.9414 | 145.6794 | Slope looks 'old' with sediments covering boulders. | | | |

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| 18:30:53 Apr/03/04 | 348 | 281 | 15.9414 | 145.6793 | Very old slope. | | | R787-157 |
| 18:35:08 Apr/03/04 | 347 | 22 | 15.9418 | 145.6795 | Heading turning to more NW coming around to the north side of the cone. | | | |
| 18:36:40 Apr/03/04 | 346 | 50 | 15.9418 | 145.6796 | View of old naval shell? | | | R787-158 |
| 18:37:13 Apr/03/04 | 347 | 33 | 15.9418 | 145.6797 | Some debris. | | | R787-159 |
| 18:37:18 Apr/03/04 | 347 | 32 | 15.9418 | 145.6797 | Found what looks like a shell casing? 10 cm bore? | | | |
| 18:38:15 Apr/03/04 | 347 | 31 | 15.9418 | 145.6797 | Naval shell with a soft coral growing on it. | | | R787-160 |
| 18:39:43 Apr/03/04 | 347 | 32 | 15.9418 | 145.6797 | One more view of the shell. | | | R787-161 |
| 18:46:41 Apr/03/04 | 347 | 34 | 15.9419 | 145.6797 | Close up view of naval shell. | | | R787-162 |
| 18:48:38 Apr/03/04 | 346 | 56 | 15.9419 | 145.6797 | Picked up the naval shell and will attempt to bring it on board. Continuing on the survey and see old slopes with sediment covering rocks. | | | |
| 18:50:51 Apr/03/04 | 347 | 11 | 15.9421 | 145.6798 | Rock is mostly covered by sediment. Quite and old slope compared to the east side of the summit. Very old looking surface with almost a crust on the surface of the sediments. NW slope of the summit area. | | | |
| 18:51:07 Apr/03/04 | 348 | 331 | 15.9422 | 145.6798 | An old sediment covered slope. | | | R787-163 |
| 18:51:40 Apr/03/04 | 349 | 11 | 15.9422 | 145.6798 | Another grab of the very old NW slope. | | | R787-164 |
| 18:52:16 Apr/03/04 | 349 | 32 | 15.9423 | 145.6798 | No lava blocks here all gravel and sand. Pockmarked surface. | | | |
| 18:53:21 Apr/03/04 | 347 | 94 | 15.9423 | 145.6799 | Going to take suction sample of very fine sediment here in Jar #4. | | | |
| 18:56:23 Apr/03/04 | 349 | 128 | 15.9423 | 145.6799 | Area to be suction sampled for sediments. | | | R787-165 |
| 18:59:56 Apr/03/04 | 349 | 132 | 15.9423 | 145.6799 | Suction sample of sediments into jar J2 (at position 4). Z=349. Still circling the cone on the NE side of the caldera. [E Diamante]. | R787-SS-JJ2-0023 | Juniper | |
| 19:07:00 Apr/03/04 | 346 | 57 | 15.9423 | 145.6799 | Almost completed the tour around the cone at 345m. We are moving back to the venting chimneys where we plan to do a plankton tow. After that we will move to the next cone if the weather permits it. | | | |
| 19:11:03 Apr/03/04 | 342 | 59 | 15.9426 | 145.6804 | Frame grab computer test. | | | R787-166 |
| 19:12:42 Apr/03/04 | 339 | 86 | 15.9427 | 145.6806 | Frame grabber computer was reset due to graphical glitches. | | | |
| 19:21:09 Apr/03/04 | 346 | 80 | 15.9424 | 145.6810 | Soft coral. | | | R787-167 |
| 19:21:30 Apr/03/04 | 348 | 68 | 15.9424 | 145.6810 | Spotted a nice piece of coral on the way to the active hydrothermal site. | | | |
| 19:22:21 Apr/03/04 | 348 | 50 | 15.9423 | 145.6810 | Up close soft coral. | | | R787-168 |
| 19:22:37 Apr/03/04 | 348 | 42 | 15.9423 | 145.6810 | Soft corals. | | | R787-169 |
| 19:23:58 Apr/03/04 | 347 | 54 | 15.9423 | 145.6810 | Ship has moved into position so we are proceeding to the chimneys; downslope to the NE. | | | |
| 19:25:07 Apr/03/04 | 352 | 34 | 15.9425 | 145.6812 | Near the SW edge target of the chimney field. | | | |
| 19:25:47 Apr/03/04 | 351 | 34 | 15.9425 | 145.6813 | Inactive chimneys in view. | | | |
| 19:25:48 Apr/03/04 | 351 | 34 | 15.9425 | 145.6813 | Inactive sulfide chimneys. | | | R787-170 |
| 19:28:22 Apr/03/04 | 354 | 303 | 15.9428 | 145.6814 | Back at the large chimney. It is approximately 7m in height and has diffuse vent out of one side. | | | |
| 19:30:38 Apr/03/04 | 348 | 344 | 15.9427 | 145.6814 | Top of chimney where we sampled snails earlier. White side has diffuse venting all over it. | | | R787-171 |
| 19:32:25 Apr/03/04 | 340 | 3 | 15.9427 | 145.6814 | Going up off bottom directly over the smokers to do a plankton tow for 30 minutes. Videotape turned off. | | | |
| 19:35:43 Apr/03/04 | 329 | 9 | 15.9424 | 145.6817 | Stbd plankton tow directly over Diamante Forest chimney field. ROPOS drove back and forth over the vents for 30 minutes. Z=320 (35 m above the bottom - though the vents are at 345-350m). Start 1935 Stop 2012. [E Diamante - Diamante Forest]. | R787-net-0024 | Metaxas | |
| 19:40:33 Apr/03/04 | 320 | 286 | 15.9427 | 145.6818 | Stbd McLane pump sample taken during plankton sample. ROPOS drove back and forth over the vents for 30 minutes. Z=320 (35m above the bottom - though the vents are at 345-350m). Start 1935 Stop 2012. Vol=150 ml. [E Diamante - Diamante Forest]. | R787-MP-0025 | Juniper | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
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| 19:45:03 Apr/03/04 | 322 | 272 | 15.9427 | 145.6816 | Lost the WWII shell casing that was in the 7-function arm. | | | |
| 20:04:29 Apr/03/04 | 322 | 3 | 15.9426 | 145.6814 | Plankton tow being pushed south by a current. | | | |
| 20:14:13 Apr/03/04 | 362 | 298 | 15.9423 | 145.6817 | Back on bottom following plankton tow. | | | R787-172 |
| 20:17:33 Apr/03/04 | 357 | 325 | 15.9425 | 145.6815 | Moving SW to look at seafloor in transit to the middle peak. Archive videotapes are back on. | | | |
| 20:19:37 Apr/03/04 | 349 | 265 | 15.9426 | 145.6812 | Back on bottom - just N of Diamante chimney field and will transit the peak of the next cone to the SW, which is in shallower water. Tuna just went by. | | | |
| 20:21:32 Apr/03/04 | 333 | 262 | 15.9423 | 145.6806 | Looks like a small shark (?) leaving the frame to the right. 2nd one we've seen. | | | R787-173 |
| 20:21:33 Apr/03/04 | 333 | 261 | 15.9423 | 145.6806 | At top of chimney cone. | | | |
| 20:22:44 Apr/03/04 | 339 | 255 | 15.9421 | 145.6803 | Lava - blocky cobble field resting on sediment. Angelfish. | | | |
| 20:23:46 Apr/03/04 | 339 | 259 | 15.9421 | 145.6802 | Lava cobble/boulder field without sediment. | | | |
| 20:26:19 Apr/03/04 | 341 | 255 | 15.9418 | 145.6798 | Back into sediment with cobbles and boulders on the surface and sparse sessile biota. | | | |
| 20:27:16 Apr/03/04 | 341 | 256 | 15.9417 | 145.6797 | Layer of volcaniclastic(?) rock resting on sediment. More fragmental rocks mixed in with the lava talus. | | | |
| 20:28:37 Apr/03/04 | 343 | 259 | 15.9415 | 145.6795 | Sediment covered seafloor with some pebbles and sparse cobbles of lava talus. | | | |
| 20:30:05 Apr/03/04 | 348 | 287 | 15.9413 | 145.6792 | Large lava boulder or outcrop. At bottom of saddle between cones. Starting up shallowest cone within Diamante. | | | |
| 20:31:10 Apr/03/04 | 339 | 245 | 15.9411 | 145.6790 | Lower slope consists of lava outcrops and talus on sediment. Steep slope. The saddle was at about 340 m. | | | |
| 20:32:34 Apr/03/04 | 327 | 271 | 15.9409 | 145.6789 | What appears to be a tuna on the saddle between the two peaks. | | | R787-174 |
| 20:32:36 Apr/03/04 | 327 | 274 | 15.9409 | 145.6789 | Large tuna seen. Outcrops of volcaniclastic and fragmental volcanic rocks with areas of cobbles and boulders of blocky lava on sediment. | | | |
| 20:33:53 Apr/03/04 | 321 | 295 | 15.9410 | 145.6787 | Small fish amongst lava blocks. | | | R787-175 |
| 20:34:01 Apr/03/04 | 319 | 295 | 15.9410 | 145.6787 | Climbing a ridge made up of lava flows about 1m in size. | | | R787-176 |
| 20:34:25 Apr/03/04 | 315 | 296 | 15.9410 | 145.6787 | Edge of cliff off to left. Cobble lava field without much sediment. Strong current moving up and over cliff face. | | | |
| 20:37:54 Apr/03/04 | 340 | 225 | 15.9408 | 145.6786 | Dropping down slope instead of moving up the cone. Contours on map not accurate on this scale. Lost bottom. | | | |
| 20:38:28 Apr/03/04 | 348 | 329 | 15.9408 | 145.6786 | Sand waves on bottom near rock outcrop. | | | R787-177 |
| 20:38:53 Apr/03/04 | 350 | 232 | 15.9408 | 145.6786 | Back on bottom showing a rippled sediment surface. Long straight crested ripples. Huge field of ripples. Sparse pebbles on the surface and some white staining that may be animal produced. Sea anemone crawling across bottom. | | | |
| 20:39:05 Apr/03/04 | 352 | 236 | 15.9407 | 145.6786 | More sand waves. Not clear which way they're oriented. | | | R787-178 |
| 20:40:50 Apr/03/04 | 354 | 291 | 15.9405 | 145.6784 | Some sort of sea star (?) on sandy bottom of the saddle between the two cones. It appeared to be moving along the bottom. | | | R787-179 |
| 20:41:51 Apr/03/04 | 356 | 294 | 15.9406 | 145.6782 | Ripples and non-rippled sediment here and from previous entry are in the saddle. Depth of saddle about 365m. Now going back up the SW (central) cone. Sediment covered. | | | |
| 20:44:10 Apr/03/04 | 365 | 268 | 15.9405 | 145.6777 | Lava cobbles with and without sediment in places. White staining in places. Pockets and areas of gravel and sediment. White material covers some rocks. | | | |
| 20:44:25 Apr/03/04 | 364 | 265 | 15.9405 | 145.6777 | Crossing the saddle over some lava blocks. | | | R787-180 |
| 20:46:32 Apr/03/04 | 359 | 274 | 15.9404 | 145.6775 | Coming up the slope of the saddle toward the 2nd cone. Mixed sand and boulders. | | | R787-181 |
| 20:47:03 Apr/03/04 | 355 | 257 | 15.9404 | 145.6775 | Moving up slope with lava cobbles resting on sediment and some pebble fields. Cobbles are more rounded than those noted previously on this transect. | | | |
| 20:47:58 Apr/03/04 | 349 | 234 | 15.9402 | 145.6773 | Sandy saddle gives way to a blocky talus slope. Some evidence of a mat on the rocks and sediment too. | | | R787-182 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
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| 20:48:16 Apr/03/04 | 347 | 237 | 15.9402 | 145.6773 | Pale white bacterial mats on sediment and rocks. Cobble field with moderately well rounded cobbles. Mats are thick on some rocks that may have diffuse flow coming from under them. Limpet noted. No Eh anomaly. | | | |
| 20:49:39 Apr/03/04 | 344 | 252 | 15.9401 | 145.6772 | Mat covered boulder with what appear to be limpets. | | | R787-183 |
| 20:49:55 Apr/03/04 | 344 | 249 | 15.9401 | 145.6772 | Limpets (?) on mat covered rock. | | | R787-184 |
| 20:51:02 Apr/03/04 | 339 | 222 | 15.9400 | 145.6772 | Gravel slope alternating with rounded cobble slope with bacterial mats on the cobbles. | | | |
| 20:51:58 Apr/03/04 | 334 | 258 | 15.9399 | 145.6771 | Small blocks with lots of limpets. Nav target called "limpets" entered here. | | | R787-185 |
| 20:52:36 Apr/03/04 | 329 | 258 | 15.9399 | 145.6770 | Nav marker in limpet field and bacterial mats. | | | |
| 20:54:02 Apr/03/04 | 322 | 245 | 15.9398 | 145.6769 | At 320 m showing a slope covered with gravel; cobbles; mat; lots of limpets and snail. Nav marker moved to this spot. Some shimmering water. | | | |
| 20:54:22 Apr/03/04 | 320 | 267 | 15.9398 | 145.6768 | Sloping rocky bottom with lots of limpets. "Limpets" nav target moved to this location instead. | | | R787-186 |
| 20:56:22 Apr/03/04 | 317 | 266 | 15.9398 | 145.6767 | White mat at margin of many rocks indicating that much of the slope may be supporting diffuse flow venting. | | | |
| 20:58:15 Apr/03/04 | 313 | 229 | 15.9397 | 145.6766 | Pebbles and cobbles with a large variety of colors indicating a mixture of newly introduced talus mixed with rocks exposed to diffuse venting for varying periods of time. | | | |
| 20:59:34 Apr/03/04 | 306 | 240 | 15.9396 | 145.6765 | Areas of minor shimmering water. A boulder is noted. Eh is going down and more particulate matter in the water. | | | |
| 21:00:20 Apr/03/04 | 301 | 245 | 15.9396 | 145.6764 | Lots of floc in the water so we may be approaching a vent area. | | | R787-187 |
| 21:00:49 Apr/03/04 | 298 | 234 | 15.9395 | 145.6764 | We are at 298 m and the Eh (11) is still dropping. Cobbles and sediment with lots of particulate matter. | | | |
| 21:02:26 Apr/03/04 | 289 | 263 | 15.9395 | 145.6762 | Sea star with limpet-covered boulder on blocky outcrop. | | | R787-188 |
| 21:02:32 Apr/03/04 | 288 | 261 | 15.9395 | 145.6762 | Lava or volcaniclastic outcrop coated with Mn oxide; probably the thickest we have seen. Eh just hit negative numbers. This is the negative Eh site. At 280 m we are in black lava cobbles that are sub-rounded to sub-angular. All with thick Mn oxide. | | | |
| 21:03:56 Apr/03/04 | 281 | 200 | 15.9396 | 145.6761 | Manganese oxide coating on outcrop. | | | R787-189 |
| 21:06:26 Apr/03/04 | 277 | 246 | 15.9396 | 145.6759 | Pink snails and white blobs on manganese covered boulders. | | | R787-190 |
| 21:06:29 Apr/03/04 | 277 | 246 | 15.9396 | 145.6759 | Pink snails and white blobs on manganese covered boulders. | | | R787-191 |
| 21:06:35 Apr/03/04 | 277 | 249 | 15.9396 | 145.6759 | Stopping ship to collect limpets and snails. Sponge seen on rock. Samples will be sucked into bottle number 2. | | | |
| 21:07:16 Apr/03/04 | 277 | 265 | 15.9396 | 145.6759 | White blobs might be sponges. | | | R787-192 |
| 21:12:24 Apr/03/04 | 278 | 266 | 15.9396 | 145.6759 | Suction sampling snails and other organisms off boulders that are Mn-oxide coated lava blocks. Sediment pocket also looks black. | | | R787-193 |
| 21:12:42 Apr/03/04 | 278 | 266 | 15.9396 | 145.6759 | Suctioning snails into jar 2. Got 4-5 snails and 3 sponges. Snails sitting on Mn coated lava blocks. Z=278. [E Diamante - Middle Cone]. | R787-SS-J2-0026 | Juniper | |
| 21:28:16 Apr/03/04 | 275 | 247 | 15.9396 | 145.6758 | Done suction sampling. We are going to continue going upslope. | | | |
| 21:29:56 Apr/03/04 | 273 | 226 | 15.9396 | 145.6759 | We see shimmering water. Lots of snails, limpets and sponges. Eh going upward. | | | |
| 21:31:48 Apr/03/04 | 269 | 292 | 15.9395 | 145.6758 | Steep blocky cobble talus slope with lots of fish; limpets; snails; Eh is going down. | | | |
| 21:31:59 Apr/03/04 | 269 | 312 | 15.9395 | 145.6758 | Talus slope on second peak. | | | R787-194 |
| 21:33:29 Apr/03/04 | 270 | 248 | 15.9394 | 145.6758 | Eh is still going down and is now at -2 mV. Cobble and boulder field of sub-rounded blocky lava. Widespread diffuse flow characterized this cone flank. Bacterial mats also present. | | | |
| 21:34:43 Apr/03/04 | 273 | 199 | 15.9394 | 145.6758 | Density of sponges is increasing on the way up the slope. | | | R787-195 |
| 21:35:31 Apr/03/04 | 274 | 208 | 15.9393 | 145.6758 | Nav marker at second negative Eh anomaly at -11. Abundant limpets and snails on lava cobbles and boulders that are now angular. Eh now -15. Bacterial mat present. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
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| 21:36:35 Apr/03/04 | 272 | 207 | 15.9392 | 145.6758 | High sponge density on boulders in area of low he. | | | R787-196 |
| 21:38:00 Apr/03/04 | 269 | 176 | 15.9392 | 145.6758 | Higher diffuse flow rate now with Eh at -18; but going up now. Lots of particulates in the water. Lots of bacterial mat. | | | |
| 21:39:35 Apr/03/04 | 266 | 217 | 15.9390 | 145.6759 | White mats around margin of rocks and between rocks. Eh -53mV. Significant shimmering water at focused-flow vent. Abundant limpets on rocks around vent. Nav target at boulder vent. White crabs are abundant; which we will try to collect. | | | |
| 21:40:25 Apr/03/04 | 267 | 204 | 15.9390 | 145.6759 | Small area with intense venting fluids. Limpets and crabs also visible. | | | R787-197 |
| 21:41:27 Apr/03/04 | 267 | 203 | 15.9390 | 145.6759 | Wall to wall limpets on the rocks about the venting area. Crabs also visible in lower right. | | | R787-198 |
| 21:45:45 Apr/03/04 | 267 | 205 | 15.9390 | 145.6759 | Boulder vent site is potential water sampling site. Eh now -39 mV. | | | |
| 21:49:29 Apr/03/04 | 267 | 205 | 15.9390 | 145.6759 | Suction sampled 2 white crabs and several limpets into jar 8. Eh is now -88 mV. Z=267. [E Diamante - Boulder Vent]. | R787-SS-J8-0027 | Juniper | |
| 21:50:55 Apr/03/04 | 267 | 203 | 15.9390 | 145.6759 | Sampling crabs and limpets on boulders near high volume small vent. | | | R787-199 |
| 21:52:47 Apr/03/04 | 267 | 206 | 15.9390 | 145.6759 | Suctioning limpets. Shimmering water visible to right of vacuum hose. | | | R787-200 |
| 21:54:44 Apr/03/04 | 267 | 205 | 15.9390 | 145.6759 | High density of limpets on boulders. Bacterial mat comes out from under boulders when rocked by ROPOS arm. | | | R787-201 |
| 21:58:04 Apr/03/04 | 266 | 244 | 15.9390 | 145.6759 | Leaving boulder vent with outcrops of lava and perhaps volcaniclastic or fragmental volcanic rocks. Lots of particulate matter in water. | | | |
| 21:59:04 Apr/03/04 | 261 | 247 | 15.9390 | 145.6758 | Climbing boulder slope toward top of peak. | | | R787-202 |
| 22:00:15 Apr/03/04 | 255 | 244 | 15.9390 | 145.6758 | Boulder slop with lots of floc. | | | R787-203 |
| 22:00:38 Apr/03/04 | 253 | 294 | 15.9389 | 145.6758 | Strong current blowing floc up the slope toward us. | | | R787-204 |
| 22:00:43 Apr/03/04 | 253 | 303 | 15.9389 | 145.6758 | Strong current carrying particulate matter up slope. Rocks covered with limpets. More vents and staining from them. Eh now -97 mV reached. Particulate matter looks like snow. | | | |
| 22:01:06 Apr/03/04 | 253 | 272 | 15.9389 | 145.6758 | Snowstorm of floc suddenly appears. | | | R787-205 |
| 22:02:01 Apr/03/04 | 252 | 283 | 15.9389 | 145.6758 | Floc snowstorm. Not clear whether it's coming out of the bottom or being carried laterally by the background flow. | | | R787-206 |
| 22:03:47 Apr/03/04 | 252 | 282 | 15.9389 | 145.6758 | Highlights on to film ROPOS from the cage. Snowstorm on seafloor. Nav target "Flock Storm". | | | |
| 22:05:16 Apr/03/04 | 243 | 278 | 15.9388 | 145.6757 | Huge lava boulders covered completely with limpets. Huge biomass. Eh fluctuates between -40 and -80 mV. Large fish noted. Large lava outcrops. | | | |
| 22:05:36 Apr/03/04 | 240 | 277 | 15.9388 | 145.6757 | Large boulders completely covered with limpets and also with manganese crusts. | | | R787-207 |
| 22:07:40 Apr/03/04 | 227 | 250 | 15.9387 | 145.6755 | Large fish swimming upslope. Not one we've seen before. | | | R787-208 |
| 22:07:42 Apr/03/04 | 226 | 251 | 15.9387 | 145.6755 | Large fish swimming upslope. Not one we've seen before. | | | R787-209 |
| 22:08:02 Apr/03/04 | 222 | 261 | 15.9387 | 145.6755 | Large boulders and lava outcrops with bacterial mats; but no longer covered by limpets. Another angelfish. | | | |
| 22:09:08 Apr/03/04 | 215 | 276 | 15.9387 | 145.6754 | Mat covered boulders. | | | R787-210 |
| 22:09:16 Apr/03/04 | 213 | 276 | 15.9387 | 145.6754 | Mat city; rocks look like they are covered with snow. Yellow and black fish; yellow tail and along dorsal and ventral edges and the rest is black. | | | |
| 22:09:22 Apr/03/04 | 213 | 281 | 15.9387 | 145.6754 | Mat covered boulders. | | | R787-211 |
| 22:09:48 Apr/03/04 | 208 | 268 | 15.9387 | 145.6754 | School of blue and yellow fish. | | | R787-212 |
| 22:10:00 Apr/03/04 | 208 | 270 | 15.9387 | 145.6754 | School of blue and yellow fish. | | | R787-213 |
| 22:11:53 Apr/03/04 | 200 | 304 | 15.9388 | 145.6751 | Rocks still nearly 100% covered with bacterial mat. Huge area of diffuse venting. Blocky angular lava cobbles and boulders. Mat is bluish white. This whole flank of the cone supports diffuse flow. | | | |
| 22:12:22 Apr/03/04 | 199 | 215 | 15.9389 | 145.6749 | Whole bottom covered with dense mat. | | | R787-214 |
| 22:12:28 Apr/03/04 | 200 | 224 | 15.9389 | 145.6749 | Whole bottom covered with dense mat. | | | R787-215 |

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| 22:13:11 Apr/03/04 | 199 | 232 | 15.9388 | 145.6749 | Whole bottom covered with dense mat. | | | R787-216 |
| 22:14:07 Apr/03/04 | 195 | 244 | 15.9387 | 145.6748 | Angle-fish on boulder slope? | | | R787-217 |
| 22:14:29 Apr/03/04 | 194 | 263 | 15.9387 | 145.6747 | Stalked biota such as hydroids. Bacterial mats are decreasing. Large shark and many tropical colorful fish. Diffuse ambient light can be seen. School of jack fish. Blocky lava outcrops. | | | |
| 22:14:47 Apr/03/04 | 192 | 297 | 15.9388 | 145.6747 | Shark at about 200m. | | | R787-218 |
| 22:15:58 Apr/03/04 | 192 | 292 | 15.9388 | 145.6746 | Ambient light at 192m! | | | R787-219 |
| 22:16:24 Apr/03/04 | 191 | 297 | 15.9388 | 145.6746 | Tuna at 192m in ambient light. | | | R787-220 |
| 22:18:14 Apr/03/04 | 162 | 303 | 15.9389 | 145.6744 | Near or at the top of the cone. Abundant tropical fish and significant ambient light. Sill lots of bluish white bacterial mat. | | | |
| 22:19:32 Apr/03/04 | 176 | 311 | 15.9389 | 145.6744 | School of small fish on summit. | | | R787-221 |
| 22:19:36 Apr/03/04 | 177 | 313 | 15.9389 | 145.6744 | School of small fish on summit. | | | R787-222 |
| 22:20:52 Apr/03/04 | 174 | 263 | 15.9389 | 145.6744 | Highlights off. Lots of particulates in the water. Rocks covered with mats. Turning to SW. Shimmering water with abundant soft corals and green algae. This may be deepest green algae found. Video back on. Horn coral. | | | |
| 22:22:04 Apr/03/04 | 178 | 315 | 15.9387 | 145.6743 | Green algae at 180m! | | | R787-223 |
| 22:22:17 Apr/03/04 | 180 | 314 | 15.9387 | 145.6743 | Green algae at 180m! | | | R787-224 |
| 22:22:58 Apr/03/04 | 179 | 296 | 15.9387 | 145.6743 | Urchins and soft corals near summit. | | | R787-225 |
| 22:23:08 Apr/03/04 | 179 | 296 | 15.9387 | 145.6743 | Urchins and soft corals near summit. | | | R787-226 |
| 22:24:11 Apr/03/04 | 180 | 292 | 15.9387 | 145.6743 | Schools of juvenile fish near summit. | | | R787-227 |
| 22:24:15 Apr/03/04 | 180 | 290 | 15.9387 | 145.6743 | Side view of soft corals. | | | R787-228 |
| 22:25:08 Apr/03/04 | 180 | 279 | 15.9387 | 145.6743 | Sea urchin and abundant life completely covering rock including different algae; soft corals; many tropical fish; colors of green; purple; yellow; orange; white; brown; yellow-green. Red algae common. | | | |
| 22:25:27 Apr/03/04 | 180 | 279 | 15.9387 | 145.6743 | Another shot of the urchin. | | | R787-229 |
| 22:26:54 Apr/03/04 | 180 | 246 | 15.9387 | 145.6743 | Both red algae and green algae at 180m. | | | R787-230 |
| 22:27:22 Apr/03/04 | 179 | 240 | 15.9387 | 145.6743 | Octocorals as well as algae. | | | R787-231 |
| 22:27:23 Apr/03/04 | 179 | 240 | 15.9387 | 145.6743 | Octocorals; cirpulid polychaetes. This is nav target "Aquarium Site". Spiny sea urchins in several places. Small solitary corals. Orange squirrel fish or soldier fish family. Eh is 88 mV and ambient T=11C. | | | |
| 22:29:56 Apr/03/04 | 179 | 245 | 15.9387 | 145.6743 | Profile view of octocorals on summit. | | | R787-232 |
| 22:30:47 Apr/03/04 | 179 | 245 | 15.9387 | 145.6743 | Spiny urchin and octocorals. | | | R787-233 |
| 22:31:14 Apr/03/04 | 179 | 245 | 15.9387 | 145.6743 | Coralline algae and solitary cup corals. | | | R787-234 |
| 22:32:39 Apr/03/04 | 179 | 245 | 15.9387 | 145.6743 | Butterfly fish near summit. | | | R787-235 |
| 22:33:57 Apr/03/04 | 179 | 246 | 15.9387 | 145.6743 | School of small fish in the distance at about 179m. | | | R787-236 |
| 22:34:00 Apr/03/04 | 179 | 246 | 15.9387 | 145.6743 | School of small fish in the distance at about 179m. | | | R787-237 |
| 22:34:28 Apr/03/04 | 179 | 246 | 15.9387 | 145.6743 | We are looking for a rock to collect that has algae on it. Abundant red algae. Salmon colored fish with yellow fins and tail. Sparse sponges. | | | |
| 22:35:18 Apr/03/04 | 180 | 288 | 15.9387 | 145.6743 | Squirrelfish (?) at 179m. | | | R787-238 |
| 22:36:40 Apr/03/04 | 179 | 285 | 15.9387 | 145.6742 | Preparing to collect a rock at 179m. | | | R787-239 |
| 22:37:17 Apr/03/04 | 179 | 285 | 15.9387 | 145.6742 | Rock with biota including green and red algae. The fact that the algae are this deep is quite a surprise. Starboard biobox. Rock about 15-20cm. Z=179.2. [E Diamante - Aquarium]. | R787-Bio/Geo-0028 | Tunnicliffe | |

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| 22:37:24 Apr/03/04 | 179 | 285 | 15.9387 | 145.6742 | Rock being placed in biobox. | | | R787-240 |
| 22:39:57 Apr/03/04 | 179 | 281 | 15.9387 | 145.6742 | Moving up the summit with large gorgonian corals; fan corals; soft corals. Stalked barnacles. Brittle stars filter feeding in the gorgonians. Tropical fish are abundant. | | | |
| 22:40:16 Apr/03/04 | 178 | 292 | 15.9387 | 145.6742 | Soft corals and fish at 175m. | | | R787-241 |
| 22:40:43 Apr/03/04 | 176 | 282 | 15.9387 | 145.6742 | Gorgonian coral near summit at 175m. | | | R787-242 |
| 22:41:42 Apr/03/04 | 176 | 251 | 15.9387 | 145.6742 | Skeleton of gorgonian coral with brittle stars and small fish in background. | | | R787-243 |
| 22:42:07 Apr/03/04 | 176 | 246 | 15.9387 | 145.6742 | Brittle stars and stalked barnacles on coral skeleton. | | | R787-244 |
| 22:42:16 Apr/03/04 | 176 | 244 | 15.9387 | 145.6742 | Brittle stars and stalked barnacles on coral skeleton. | | | R787-245 |
| 22:43:25 Apr/03/04 | 174 | 285 | 15.9387 | 145.6742 | Numerous small fish amongst soft corals. | | | R787-246 |
| 22:43:27 Apr/03/04 | 174 | 282 | 15.9387 | 145.6742 | Numerous small fish amongst soft corals. | | | R787-247 |
| 22:43:30 Apr/03/04 | 174 | 281 | 15.9387 | 145.6742 | Numerous small fish amongst sof t corals. | | | R787-248 |
| 22:45:03 Apr/03/04 | 174 | 299 | 15.9387 | 145.6742 | Coral skeleton near summit. | | | R787-249 |
| 22:45:51 Apr/03/04 | 169 | 332 | 15.9387 | 145.6742 | Top of the summit. | | | R787-250 |
| 22:46:09 Apr/03/04 | 168 | 303 | 15.9387 | 145.6742 | Top of the summit with lots of small fish and red algae. | | | R787-251 |
| 22:46:40 Apr/03/04 | 168 | 322 | 15.9387 | 145.6742 | Top of the summit. | | | R787-252 |
| 22:46:43 Apr/03/04 | 168 | 324 | 15.9387 | 145.6742 | Top of the summit. | | | R787-253 |
| 22:47:05 Apr/03/04 | 169 | 332 | 15.9387 | 145.6742 | Likely black coral present. Rocks are encrusted with red and green algae; filamentous algae and encrusting sponges; few stony corals and basket stars. At top of cone at 169 m. | | | |
| 22:48:25 Apr/03/04 | 169 | 331 | 15.9387 | 145.6742 | Basket star on summit. | | | R787-254 |
| 22:48:46 Apr/03/04 | 169 | 330 | 15.9387 | 145.6742 | Detail of basket star. | | | R787-255 |
| 22:49:25 Apr/03/04 | 169 | 329 | 15.9387 | 145.6742 | Detail of basket star. | | | R787-256 |
| 22:53:25 Apr/03/04 | 167 | 180 | 15.9388 | 145.6742 | Wide scale pic showing lots of soft corals and small fish. | | | R787-257 |
| 22:54:08 Apr/03/04 | 167 | 201 | 15.9388 | 145.6742 | Thousands of small fish in the water above the summit. | | | R787-258 |
| 22:54:14 Apr/03/04 | 167 | 202 | 15.9388 | 145.6742 | Thousands of small fish in the water above the summit. | | | R787-259 |
| 22:55:59 Apr/03/04 | 180 | 210 | 15.9384 | 145.6741 | Moving deeper: Rock outcrops completely covered with biota. Soft corals; gorgonians; abundant schools of tropical fish; abundant algae. | | | |
| 22:57:43 Apr/03/04 | 174 | 227 | 15.9384 | 145.6740 | Schools of small fish near summit. | | | R787-260 |
| 22:57:50 Apr/03/04 | 173 | 226 | 15.9384 | 145.6740 | Schools of small fish near summit. | | | R787-261 |
| 23:00:08 Apr/03/04 | 173 | 214 | 15.9384 | 145.6740 | Turned on highlight videos. Abundant life. Discussion about whether diffuse flow is occurring here. I don't think so. Abundant life support by strong upwelling along the flanks of this cone and ambient light. | | | |
| 23:03:29 Apr/03/04 | 169 | 285 | 15.9384 | 145.6739 | Abundant schools of fish. May be very mild shimmering water(?). Eh is at 109. All the outcrop peaks covered with the same abundant biota. School of tuna. | | | |
| 23:03:43 Apr/03/04 | 169 | 264 | 15.9384 | 145.6739 | Schools of small fish near summit. | | | R787-262 |
| 23:03:46 Apr/03/04 | 169 | 257 | 15.9384 | 145.6739 | Schools of small fish near summit. | | | R787-263 |
| 23:04:24 Apr/03/04 | 170 | 250 | 15.9384 | 145.6739 | Fan corals and soft corals on outcrop near summit. | | | R787-264 |
| 23:04:59 Apr/03/04 | 170 | 256 | 15.9384 | 145.6739 | Blue tang over corals. | | | R787-265 |
| 23:05:40 Apr/03/04 | 170 | 253 | 15.9384 | 145.6739 | Schools of small fish near summit. | | | R787-266 |
| 23:06:20 Apr/03/04 | 170 | 254 | 15.9384 | 145.6739 | Schools of small fish near summit. | | | R787-267 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 23:07:40 Apr/03/04 | 170 | 251 | 15.9384 | 145.6739 | School of tiny fish that shimmer when they all turn together and the light reflects off them. Jack fish. We will try now to catch some fish and put them into bottle 1. | | | |
| 23:13:39 Apr/03/04 | 170 | 265 | 15.9384 | 145.6739 | Medium sized orange fish. | | | R787-268 |
| 23:13:41 Apr/03/04 | 170 | 264 | 15.9384 | 145.6739 | Medium sized orange fish. | | | R787-269 |
| 23:21:12 Apr/03/04 | 170 | 266 | 15.9384 | 145.6739 | Suction sample attempt at a basket star. Seems we only got the legs and surrounding particulates. (central summit cone). Z=170. [E Diamante - Aquarium]. | R787-SS-J1-0029 | Juniper | |
| 23:24:05 Apr/03/04 | 170 | 292 | 15.9384 | 145.6739 | Fan coral near summit amongst soft corals. | | | R787-270 |
| 23:25:45 Apr/03/04 | 170 | 274 | 15.9384 | 145.6739 | Wrestling with a basket star. | | | R787-271 |
| 23:26:12 Apr/03/04 | 170 | 279 | 15.9384 | 145.6739 | Wrestling with a basket star. | | | R787-272 |
| 23:27:36 Apr/03/04 | 170 | 225 | 15.9384 | 145.6739 | More small fish against a background of soft corals. | | | R787-273 |
| 23:30:17 Apr/03/04 | 170 | 225 | 15.9384 | 145.6739 | Small topographic high crowned with soft corals and surrounded by small fish. | | | R787-274 |
| 23:31:33 Apr/03/04 | 170 | 229 | 15.9384 | 145.6739 | Moving ship half way between Mat City and Aquarium sites and will follow transition from hydrothermal mat environment to coral environment at the summit. | | | |
| 23:34:10 Apr/03/04 | 181 | 34 | 15.9386 | 145.6742 | Rock outcrops with soft corals that are not as densely distributed as at the summit. | | | |
| 23:34:19 Apr/03/04 | 180 | 29 | 15.9386 | 145.6742 | Vertical face with soft corals and fish. | | | R787-275 |
| 23:35:47 Apr/03/04 | 182 | 240 | 15.9388 | 145.6744 | We passed through Aquarium and heading NE; the way from which we came earlier--back tracking. | | | |
| 23:37:17 Apr/03/04 | 191 | 277 | 15.9388 | 145.6747 | We are 190m and now into the bluish white mat area named "Mat City". Rock completely covered by mat at 200m. Nothing but mat on the rocks. | | | |
| 23:39:45 Apr/03/04 | 206 | 277 | 15.9388 | 145.6749 | Detail of boulder covered mat. | | | R787-276 |
| 23:40:42 Apr/03/04 | 205 | 288 | 15.9388 | 145.6749 | Wide view of mat covered boulders. | | | R787-277 |
| 23:41:06 Apr/03/04 | 206 | 281 | 15.9388 | 145.6749 | Some bare rock on some cobbles but most still covered with bacterial mat. Eh is now -25 mV. | | | |
| 23:41:55 Apr/03/04 | 206 | 290 | 15.9388 | 145.6749 | Collecting rock with bacterial mat on top of it. | | | R787-278 |
| 23:41:59 Apr/03/04 | 206 | 296 | 15.9388 | 145.6749 | Sampling a rock covered with a bluish-white bacterial mat. Large sample in left-central starboard biobox. Central cone area just E of summit. Z=206. [E Diamante]. | R787-Bio/Geo-0030 | Juniper | |
| 23:44:08 Apr/03/04 | 206 | 295 | 15.9388 | 145.6749 | Rock going into starboard biobox. | | | R787-279 |
| 23:45:27 Apr/03/04 | 206 | 296 | 15.9388 | 145.6749 | Going back up slope to look at the transition in biocommunities. Eh steady at -21. | | | |
| 23:46:20 Apr/03/04 | 204 | 252 | 15.9388 | 145.6749 | More mat covered boulders. | | | R787-280 |
| 23:46:38 Apr/03/04 | 204 | 252 | 15.9388 | 145.6749 | Few spots of pink algae overgrown by mats at 205 m. | | | |
| 23:47:41 Apr/03/04 | 200 | 254 | 15.9388 | 145.6749 | Some evidence of red coralline algae growing underneath the mats visible at about 3 o'clock. | | | R787-281 |
| 23:48:23 Apr/03/04 | 199 | 282 | 15.9387 | 145.6748 | Density of bacteria less with some green algae. At 197.5 m real transition to algae with Eh of 18. About equal amounts of algae and bacteria. | | | |
| 23:48:52 Apr/03/04 | 197 | 281 | 15.9388 | 145.6748 | Some evidence of red coralline algae growing underneath the mats. | | | R787-282 |
| 23:49:14 Apr/03/04 | 196 | 278 | 15.9388 | 145.6748 | Some evidence of red coralline algae growing underneath the mats. | | | R787-283 |
| 23:51:36 Apr/03/04 | 195 | 290 | 15.9387 | 145.6747 | Mat and coralline algae covered rocks. | | | R787-284 |
| 23:52:11 Apr/03/04 | 194 | 264 | 15.9387 | 145.6747 | Steady increase in red algae but still much mat. First appearance of gorgonian coral covered with mat. Shimmering water through boulder field. Eh is 58 mV. | | | |
| 23:52:45 Apr/03/04 | 192 | 261 | 15.9387 | 145.6747 | Mix of gorgonian corals; mat and coralline algae on a near vertical wall. | | | R787-285 |
| 23:54:03 Apr/03/04 | 192 | 260 | 15.9386 | 145.6746 | Seeing first occurrence of soft corals with abundant red algae and moderate amounts of bluish white bacterial mats. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R787 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 23:55:18 Apr/03/04 | 194 | 272 | 15.9386 | 145.6746 | Unknown blob organism on rock outcrop. | | | R787-286 |
| 23:55:23 Apr/03/04 | 194 | 271 | 15.9386 | 145.6746 | Unknown blob organism on rock outcrop. | | | R787-287 |
| 23:56:33 Apr/03/04 | 192 | 278 | 15.9386 | 145.6745 | Lots of small soft corals now and red algae whereas bacteria mats are decreasing in abundance. Eh is 78 mV. | | | |
| 23:58:04 Apr/03/04 | 191 | 330 | 15.9386 | 145.6745 | Talus cobble slope with mostly red algae and green algae is now coming in. Little mat now and fewer soft corals than previously. | | | |
| 23:59:20 Apr/03/04 | 188 | 313 | 15.9387 | 145.6745 | Talus slope with algae covered boulders. | | | R787-288 |
| 23:59:31 Apr/03/04 | 188 | 307 | 15.9387 | 145.6745 | Cone shell noted. Mat is nearly gone. | | | |
| 23:59:38 Apr/03/04 | 188 | 309 | 15.9387 | 145.6745 | Cone shell amongst rocks on talus slope with algae covered boulders. | | | R787-289 |
| 00:01:12 Apr/04/04 | 184 | 267 | 15.9387 | 145.6745 | Turing off highlights video and coming up. | | | |
| 00:02:39 Apr/04/04 | 160 | 46 | 15.9388 | 145.6747 | Recording water column on ascent using Verena's video. | | | |
| 00:28:48 Apr/04/04 | 112 | 302 | 15.9387 | 145.6777 | ROPOS in the cage and coming up. | | | |
| 00:34:04 Apr/04/04 | 1 | 274 | 15.9386 | 145.6776 | ROPOS on deck. End of an incredible dive. | | | |
| 02:51:30 Apr/04/04 | 1 | 276 | 15.9387 | 145.6766 | Stbd plankton tow directly over Diamante Forest chimney field. ROPOS drove back and forth over the vents for 30 minutes. Z=320 (35 m above the bottom - though the vents are at 345-350m). Start 1935 Stop 2012. [sample # out of order]. [E Diamante - Black Forest]. | R787-net-S-00031 | Metaxas | |

## 8.7 R788 Dive Log: E Diamante

| **R788: East Diamante** |
|---|
| wet time (UTC): 4/4 1201 - 4/5 0424. JD 95-96. 16.38 hrs. |
| bottom time (UTC): 4/4 1237 - 4/5 0351. 15.23 hrs. [31 samples] |
| **R788 DSC information:** There were 380 original DSCs taken and 344 final ones were kept starting with R788_DSC_040404_130056_00420.jpg and ending with R788_DSC_040504_020857_00796.jpg |
| HFS and biology sampling dive at high temperature vents on East Diamante. Dive began at Barnacle Beach and ended at Aquarium. Samples: **Barnacle Beach**: 6 HFS, 1 biology (crab trap), 1suction (sponges and snails). **5 Towers**: 2 suctions (bacterial mat), 4 HFS, 2 gas tights, 2 sulfides. **Diamante Chimney**: 4 HFS, 2 gas tights. **Black Forest**: 2 plankton net samples. **Fe-Mn Crust**: 1 suction (snails and bacterial mat). **Intense Diffuse**: 1 suction (sponges and snails). **Central Cone**: 3 suctions (1 bio 2 mat), 1 bio/geo (dacite and limpets). |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 12:01:36 Apr/04/04 | 1 | 263 | 15.9387 | 145.6766 | ROPOS is in the water. | | | |
| 12:37:16 Apr/04/04 | 451 | 286 | 15.9433 | 145.6830 | Bottom is in sight. | | | |
| 12:38:16 Apr/04/04 | 459 | 323 | 15.9434 | 145.6830 | We are at an area near Barnacle Beach. | | | |
| 12:38:49 Apr/04/04 | 461 | 342 | 15.9434 | 145.6830 | Crabs and barnacles near Barnacle Beach. | | | R788-001 |
| 12:38:58 Apr/04/04 | 461 | 340 | 15.9434 | 145.6830 | Crabs and barnacles in the vicinity of Barnacle Beach. | | | R788-002 |
| 12:41:15 Apr/04/04 | 461 | 339 | 15.9434 | 145.6830 | We are going to take temperature measurements to see whether we will sample. | | | |
| 12:43:05 Apr/04/04 | 461 | 345 | 15.9434 | 145.6830 | We are placing the crab/shrimp trap in the sedimented area at Charlie vent. | | | |
| 12:46:27 Apr/04/04 | 461 | 344 | 15.9434 | 145.6830 | Crabs coming to inspect the shrimp trap (Blue). | | | R788-003 |
| 12:47:31 Apr/04/04 | 461 | 339 | 15.9434 | 145.6830 | There is small mushroom-shaped structure on the sediment and we will place the temperature sensor over it. | | | |
| 12:50:00 Apr/04/04 | 463 | 228 | 15.9434 | 145.6830 | There are oil droplets coming out of the 7-function arm. | | | |
| 12:51:42 Apr/04/04 | 462 | 208 | 15.9434 | 145.6830 | We couldn't reach that mushroom structure so we are giving up. | | | |
| 12:52:05 Apr/04/04 | 459 | 183 | 15.9434 | 145.6830 | We are doing gauges. | | | |
| 12:53:55 Apr/04/04 | 460 | 224 | 15.9434 | 145.6830 | Moving 30 m to the southwest to find Barnacle Beach. | | | |
| 12:54:46 Apr/04/04 | 457 | 248 | 15.9433 | 145.6829 | We are seeing a sedimented area with scattered rocks and some staining. Some evidence of bioturbation. | | | |
| 12:56:56 Apr/04/04 | 451 | 139 | 15.9433 | 145.6827 | We are seeing a relatively steep slope. And we are there. | | | |
| 12:57:10 Apr/04/04 | 453 | 133 | 15.9433 | 145.6828 | Cloudy venting from Barnacle Beach. | | | R788-004 |
| 12:59:41 Apr/04/04 | 456 | 232 | 15.9433 | 145.6828 | Barnacles and Crab at the Beach. | | | R788-005 |
| 13:00:21 Apr/04/04 | 456 | 232 | 15.9433 | 145.6828 | Measuring temperature in fluid coming from in between the rocks. Ambient is 8.5 degrees and in fluid it is ~11 degrees. | | | |
| 13:02:40 Apr/04/04 | 456 | 230 | 15.9433 | 145.6828 | Temperature probe recording around 10.8 degrees. | | | R788-006 |
| 13:06:16 Apr/04/04 | 455 | 240 | 15.9433 | 145.6828 | We are moving the ship 50 m away. | | | |
| 13:07:25 Apr/04/04 | 448 | 206 | 15.9433 | 145.6828 | Temperature was only 2.5 degrees above ambient. | | | |
| 13:09:35 Apr/04/04 | 456 | 285 | 15.9433 | 145.6828 | Taking some digital photos of Barnacle Beach. | | | |
| 13:09:45 Apr/04/04 | 456 | 283 | 15.9433 | 145.6828 | More barnacles on rocks. | | | R788-007 |
| 13:12:48 Apr/04/04 | 457 | 282 | 15.9433 | 145.6828 | Preparing to take HFS samples. | | | |
| 13:16:37 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | Repositioning to make sure we are in a good spot. The warmest temperature we have measured so far ~13.4 degrees. | | | |
| 13:18:14 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | HFS Filter-1. Start=13:18. Stop=13:22. Tmax=13.7. Tavg=13.6 (sd=0.08). T2=12.1 Vol=528mL. Z=457. [E Diamante - Barnacle Beach]. | R788-HFS-1-0001 | Butterfield | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 13:19:20 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | Location of sample #1 filter-1. While sampling temperature remains steady at 13.7. | | | R788-008 |
| 13:22:04 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | Stable temperature of 13.7. | | | R788-009 |
| 13:23:26 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | HFS FISH Filter-2. Start=13:23. Stop=13:25. Tmax=13.8. Tavg=13.8 (sd=0.05). T2=12.1 Vol=300ml. Z=457 m. [E Diamante - Barnacle Beach]. | R788-HFS-2-0002 | Butterfield | |
| 13:25:31 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | Less populated rocks at greater distance from vent. | | | R788-010 |
| 13:26:25 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | HFS Piston-4. Start=13.26. Stop=13:32. Tmax=13.8. Tavg=13.8 (sd=0.00). T2= 12.2. Vol= 704 ml. Z=457 m. [E Diamante - Barnacle Beach]. | R788-HFS-4-0003 | Butterfield | |
| 13:28:07 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | Exhaust is clear while taking HFS Piston-4. Piston seems to be moving. | | | |
| 13:32:06 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | Highlights have f ootage of this scene. | | | R788-011 |
| 13:33:20 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | HFS Sterivex Filter-3. Start=13:33 Stop=13:45. Tmax=13.7 Tavg=13.6 (sd=0.1). T2=12.0. Vol=1604mL. Z=457 m. [E Diamante - Barnacle Beach]. | R788-HFS-3-0004 | Butterfield | |
| 13:34:36 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | The forefront barnacles are waving while the barnacles in the far field are basically still. | | | R788-012 |
| 13:37:14 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | We are also observing barnacle particle capturing behavior and taping it. | | | |
| 13:47:17 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | HFS Filtered Bag-11. Start=13:47 Stop=13:52. Tmax=13.7 Tavg=13.7 (sd=0.05) T2=12.0 Vol=693mL. Z=457 m. [E Diamante - Barnacle Beach]. | R788-HFS-11-0005 | Butterfield | |
| 13:48:35 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | Doing gauges. | | | |
| 13:49:46 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | Unfiltered sample taking. | | | R788-013 |
| 13:52:55 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | HFS RNA Filter-10. Start=13:56. Stop=14:09. Tmax=13.6. Tavg=12.6 (sd=0.6). T2=11.5. Vol=174ml. Z=457m. [E Diamante - Barnacle Beach]. | R788-HFS-10-0006 | Butterfield | |
| 13:54:44 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | The valve is lost. We are waiting for it to find where it is. | | | |
| 13:55:36 Apr/04/04 | 457 | 244 | 15.9433 | 145.6828 | Barnacles on a mound. Less populated rock in background. | | | R788-014 |
| 13:56:46 Apr/04/04 | 457 | 245 | 15.9433 | 145.6828 | RNA filter-10. | | | R788-015 |
| 14:10:27 Apr/04/04 | 455 | 243 | 15.9433 | 145.6828 | Heading for Diamante chimney site. First getting to the cage and then moving the ship. | | | |
| 14:17:36 Apr/04/04 | 396 | 197 | 15.9437 | 145.6831 | We are moving the ship. | | | |
| 14:24:21 Apr/04/04 | 410 | 245 | 15.9432 | 145.6822 | Transiting and on bottom moving to Diamante high temperature chimney site to sample fluids. | | | |
| 14:31:49 Apr/04/04 | 368 | 253 | 15.9428 | 145.6817 | Approaching the Black Forest vent field and see dead chimneys at 365 m. | | | |
| 14:33:30 Apr/04/04 | 360 | 269 | 15.9428 | 145.6816 | Took DSC photos (9) of cluster of dead chimneys at 360 m. Tallest chimney ~9 m tall. Several in this stand. | | | |
| 14:38:08 Apr/04/04 | 352 | 22 | 15.9427 | 145.6814 | Bubbles are coming from this vent. | | | R788-016 |
| 14:39:04 Apr/04/04 | 348 | 351 | 15.9426 | 145.6814 | White colored vent site with intermittent bubbles. No obviously focused venting. Looks more diffuse. | | | |
| 14:43:11 Apr/04/04 | 350 | 239 | 15.9427 | 145.6814 | At Don Ho (at the base of Diamante chimney). Seeing phase separation in progress. See a stream of bubbles coming out of one small orifice and liquid coming out of the adjacent one. Great example of boiling. | | | |
| 14:44:49 Apr/04/04 | 350 | 238 | 15.9427 | 145.6814 | The Don. Our sampling site? | | | R788-017 |
| 14:49:32 Apr/04/04 | 349 | 328 | 15.9427 | 145.6814 | Took a series of (3) DSC photos of Don Ho vent showing bubbles coming out with liquid. | | | |
| 14:50:26 Apr/04/04 | 349 | 329 | 15.9427 | 145.6814 | Going to attempt to sample bubbles coming out of Don Ho chimney (at the base of Diamante) with funnel apparatus. | | | |
| 14:56:25 Apr/04/04 | 349 | 326 | 15.9427 | 145.6814 | Attempting to place the sampler over Don Ho. | | | R788-018 |
| 15:00:46 Apr/04/04 | 349 | 324 | 15.9427 | 145.6814 | Took time to set up at Don Ho chimney, which is very small - located at the base of Diamante chimney. Will try and sample vent fluids here. | | | |
| 15:05:10 Apr/04/04 | 349 | 323 | 15.9427 | 145.6814 | Note that it is bubbling all over the place at this general locality. Knocked off top of Don Ho chimney. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 15:06:02 Apr/04/04 | 349 | 326 | 15.9427 | 145.6814 | Don Ho's death.... | | | R788-019 |
| 15:14:40 Apr/04/04 | 349 | 323 | 15.9427 | 145.6814 | Reached 102 C but when pump turned on temperature goes down so decided not to sample here. Thus seal not so good between sampling device and top of chimney. Tried to break off more to get a better flow. | | | |
| 15:23:30 Apr/04/04 | 342 | 60 | 15.9427 | 145.6813 | Took a series of DSC photos (14) of the 5 Towers chimney site where see several tall spires about 9 m high. Each has a beehive type chimney on top of it with lots of black smoke coming out of the top. | | | |
| 15:26:31 Apr/04/04 | 341 | 56 | 15.9427 | 145.6814 | Plume from Five Towers. | | | R788-020 |
| 15:31:45 Apr/04/04 | 342 | 74 | 15.9427 | 145.6814 | Attempting to sample black smoker vent at one of the 5 Towers near the top. Hard to sample as ROPOS pushed hard up against chimney some 7 m above seafloor. Hard to get sampling probe in orifice. | | | |
| 15:36:50 Apr/04/04 | 342 | 68 | 15.9427 | 145.6814 | Sampling at the Five Towers site. One tower was knocked off to allow for a greater sampling rate. | | Butterfield | R788-021 |
| 15:36:53 Apr/04/04 | 342 | 67 | 15.9427 | 145.6814 | Seeing temperatures of up to 210 C. | | | |
| 15:39:51 Apr/04/04 | 342 | 68 | 15.9427 | 145.6814 | HFS Unfiltered bag-8. Start=15:40 Stop=15:43. Tmax=223.5 Tavg=220.6. T2=110 Vol=481ml. z=341.7. Sampling probe moved out of vent orifice as sub moved away so sampling stopped then. Pump stopped as soon as temperature dropped. [E Diamante - 5 Towers]. | R788-HFS-8-0007 | Butterfield | |
| 15:42:07 Apr/04/04 | 342 | 72 | 15.9427 | 145.6814 | Gastight bottle #1 (HIL #9) fired at 15:42. T=223 Z=341.7. At the black smoker - 5 Towers - Black Forest Vent Field. [E Diamante - 5 Towers]. | R788-GTB-1-0008 | Lupton | |
| 15:44:29 Apr/04/04 | 342 | 7 | 15.9426 | 145.6814 | We fell out of Five Towers chimney site. The broken tower was on the left side. | | | R788-022 |
| 15:50:36 Apr/04/04 | 341 | 54 | 15.9427 | 145.6814 | Repositioned sub to resample. | | | |
| 15:51:39 Apr/04/04 | 341 | 51 | 15.9427 | 145.6814 | HFS Filtered bag-14. Start=15.51 Stop=15:56. Tmax=223.5 Tavg=222 T2=107. Vol=663ml. Z=341m. [E Diamante - 5 Towers]. | R788-HFS-14-0009 | Butterfield | |
| 15:52:21 Apr/04/04 | 341 | 49 | 15.9427 | 145.6813 | Gastight bottle #2 (HIL #12) fired at 15:52. T=222C Z=342m. [E Diamante - 5 Towers]. | R788-GTB-2-0010 | Lupton | |
| 15:58:23 Apr/04/04 | 341 | 48 | 15.9427 | 145.6814 | HFS Filtered Bag-18. Start= 5:58 Stop=15:59. Start2=16:07 Stop2=16:10. Tmax=220 Tavg=215 T2=101 Vol= 505ml. Z=341.7m. Came off chimney and stopped sampling. Repositioned and started sampling again. [E Diamante - 5 Towers]. | R788-HFS-18-0011 | Butterfield | |
| 16:05:39 Apr/04/04 | 342 | 51 | 15.9427 | 145.6814 | Repositioned sub to further sample at same position to continue sample HFS-18. | | | |
| 16:12:34 Apr/04/04 | 342 | 43 | 15.9427 | 145.6814 | HFS Piston-22. Start=16:13 Stop=16:16 Tmax=201.8 Tavg=196.8(+/- 2.4) T2=98 Vol=557ml. Z=341.7m. [E Diamante - 5 Towers]. | R788-HFS-22-0012 | Butterfield | |
| 16:14:43 Apr/04/04 | 342 | 43 | 15.9427 | 145.6814 | Continuing sampling at 5 Towers for further vent fluids. | | | |
| 16:19:44 Apr/04/04 | 341 | 46 | 15.9427 | 145.6813 | Taking digital pictures (3) of bacteria mats on top of chimney at 5 Towers. | | | |
| 16:21:36 Apr/04/04 | 344 | 26 | 15.9427 | 145.6813 | Taking several DSC photos of bacterial mats in 5 Towers area. Going to reposition sub to take suction sample at this locality. | | | |
| 16:26:24 Apr/04/04 | 344 | 309 | 15.9426 | 145.6814 | Moving sub around and took another DSC photo of bacterial mat. | | | |
| 16:33:01 Apr/04/04 | 341 | 305 | 15.9426 | 145.6814 | Re-holstered fluid sampler intake probe. | | | |
| 16:34:41 Apr/04/04 | 344 | 260 | 15.9427 | 145.6814 | Preparing to suction sample. | | Moyer | R788-023 |
| 16:36:52 Apr/04/04 | 344 | 257 | 15.9426 | 145.6814 | Begin suction sampling of bacterial mat into jar 5 - on the flank of Five Towers chimney. Z=344.1. [E Diamante - 5 Towers]. | R788-SS-J5-0013 | Moyer | |
| 16:45:41 Apr/04/04 | 344 | 264 | 15.9427 | 145.6814 | Suction sampling complete. | | | |
| 16:47:42 Apr/04/04 | 343 | 279 | 15.9426 | 145.6814 | Looking around to see if there is another good suction sampling location. If not we'll suction somewhere else later. | | | |
| 16:52:42 Apr/04/04 | 348 | 285 | 15.9426 | 145.6814 | Looking for bacterial mat to suction sample. | | Moyer | R788-024 |
| 17:02:03 Apr/04/04 | 348 | 290 | 15.9426 | 145.6814 | Trying to position for suction sample. | | | |
| 17:06:09 Apr/04/04 | 350 | 219 | 15.9426 | 145.6814 | Looks to be a good sampling site. | | Moyer | R788-025 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 17:08:51 Apr/04/04 | 349 | 284 | 15.9426 | 145.6814 | Positioning to get a sample is proving quite difficult. | | | |
| 17:09:35 Apr/04/04 | 349 | 284 | 15.9426 | 145.6814 | Another site to suction sample. | | Moyer | R788-026 |
| 17:11:46 Apr/04/04 | 350 | 281 | 15.9426 | 145.6814 | We moved to a chimney covered with the fluffy mat. The texture isn't the same so we may not sample here. | | | |
| 17:19:53 Apr/04/04 | 347 | 249 | 15.9426 | 145.6814 | Still looking for a good place to suction sample bacteria mat. | | | |
| 17:29:20 Apr/04/04 | 354 | 278 | 15.9426 | 145.6815 | Something is blocking the holster for fluid sampler intake probe and we can't put it away. | | | |
| 17:37:21 Apr/04/04 | 354 | 183 | 15.9426 | 145.6815 | Still dealing with the intake probe. | | | |
| 17:39:55 Apr/04/04 | 349 | 213 | 15.9426 | 145.6814 | We'll resume looking for a good place to suction sample. | | | |
| 17:47:06 Apr/04/04 | 349 | 8 | 15.9426 | 145.6814 | Once again looking for a good spot to suction. | | Moyer | R788-027 |
| 17:53:02 Apr/04/04 | 344 | 352 | 15.9426 | 145.6814 | Still looking. | | | |
| 17:55:08 Apr/04/04 | 347 | 41 | 15.9426 | 145.6814 | Suction sample of yellow(?) bacterial mat into jar 6. The mat is growing on a chimney. Z=346.8. [E Diamante - 5 Towers]. | R788-SS-J6-0014 | Moyer | |
| 17:58:14 Apr/04/04 | 347 | 28 | 15.9427 | 145.6814 | Suction sample in progress. | | | R788-028 |
| 18:04:38 Apr/04/04 | 347 | 44 | 15.9427 | 145.6814 | Done suction sampling. Flushing into jar 8. | | | |
| 18:05:44 Apr/04/04 | 347 | 10 | 15.9426 | 145.6814 | Heading to Diamante chimney site for more fluid sampling. | | | |
| 18:08:28 Apr/04/04 | 345 | 246 | 15.9427 | 145.6814 | Looking for the place where we took the double chimney sample on the last dive. | | | |
| 18:09:56 Apr/04/04 | 344 | 189 | 15.9427 | 145.6814 | We think we have found it. Going to take fluid samples here. | | | |
| 18:09:56 Apr/04/04 | 344 | 189 | 15.9427 | 145.6814 | Back at Diamante chimney where the chimney sample was taken from on Dive R787. | | | R788-029 |
| 18:12:18 Apr/04/04 | 345 | 189 | 15.9427 | 145.6814 | Water sampling at Diamante. | | | R788-030 |
| 18:13:19 Apr/04/04 | 345 | 189 | 15.9427 | 145.6814 | Taking out HFS probe to take temperature measurements. | | | |
| 18:16:20 Apr/04/04 | 345 | 189 | 15.9427 | 145.6814 | Arm is locked here in sampling position. | | | |
| 18:18:57 Apr/04/04 | 345 | 188 | 15.9427 | 145.6814 | Temperature seems to be leveling off around 239 C. | | | |
| 18:19:32 Apr/04/04 | 345 | 189 | 15.9427 | 145.6814 | HFS unfiltered bag #9. Start=1819 Stop=1824. Tmax=239.4 Tavg=239.0 T2=100 Vol=684mL. Z=345m. [E Diamante - Diamante]. | R788-HFS-9-0015 | Butterfield | |
| 18:22:19 Apr/04/04 | 345 | 194 | 15.9427 | 145.6814 | Water sampling continued. | | Butterfield | R788-031 |
| 18:22:37 Apr/04/04 | 345 | 195 | 15.9427 | 145.6814 | Firing gas tight bottle #3 (HIL #7). Fired at 1825. T=238.9 Z=345m. [E Diamante - Diamante]. | R788-GTB-3-0016 | Lupton | |
| 18:25:51 Apr/04/04 | 345 | 191 | 15.9427 | 145.6814 | HFS filtered bag #16. Start=1826 Stop=1829. Tmax=238.9. Tavg=238.8 T2=95 Vol=461mL. Z=345m. Pump stopped itself during sampling. [E Diamante - Diamante]. | R788-HFS-16-0017 | Butterfield | |
| 18:26:41 Apr/04/04 | 345 | 192 | 15.9427 | 145.6814 | Firing gas tight bottle #4 (HIL #2)at 1826. T=238.8. Z=345m. [E Diamante - Diamante]. | R788-GTB-4-0018 | Lupton | |
| 18:28:36 Apr/04/04 | 345 | 192 | 15.9427 | 145.6814 | Water sampling continued. | | Butterfield | R788-032 |
| 18:30:12 Apr/04/04 | 345 | 196 | 15.9427 | 145.6814 | HFS filtered bag #17. Start=1830 Stop=1834. Tmax=239.4 Tavg=239.1 T2=100 Vol=484mL. Z=345m. [E Diamante - Diamante]. | R788-HFS-17-0019 | Butterfield | |
| 18:35:14 Apr/04/04 | 345 | 201 | 15.9427 | 145.6814 | HFS piston #24. Start=1837 Stop=1841. Tmax=239.4. Tavg=231.6 T2=100 Vol=495mL. Z=345m. Intake pulled out of the flow at the end of sampling. [E Diamante - Diamante]. | R788-HFS-24-0020 | Butterfield | |
| 18:42:43 Apr/04/04 | 341 | 196 | 15.9427 | 145.6814 | Done fluid sampling here. Putting HFS probe into the holster and moving back to Five Towers to collect a chimney. | | | |
| 18:48:43 Apr/04/04 | 345 | 305 | 15.9426 | 145.6814 | We are at Five Towers. Going to get a chimney sample here. | | | |
| 18:51:14 Apr/04/04 | 341 | 6 | 15.9426 | 145.6814 | The hose on the fluid sampler was pulled out of the intake probe while trying to put it back in the holster. | | | |
| 18:51:28 Apr/04/04 | 341 | 28 | 15.9427 | 145.6814 | Going to sample part of the Five Towers chimney and place it in the purse. | | | R788-033 |
| 18:54:18 Apr/04/04 | 341 | 41 | 15.9427 | 145.6814 | Near the top of the Five Towers. | | de Ronde | R788-034 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 18:55:56 Apr/04/04 | 342 | 38 | 15.9427 | 145.6814 | Trying to grab a chimney. | | | |
| 18:56:19 Apr/04/04 | 341 | 64 | 15.9427 | 145.6814 | We have a piece of a chimney. | | | |
| 18:57:13 Apr/04/04 | 341 | 40 | 15.9427 | 145.6814 | Dropped that piece of chimney. Trying for a more solid piece. | | | |
| 18:59:24 Apr/04/04 | 341 | 260 | 15.9427 | 145.6814 | Tried to grab another piece of the chimney but it seems to just fall apart. | | | |
| 19:03:04 Apr/04/04 | 342 | 70 | 15.9427 | 145.6814 | Trying for another piece of this chimney. | | | |
| 19:03:53 Apr/04/04 | 341 | 54 | 15.9427 | 145.6814 | Part of Five Towers chimney being sampled. | | | R788-035 |
| 19:04:55 Apr/04/04 | 345 | 349 | 15.9426 | 145.6814 | Broke off a rather large piece. Taking it down to the bottom to try to break it up a bit to make it fit into the purse. | | | |
| 19:10:48 Apr/04/04 | 356 | 325 | 15.9425 | 145.6814 | Opening the purse. | | | |
| 19:12:30 Apr/04/04 | 356 | 327 | 15.9425 | 145.6814 | Correct color frame grab of the chimney from Five Towers. | | | R788-036 |
| 19:13:47 Apr/04/04 | 356 | 324 | 15.9425 | 145.6814 | We dropped the big piece. Trying to push the smaller piece we dropped onto the fluid sampler into the purse. | | | |
| 19:18:55 Apr/04/04 | 356 | 317 | 15.9425 | 145.6814 | Going down to look for the remnants of the big piece we dropped. | | | |
| 19:22:48 Apr/04/04 | 356 | 317 | 15.9425 | 145.6814 | Still trying to find the large piece of chimney we dropped. | | | |
| 19:28:24 Apr/04/04 | 356 | 187 | 15.9425 | 145.6814 | We found the piece of chimney we dropped. Trying to pick it back up again. | | | |
| 19:29:18 Apr/04/04 | 356 | 185 | 15.9425 | 145.6814 | We have the chimney again. Try to put it in the purse. | | | |
| 19:34:34 Apr/04/04 | 356 | 186 | 15.9425 | 145.6814 | We dropped the piece of chimney again. This one may be a lost cause. | | | |
| 19:37:02 Apr/04/04 | 355 | 211 | 15.9425 | 145.6814 | Going back up Five Towers to try to get a less fragile sample. | | | |
| 19:38:03 Apr/04/04 | 344 | 333 | 15.9426 | 145.6814 | A few bits of the large chimney we broke off the top of Five Towers made it into the purse. The material was too fragile so the whole piece did not make it. Z=~343.8 m. [E Diamante - 5 Towers]. | R788-SF-0021 | SROF geo team (de Ronde/Hein) | |
| 19:41:11 Apr/04/04 | 345 | 273 | 15.9427 | 145.6814 | The next sample hopeful. | | | R788-037 |
| 19:42:48 Apr/04/04 | 345 | 271 | 15.9427 | 145.6814 | We got half of it. | | | R788-038 |
| 19:43:00 Apr/04/04 | 345 | 269 | 15.9426 | 145.6814 | Broke off another piece about 5 meters up the side of Five Towers. | | | |
| 19:44:54 Apr/04/04 | 345 | 270 | 15.9427 | 145.6814 | Upper part (about 20 cm) of active sulfide/sulfate chimney located about 5 meters up the side of Five Towers chimney in the Black Forest vent field. Into the purse. Z=344.7. [E Diamante - 5 Towers]. | R788-SF-0022 | SROF geo team (de Ronde/Hein) | |
| 19:47:25 Apr/04/04 | 339 | 289 | 15.9426 | 145.6814 | Finished sulfide sampling. Going to do a plankton tow over the Black Forest vent field. | | | |
| 19:49:46 Apr/04/04 | 338 | 351 | 15.9426 | 145.6814 | Plankton tow over Black Forest vent field. Auto depth at 340m and staying 2-3 meters above the chimneys. Speed is 0.75 knots. Nets open at 1950. Nets closed at 2020. [E Diamante - Black Forest]. | R788-net-P-0023 | Metaxas | |
| 19:53:08 Apr/04/04 | 340 | 360 | 15.9426 | 145.6814 | Plankton tow over Black Forest vent field. Auto depth at 340m and staying 2-3 meters above the chimneys. Speed 0.75 knots. Nets open at 1950. Nets closed at 2020. [E Diamante - Black Forest]. | R788-net-S-0024 | Metaxas | |
| 19:56:28 Apr/04/04 | 340 | 6 | 15.9427 | 145.6814 | Turned off all tapes at 1951. | | | |
| 20:22:18 Apr/04/04 | 338 | 85 | 15.9425 | 145.6815 | Raising ROPOS to transit to Fe-Mn crust area on the central cone in E. Diamante caldera. | | | |
| 20:53:52 Apr/04/04 | 250 | 342 | 15.9392 | 145.6767 | The ship is downslope of Fe-Mn crust target by about 50 m. Going down. | | | |
| 20:57:29 Apr/04/04 | 304 | 279 | 15.9393 | 145.6766 | Back on bottom near Fe-Mn crust site. On a sediment ridge with cobble talus. Minor venting through talus coated with sponges; mats; and limpets. | | | |
| 20:57:32 Apr/04/04 | 305 | 278 | 15.9393 | 145.6766 | Back on bottom downslope of Manganese crust target. | | | R788-039 |
| 20:59:10 Apr/04/04 | 309 | 309 | 15.9394 | 145.6765 | Boulder slope with mats and limpets. | | | R788-040 |
| 21:01:29 Apr/04/04 | 307 | 297 | 15.9394 | 145.6765 | Another venting site with rocks covered with barnacles. No shimmering water. | | | |
| 21:02:42 Apr/04/04 | 307 | 307 | 15.9394 | 145.6765 | Barnacle covered boulders near bottom of slope. No obvious hydrothermal flow. | | | R788-041 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 21:03:07 Apr/04/04 | 305 | 289 | 15.9394 | 145.6765 | We are about 30 m from Fe-Mn crust site. | | | |
| 21:06:47 Apr/04/04 | 295 | 313 | 15.9395 | 145.6763 | Approaching large outcrop covered with mat and what appear to be sponges. | | | R788-042 |
| 21:06:58 Apr/04/04 | 295 | 317 | 15.9395 | 145.6763 | Huge boulder covered with bacterial mat. Lots of sponges and limpets. Most rocks covered with mat and some shimmering water. | | | |
| 21:10:38 Apr/04/04 | 283 | 290 | 15.9395 | 145.6761 | Manganese stained outcrop with lots of sponges. | | | R788-043 |
| 21:15:39 Apr/04/04 | 279 | 280 | 15.9396 | 145.6760 | Fish around Fe-Mn crust site. | | | R788-044 |
| 21:18:15 Apr/04/04 | 273 | 314 | 15.9395 | 145.6760 | Fish near Fe-Mn Crust site. | | | R788-045 |
| 21:20:52 Apr/04/04 | 276 | 249 | 15.9396 | 145.6760 | There are no longer any mats in this area. | | | |
| 21:21:21 Apr/04/04 | 275 | 220 | 15.9396 | 145.6759 | More sponges and snails at Fe-Mn Crust site. | | | R788-046 |
| 21:25:29 Apr/04/04 | 278 | 227 | 15.9396 | 145.6760 | Claw holding sample to check the crust. | | | R788-047 |
| 21:30:32 Apr/04/04 | 290 | 163 | 15.9396 | 145.6762 | Moving downslope to Fe-Mn crust area. Lots of mats on rocks. | | | |
| 21:31:00 Apr/04/04 | 291 | 258 | 15.9396 | 145.6762 | Extensive area of stained boulders with mats and sponges. | | | R788-048 |
| 21:37:37 Apr/04/04 | 282 | 273 | 15.9395 | 145.6761 | Fe-Mn crusts look too thin to be of use. We will suction snails and bacterial mat here. | | | |
| 21:39:09 Apr/04/04 | 282 | 274 | 15.9395 | 145.6761 | This looks like a boundary between the Mn crust and the rock. DSC of snails. We're a little SW of Mn Crust. Preparing to sample snails, sponges and mat from manganese covered outcrop. | | | R788-049 |
| 21:46:44 Apr/04/04 | 282 | 272 | 15.9395 | 145.6761 | Also visible are two small white globular sponges. The lighter colored and darker colored materials are both very hard. There's evidence of scraping on the upper darker layer (a Mn stain - coating). 3 DSCs taken of snails and sponges in area. | | | R788-050 |
| 21:59:00 Apr/04/04 | 288 | 294 | 15.9395 | 145.6762 | We're looking at rocks covered with mat now. The mat is a blueish color. Rocks also covered with lots of sponges. We're going to sample this large rock with lots of mat on the top and snails on the lower face. | | | R788-051 |
| 22:00:14 Apr/04/04 | 288 | 275 | 15.9395 | 145.6762 | The last 20 minutes of log entries have been going into the R787 log. Log information that was in R787 has been added to the three previous frame grab logs. | | | |
| 22:01:16 Apr/04/04 | 288 | 287 | 15.9395 | 145.6761 | Suctioning snails and mat into jar 3. Start 2200 End 2217. Final sample light white mat and a few snails. Z=288. [E Diamante - Fe-Mn Crust]. | R788-SS-J3-0025 | Juniper | |
| 22:04:12 Apr/04/04 | 288 | 302 | 15.9395 | 145.6762 | Sampling mats and snails from boulder. | | | R788-052 |
| 22:09:53 Apr/04/04 | 288 | 280 | 15.9395 | 145.6762 | Looking at the suction sample. The DSC monitor went out - hopefully only temporary. There's a loose plug somewhere? | | | |
| 22:21:28 Apr/04/04 | 281 | 247 | 15.9393 | 145.6761 | We had a communication problem. The DSC; frame grabber and logging computer went down at 2210. At 2218 we started moving to Intense Diffuse nav target. All is up and working now at 2221. | | | |
| 22:24:01 Apr/04/04 | 286 | 251 | 15.9392 | 145.6762 | We're going to a mat suction site. | | | |
| 22:28:21 Apr/04/04 | 271 | 271 | 15.9392 | 145.6758 | Large blocks with high density of small sponges. | | | R788-053 |
| 22:29:42 Apr/04/04 | 267 | 267 | 15.9392 | 145.6758 | Lots of floc in the water and deposited on the rocks. Diffuse venting. Some sponges. We're searching for Intense Diffuse vent to sample. | | | |
| 22:32:54 Apr/04/04 | 274 | 317 | 15.9393 | 145.6759 | We've been zooming around Intense Diffuse target for the last few minutes. Preparing to suction sample. | | | |
| 22:33:47 Apr/04/04 | 274 | 359 | 15.9393 | 145.6758 | We're going to try to suction the little white sponges into jar 1. It's very rare to see sponges at vents. Verena is wondering if there are symbionts associated with the sponges. | | | |
| 22:36:36 Apr/04/04 | 274 | 354 | 15.9393 | 145.6759 | Preparing to suction sample small sponges and red snails on boulders. | | | R788-054 |
| 22:36:39 Apr/04/04 | 274 | 354 | 15.9393 | 145.6759 | Suction sponges into jar 1. (~10 snails in a 20x20 cm area). Sampled ~10 sponges. Sponges are rare at hydrothermal vents; they could possibly symbionts. Start 2237 Stop 1040. Z=274. [E Diamante - Intense Diffuse]. | R788-SS-J1-0026 | Tunnicliffe | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 22:43:23 Apr/04/04 | 273 | 297 | 15.9393 | 145.6758 | We're heading towards Mat City through the Floc Storm site. Just saw a grouper. Headed S/SW. Lots of sponges on the rocks and floc in the water. | | | |
| 22:44:55 Apr/04/04 | 271 | 208 | 15.9392 | 145.6758 | Some sort of grouper (?) swimming out of top of frame. | | | R788-055 |
| 22:45:39 Apr/04/04 | 269 | 218 | 15.9391 | 145.6758 | Some beautiful fish in the area. Groupers perhaps? | | | |
| 22:49:16 Apr/04/04 | 258 | 208 | 15.9390 | 145.6758 | Area with hydrothermal staining. Steep wall outcrop and steep talus slope next to it. Venting through sediment. Lost sponges and now bacterial mats. Eh is 0 mV. | | | |
| 22:49:59 Apr/04/04 | 252 | 237 | 15.9389 | 145.6758 | Moving upward into region where sponges seem to have been replaced by bacterial mat. | | | R788-056 |
| 22:50:53 Apr/04/04 | 249 | 201 | 15.9388 | 145.6758 | Eh just went very negative as low as -130. Shinkai limpets noted. White crabs that a different species than big white crabs. Their claws have little tuffs on them loaded with bacteria. We'll try to sample it. | | | |
| 22:51:22 Apr/04/04 | 248 | 229 | 15.9388 | 145.6758 | High density of limpets on large boulders. | | | R788-057 |
| 22:54:03 Apr/04/04 | 249 | 261 | 15.9388 | 145.6758 | Small white crab among high density of limpets on boulders. | | | R788-058 |
| 22:57:54 Apr/04/04 | 249 | 244 | 15.9388 | 145.6758 | Grouper entering shot from left as we retrieve a limpet-covered rock. | | | R788-059 |
| 22:59:54 Apr/04/04 | 248 | 229 | 15.9388 | 145.6758 | We are going to sample a rock with limpets on it and put it in the purse. | | | |
| 23:01:30 Apr/04/04 | 247 | 239 | 15.9388 | 145.6758 | Dimpled appearance of boulder is actually due to high density of limpets. | | | R788-060 |
| 23:03:34 Apr/04/04 | 247 | 252 | 15.9388 | 145.6758 | Collecting a dacite sample covered with limpets. Starboard side of purse. Eh is down to -200. Sample taken just south of floc storm target. Z=247.1. [E Diamante - Central Cone]. | R788-bio/geo-0027 | Tunnicliffe | |
| 23:03:53 Apr/04/04 | 247 | 253 | 15.9388 | 145.6758 | Placing rock into purse. | | | R788-061 |
| 23:06:26 Apr/04/04 | 247 | 267 | 15.9388 | 145.6758 | Picking up and stowing wand and imaging operations. Eh is down to -180. Limpets completely cover rocks. | | | |
| 23:07:58 Apr/04/04 | 247 | 279 | 15.9388 | 145.6758 | Highlight tape is on. Small white crabs are common on the limpet-covered surface. | | | |
| 23:08:00 Apr/04/04 | 247 | 279 | 15.9388 | 145.6758 | Close-up of limpet covered boulders. | | | R788-062 |
| 23:08:49 Apr/04/04 | 247 | 279 | 15.9388 | 145.6758 | Detail of limpet covered boulder with small white crabs. Crabs appear to be scraping mat off rock and feeding on it. | | | R788-063 |
| 23:12:53 Apr/04/04 | 247 | 270 | 15.9388 | 145.6758 | Shrimp are in the water but not on the rocks. Highlights are off. We will try to suction crabs. | | | |
| 23:14:45 Apr/04/04 | 247 | 270 | 15.9388 | 145.6758 | Suctioning small white crabs (at least 5) - with little black eyes and tuffs on their claws apparently used for harvesting bacteria. Z=247.1. Sample into jar 2. [E Diamante - Central Cone]. | R788-SS-J2-0028 | Juniper | |
| 23:23:25 Apr/04/04 | 247 | 284 | 15.9388 | 145.6758 | The quest for crabs continues. | | | R788-064 |
| 23:26:16 Apr/04/04 | 247 | 256 | 15.9388 | 145.6758 | Collecting bacterial mat. | | | |
| 23:26:34 Apr/04/04 | 247 | 257 | 15.9388 | 145.6758 | Suctioning rock surface for bacterial mat that is going into bottle 4. Mat is rather sparse on the rock. Bycatch of limpets also collected. Z=247.2. [E Diamante - Central Cone]. | R788-SS-J4-0029 | Juniper | |
| 23:38:40 Apr/04/04 | 247 | 265 | 15.9388 | 145.6758 | Finished with sampling bacterial mat and crabs. Took two digital photos. Stop for tether management then will came back down and go to Mat City. | | | |
| 23:47:19 Apr/04/04 | 183 | 49 | 15.9384 | 145.6757 | Going back down to bottom following tether management. | | | |
| 23:51:15 Apr/04/04 | 225 | 339 | 15.9384 | 145.6756 | On bottom heading NW to Mat City. Bacterial mats are partly covering the rocks at this location. Digital photo of geology including layering and steep-walled outcrop. | | | |
| 23:52:14 Apr/04/04 | 220 | 341 | 15.9385 | 145.6756 | Very dense mat cover on blocky boulders. | | | R788-065 |
| 23:53:38 Apr/04/04 | 211 | 313 | 15.9385 | 145.6755 | Detail of mat on rock at Mat City. | | | R788-066 |
| 23:53:41 Apr/04/04 | 211 | 311 | 15.9385 | 145.6755 | Significant bacterial mat that mostly but not completely covers rock especially on cliff face for which we got a digital photo. Still S of Mat City. Some small fish. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 23:56:20 Apr/04/04 | 201 | 224 | 15.9387 | 145.6754 | School of fish and bacterial mat covering rock. The fish are eating the bacteria. Digital photo of fish grazing on the mat. | | | |
| 23:58:27 Apr/04/04 | 206 | 255 | 15.9387 | 145.6753 | Dense mats on boulders in Mat City. | | | R788-067 |
| 23:59:14 Apr/04/04 | 206 | 255 | 15.9387 | 145.6753 | Angelfish and very thick and extensive bacterial mat. | | | |
| 00:00:19 Apr/05/04 | 206 | 252 | 15.9387 | 145.6753 | Taking a suction sample of white filamentous bacterial mats that are going into bottle 7. Z=206.1. [E Diamante - Central Cone]. | R788-SS-J7-0030 | Moyer | |
| 00:01:54 Apr/05/04 | 206 | 253 | 15.9387 | 145.6753 | Suction sampling dense filamentous mats. | | | R788-068 |
| 00:14:51 Apr/05/04 | 205 | 232 | 15.9387 | 145.6753 | Repositioning to do more suctioning for bacterial mat. | | | |
| 00:20:38 Apr/05/04 | 206 | 263 | 15.9387 | 145.6753 | Sample R788-SS-J7-0030. | | | R788-069 |
| 00:23:01 Apr/05/04 | 206 | 262 | 15.9387 | 145.6753 | Begin up the slope to document with digital photography the transition in biological communities with water depth. | | | |
| 00:24:14 Apr/05/04 | 206 | 264 | 15.9387 | 145.6753 | Clown fish in Mat City. | | | R788-070 |
| 00:25:45 Apr/05/04 | 203 | 230 | 15.9387 | 145.6753 | Photo of angelfish with bacterial mat. Also many other fish. Heading is about 240 and Eh about -42. | | | |
| 00:29:04 Apr/05/04 | 201 | 263 | 15.9386 | 145.6751 | Eh changes to positive at 201 m. Lots of fish and still completely coated with bacterial mat. | | | |
| 00:30:03 Apr/05/04 | 200 | 273 | 15.9386 | 145.6750 | Mat covered boulders on our way up past 200m toward Aquarium sampling site. | | | R788-071 |
| 00:31:41 Apr/05/04 | 199 | 282 | 15.9386 | 145.6749 | Eh is up to 21 at 199 m. First appearance of soft corals on the extensive bacterial mat. Yellow tropical fish. | | | |
| 00:32:02 Apr/05/04 | 198 | 285 | 15.9386 | 145.6749 | Yellow fish in front of mat covered boulders. Soft corals on boulders also covered by mat. | | | R788-072 |
| 00:34:12 Apr/05/04 | 199 | 289 | 15.9386 | 145.6748 | First occurrence of red algae at 198 m near same depth as the soft coral appearance. Stopping ship to look at gas bottles. | | | |
| 00:39:47 Apr/05/04 | 199 | 289 | 15.9386 | 145.6748 | Gas bottles check out okay and moving upslope again. | | | |
| 00:40:23 Apr/05/04 | 198 | 288 | 15.9386 | 145.6748 | Heading up boulder slope to Aquarium. | | | R788-073 |
| 00:41:17 Apr/05/04 | 196 | 285 | 15.9386 | 145.6748 | Soft corals are becoming more abundant and now beginning to see green algae along with the red algae at 196-197 m and Eh of 31 mV. Red algae are quite abundant here. Bacterial mat is thinning. | | | |
| 00:44:49 Apr/05/04 | 197 | 292 | 15.9386 | 145.6748 | Close-up of boulder with mat plus both red and green algae at 197m. | | | R788-074 |
| 00:45:46 Apr/05/04 | 197 | 291 | 15.9386 | 145.6748 | Eh just dropped to negative values to as low as -12. Bacterial mat still decreasing in abundance. | | | |
| 00:47:18 Apr/05/04 | 196 | 291 | 15.9386 | 145.6748 | Continuing on heading at just north of west. Much particulate floc in the water. Very few fish noted over last 2 m of water depth transect. Eh is now -5. | | | |
| 00:48:50 Apr/05/04 | 196 | 278 | 15.9386 | 145.6747 | Digital photo of yellow fish - different than the last yellow fish. More soft corals covered with bacterial mat. | | | |
| 00:49:20 Apr/05/04 | 196 | 304 | 15.9386 | 145.6747 | Yellow fish crossing frame. | | | R788-075 |
| 00:50:50 Apr/05/04 | 195 | 288 | 15.9386 | 145.6747 | Two yellow fish on boulder slope. | | | R788-076 |
| 00:51:03 Apr/05/04 | 196 | 286 | 15.9386 | 145.6747 | Bacterial mats are now confined to certain faces on the rocks; mostly on the edges. Soft corals and red and green algae are abundant. Noted a calcareous hydrozoan. | | | |
| 00:51:14 Apr/05/04 | 196 | 294 | 15.9386 | 145.6746 | Mats disappearing and red algae becoming more widespread. | | | R788-077 |
| 00:51:57 Apr/05/04 | 196 | 293 | 15.9386 | 145.6746 | Calcareous hydrozoan (fire coral) on boulders. | | | R788-078 |
| 00:55:38 Apr/05/04 | 196 | 306 | 15.9386 | 145.6747 | Close-up of gorgonian on side of rock outcrop. | | | R788-079 |
| 00:57:02 Apr/05/04 | 194 | 317 | 15.9386 | 145.6746 | Moving up slope again. | | | |
| 00:57:02 Apr/05/04 | 194 | 317 | 15.9386 | 145.6746 | Bacterial mat thinning and being replaced by red algae. Yellow fish in background. | | | R788-080 |
| 00:58:12 Apr/05/04 | 191 | 310 | 15.9387 | 145.6746 | Fish are becoming more abundant and lush green algae on rocks and traces of bacterial mat at 191 m and Eh of 48 mV. | | | |
| 00:59:16 Apr/05/04 | 191 | 293 | 15.9387 | 145.6746 | Green algae clearly visible at 191m. | | | R788-081 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 01:00:51 Apr/05/04 | 188 | 291 | 15.9387 | 145.6745 | Abundant schools of fish and solitary fish. Soft coral and abundant red and green algae are present. | | | |
| 01:04:08 Apr/05/04 | 188 | 233 | 15.9387 | 145.6745 | Sitting to transfer frames: soldier fish and alcyonacean corals. No filaments on polyps. | | | |
| 01:04:27 Apr/05/04 | 188 | 233 | 15.9387 | 145.6745 | Close-up of soft corals on outcrop. No evidence of mat on corals. | | | R788-082 |
| 01:05:45 Apr/05/04 | 188 | 233 | 15.9387 | 145.6745 | Seeing nearly 100% cover of talus by algae. Very sparse filaments of bacteria can be seen in profile. Coralline algae dominate - more than one species present. Zoom onto a yellow sponge with clear osculae. | | | |
| 01:09:55 Apr/05/04 | 188 | 245 | 15.9387 | 145.6745 | Encrusting demosponge overgrowing red algae on rock. Some mat on right side of rock too. | | | R788-083 |
| 01:10:17 Apr/05/04 | 188 | 245 | 15.9387 | 145.6745 | Tiny white calcareous encrustations - serpulids and possibly benthic forams. Spot a likely solitary scleractinian coral. | | | |
| 01:11:37 Apr/05/04 | 188 | 243 | 15.9387 | 145.6745 | Moving upslope over talus and outcrop covered with red corallines. Possible yellow snapper. On rock face - alcyonaceans and hydrozoans. | | | |
| 01:13:43 Apr/05/04 | 185 | 301 | 15.9387 | 145.6745 | Small gorgonian coral oriented vertically. Ambient light is very obvious. Much greater density of alcyonaceans. | | | |
| 01:15:03 Apr/05/04 | 184 | 324 | 15.9387 | 145.6745 | Top of first pinnacle cov ered with soft corals and fish in distance are dense. Schools of small fish abundant. | | | |
| 01:16:39 Apr/05/04 | 181 | 277 | 15.9387 | 145.6744 | More green algae at 180m. | | | R788-084 |
| 01:17:13 Apr/05/04 | 179 | 293 | 15.9387 | 145.6743 | Squirrel fish; black tang; yellow wrasse; solitary corals; possible parrot fish. | | | |
| 01:17:22 Apr/05/04 | 179 | 291 | 15.9387 | 145.6743 | Crevice in pinnacle as we approach Aquarium summit. Several small fish and numerous soft corals. | | | R788-085 |
| 01:18:59 Apr/05/04 | 180 | 292 | 15.9387 | 145.6743 | Light dusting of sediments in patches - no sign of microbial filaments. | | | |
| 01:20:05 Apr/05/04 | 180 | 293 | 15.9387 | 145.6743 | Looks like two different species of red algae. | | | R788-086 |
| 01:20:22 Apr/05/04 | 180 | 293 | 15.9387 | 145.6743 | Jointed basalts form rough topography with many crevices - Bob comments on importance of geology in forming habitat. Note deep red coralline appearing. | | | |
| 01:21:49 Apr/05/04 | 180 | 291 | 15.9387 | 145.6743 | Detail of dense stand of soft corals. | | | R788-087 |
| 01:22:40 Apr/05/04 | 180 | 293 | 15.9387 | 145.6743 | Excellent close-up of soft corals. Sprinkling of small yellow sponges. | | | |
| 01:25:24 Apr/05/04 | 178 | 282 | 15.9387 | 145.6743 | Now to 100% cover of substratum by algae. On edges of rocks and alcyonaceans in abundance. Soldier fish and wrasse. Some darker green corallines. | | | |
| 01:27:09 Apr/05/04 | 178 | 267 | 15.9387 | 145.6743 | Group of squirrelfish near Aquarium summit. | | | R788-088 |
| 01:31:23 Apr/05/04 | 176 | 292 | 15.9387 | 145.6743 | First basket star but it is closed up likely as a diurnal response to zooplankton availability. | | | |
| 01:32:32 Apr/05/04 | 177 | 348 | 15.9387 | 145.6743 | In close up spot solitary scleratinians and small sponges. Very few grazers evident except fish. | | | |
| 01:34:08 Apr/05/04 | 176 | 336 | 15.9387 | 145.6743 | Basket star on underside of an almost vertical wall near summit. | | | R788-089 |
| 01:38:05 Apr/05/04 | 174 | 280 | 15.9387 | 145.6743 | Rising again up a cliff face...vertical face with alcyonaceans oriented vertically. Serpulid polychaetes form small white calcareous tubes; also see many apricot-colored solitary stony corals. | | | |
| 01:38:33 Apr/05/04 | 174 | 256 | 15.9387 | 145.6743 | Several fish species on near vertical wall just below summit. | | | R788-090 |
| 01:40:28 Apr/05/04 | 173 | 264 | 15.9387 | 145.6743 | 5m from summit - much more ambient light. Another basket star and lots of small fish. We are feeling current effects. | | | |
| 01:40:40 Apr/05/04 | 173 | 252 | 15.9387 | 145.6743 | Vista view near summit with small fish. | | | R788-091 |
| 01:41:31 Apr/05/04 | 172 | 251 | 15.9387 | 145.6743 | First gorgonian coral - a fan coral (blue Gorgonia) has a small cowrie at the base. Large numbers of soldier fish. | | | |
| 01:42:15 Apr/05/04 | 172 | 281 | 15.9387 | 145.6743 | Large fan coral with fish near summit. | | | R788-092 |
| 01:42:29 Apr/05/04 | 172 | 298 | 15.9387 | 145.6743 | Fan coral with cowry shells near its base. | | | R788-093 |
| 01:43:37 Apr/05/04 | 173 | 282 | 15.9387 | 145.6743 | Swarm of squirrelfish in a crevice. | | | R788-094 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R788 Comments: E Diamante | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 01:44:18 Apr/05/04 | 172 | 295 | 15.9387 | 145.6743 | Arriving at peak, which is a very sharp pinnacle. Can't see any bare rock. On top is a large aggregation of basket stars with many wrasse schooling. | | | |
| 01:46:12 Apr/05/04 | 168 | 247 | 15.9387 | 145.6743 | Summit shot. | | | R788-095 |
| 01:47:43 Apr/05/04 | 168 | 353 | 15.9387 | 145.6742 | Trying to perch on top of the pinnacle. One star on top gripping rock with arms. Scleractinians present. | | | |
| 01:48:13 Apr/05/04 | 169 | 346 | 15.9387 | 145.6742 | King of the castle. | | | R788-096 |
| 01:51:51 Apr/05/04 | 169 | 309 | 15.9387 | 145.6742 | Waiting for DSC download. | | | |
| 01:55:52 Apr/05/04 | 169 | 265 | 15.9387 | 145.6743 | Close-up of basket star. | | | R788-097 |
| 01:56:02 Apr/05/04 | 169 | 266 | 15.9387 | 145.6742 | Basket star on the top of this outcrop at Aquarium. We're getting a series of DSC images here. | | | |
| 01:57:00 Apr/05/04 | 169 | 269 | 15.9387 | 145.6743 | Large gorgonian coral on pinnacle. | | | R788-098 |
| 01:57:15 Apr/05/04 | 168 | 270 | 15.9387 | 145.6743 | A large gorgonian coral sitting on a pinnacle. We're looking around the area. Highlights are on. | | | |
| 01:58:40 Apr/05/04 | 168 | 282 | 15.9387 | 145.6743 | School of small fish near basket star on summit. | | | R788-099 |
| 01:58:58 Apr/05/04 | 168 | 278 | 15.9387 | 145.6743 | We're trying to get some images of the little fish surrounding the pinnacle topped with basket stars and gorgonians. | | | |
| 02:00:58 Apr/05/04 | 168 | 210 | 15.9387 | 145.6743 | Shot of various species on summit. | | | R788-100 |
| 02:01:20 Apr/05/04 | 167 | 209 | 15.9387 | 145.6743 | We're going to transit over to Barnacle Beach for more DSC's of the area. Highlights and BetaCam off for now. | | | |
| 03:12:12 Apr/05/04 | 461 | 163 | 15.9436 | 145.6829 | Just landed on bottom. Talus slope with light dusting of sediment. South to Charlie vent. | | | |
| 03:13:17 Apr/05/04 | 457 | 133 | 15.9435 | 145.6829 | We got back to the bottom with talus slope. | | | R788-101 |
| 03:14:42 Apr/05/04 | 456 | 84 | 15.9434 | 145.6830 | We have some hydrothermal staining between talus. | | | R788-102 |
| 03:17:01 Apr/05/04 | 459 | 122 | 15.9434 | 145.6830 | At the crab trap. | | | R788-103 |
| 03:18:32 Apr/05/04 | 458 | 295 | 15.9434 | 145.6831 | All of the white on here is barnacles. | | | R788-104 |
| 03:20:47 Apr/05/04 | 461 | 283 | 15.9434 | 145.6831 | Close up of crab trap. | | | R788-105 |
| 03:21:50 Apr/05/04 | 462 | 311 | 15.9434 | 145.6831 | Close up of barnacles. | | | R788-106 |
| 03:28:24 Apr/05/04 | 463 | 203 | 15.9434 | 145.6831 | Still trying to acquire the deeply deployed crab and shrimp trap. | | | |
| 03:28:55 Apr/05/04 | 463 | 203 | 15.9434 | 145.6831 | This is a grab of the crab trap with the fluid sampler intake. | | | R788-107 |
| 03:30:01 Apr/05/04 | 463 | 190 | 15.9434 | 145.6831 | Second attempt at grab of crab trap. Verena says that the trap is full of crabs. We left for tether management. | | | R788-108 |
| 03:30:08 Apr/05/04 | 463 | 190 | 15.9435 | 145.6831 | Trap stock is rising. Lots of crabs detected inside. | | | |
| 03:39:51 Apr/05/04 | 476 | 176 | 15.9439 | 145.6829 | Back on bottom after tether management. Return to Charlie vent to acquire crab trap. | | | |
| 03:42:53 Apr/05/04 | 464 | 203 | 15.9435 | 145.6831 | We are headed back in to take the crab trap at Charlie vent. | | | R788-109 |
| 03:48:43 Apr/05/04 | 464 | 193 | 15.9434 | 145.6831 | 2004-04-05 03:40 DIVE LOG LOCKED UP FROM THIS TIME UNTIL END OF DIVE. TIMES APPROXIMATE BEYOND THIS POINT. ONLY LOOK AT TIMES IN COMMENTS - NOT IN THE HEADER. | | | |
| 04:48:23 Apr/05/04 | 2 | 263 | 15.9434 | 145.6830 | 2004-04-05 03:41 Crab trap recovered from Barnacle Beach. There were 3 crabs in the trap when it left the bottom. 2004-04-05 03:50 Suction fluid sample for background water on the way up above Barnacle Beach. [E Diamante - Barnacle Beach]. | R788-Bio-0031 | Tunnicliffe | |
| 04:48:29 Apr/05/04 | 2 | 263 | 15.9434 | 145.6830 | 2004-04-05 03:51. End of dive. | | | |
| 04:48:33 Apr/05/04 | 2 | 263 | 15.9434 | 145.6830 | 2004-04-05 04:24. ROPOS out of the water. 0426 ROPOS on deck. | | | |

## 8.8 R789 Dive Log: Maug

| **R789: Maug** |
|---|
| wet time (UTC): 4/7 0737 - 4/7 2206. JD 98. 14.48 hrs. |
| bottom time (UTC): 4/7 0753 - 4/7 2143. 13.83 hrs. [7 samples] |
| **R789 DSC information:** There were 325 original DSCs taken and 214 final ones were kept starting with R789_DSC_040704_093147_00799.jpg and ending with R789_DSC_040704_214049_01121.jpg |
| Exploration dive at Maug caldera. Traversed around the central cone at the 145m contour. Found 2 sites of diffuse venting on the NE side of the main cone. Samples: **W of main central cone**: 1 water. **Maug (traverse)**: 3 rocks. **Egg Drop Soup**: 1 suction (bacterial mat). **Egg White Springs**: 1 rock. **Egg Salad**: 1 rock. |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 07:37:28 Apr/07/04 | 1 | 262 | 15.9437 | 145.6831 | ROPOS in the water. | | | |
| 07:42:01 Apr/07/04 | 47 | 268 | 15.9437 | 145.6831 | Stem not down yet. | | | |
| 07:45:44 Apr/07/04 | 129 | 272 | 20.0221 | 145.2166 | Water depth should be about 220m here - west of the flank of the central cone. | | | |
| 07:48:22 Apr/07/04 | 167 | 277 | 20.0222 | 145.2167 | Moderate amount of particulate matter in the water column; water depth 175 m; stem has been put down. | | | |
| 07:49:26 Apr/07/04 | 184 | 288 | 20.0222 | 145.2167 | ROPOS has left the cage at 181 m. | | | |
| 07:51:22 Apr/07/04 | 183 | 184 | 20.0227 | 145.2174 | The water column is very cloudy. | | | |
| 07:53:53 Apr/07/04 | 225 | 163 | 20.0223 | 145.2167 | Bottom is in sight at 226 m. Just W of central cone. Sediment put in suspension when ROV approached the bottom. | | | |
| 07:55:28 Apr/07/04 | 226 | 162 | 20.0223 | 145.2167 | Testing a water sampler. Bottom is sediment covered and ripples are not evident here. Fish are noted and traces of bottom dwellers can be seen on the sediment. | | | |
| 07:56:17 Apr/07/04 | 226 | 160 | 20.0223 | 145.2167 | Testing hot fluid sampler. Sample R789-Bio-0001. | | | R789-001 |
| 07:58:00 Apr/07/04 | 226 | 163 | 20.0223 | 145.2167 | Testing Tunnicliffe's water sampler and will collect a water sample during the testing. (west of main central cone). Z=226. [Maug - Caldera]. | R789-water-0001 | Tunnicliffe | |
| 08:00:23 Apr/07/04 | 226 | 160 | 20.0223 | 145.2167 | Testing water sampler. Sample R789-Bio-0001. | | | R789-002 |
| 08:01:34 Apr/07/04 | 226 | 163 | 20.0223 | 145.2167 | Digital photo of burrowed sediment surface. | | | |
| 08:03:12 Apr/07/04 | 226 | 160 | 20.0223 | 145.2167 | Took several more digital photos. Sparse rock talus on the sediment surface. Will move NE between the main and small cones. | | | |
| 08:06:07 Apr/07/04 | 225 | 40 | 20.0224 | 145.2167 | First rock that we came across. Not an outcrop though. | | | R789-003 |
| 08:07:58 Apr/07/04 | 225 | 39 | 20.0225 | 145.2168 | Climbing over sedimented part of the caldera. Starting to move the ship 100m to the NE. | | | |
| 08:08:42 Apr/07/04 | 224 | 39 | 20.0225 | 145.2168 | Evidence of some burrows. Eh=209. Eh was 240 at the surface. | | | |
| 08:10:32 Apr/07/04 | 222 | 46 | 20.0225 | 145.2168 | White balancing. | | | |
| 08:12:30 Apr/07/04 | 221 | 44 | 20.0226 | 145.2169 | Flying over sediment with scattered outcrops. Lots of burrowing activity on the bottom and a few sea whips. | | | |
| 08:14:04 Apr/07/04 | 222 | 46 | 20.0227 | 145.2170 | Corals on the outcrop. | | | |
| 08:14:43 Apr/07/04 | 222 | 47 | 20.0227 | 145.2170 | Outcrop with plenty of coral on it. | | | R789-004 |
| 08:15:35 Apr/07/04 | 222 | 45 | 20.0227 | 145.2170 | Outcrop is covered with one to a few cm's of sediment. | | | |
| 08:15:54 Apr/07/04 | 222 | 45 | 20.0227 | 145.2170 | Coral on outcrop with small fish beneath it. | | | R789-005 |
| 08:16:46 Apr/07/04 | 220 | 39 | 20.0227 | 145.2170 | Starting to climb a steep slope. | | | |
| 08:17:31 Apr/07/04 | 216 | 100 | 20.0228 | 145.2171 | We are preparing to sample a rock. | | | |
| 08:17:34 Apr/07/04 | 216 | 105 | 20.0228 | 145.2171 | Heavily weathered; sediment covered; primary flow surfaces and possible pillows. | | | R789-006 |
| 08:19:20 Apr/07/04 | 214 | 73 | 20.0228 | 145.2172 | School of juvenile fish swimming around the outcrop. | | | |
| 08:20:40 Apr/07/04 | 212 | 118 | 20.0228 | 145.2172 | Outcrop from where first rock sample was taken. | | | R789-007 |
| 08:22:59 Apr/07/04 | 212 | 119 | 20.0228 | 145.2172 | First rock sample into port biobox. | | | R789-008 |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 08:23:00 Apr/07/04 | 212 | 121 | 20.0228 | 145.2172 | A greenish-yellow rock with one fresh surface. ~ 10cm. Port biobox. Z=212m. [Maug]. | R789-RK-0002 | SROF geo team (Stern) | |
| 08:25:11 Apr/07/04 | 212 | 119 | 20.0228 | 145.2172 | Rock from where first rock sample was broken from. | | | R789-009 |
| 08:26:23 Apr/07/04 | 212 | 105 | 20.0228 | 145.2172 | Continuing up slope. Seeing more outcrops with sponges; corals and sea whips. | | | |
| 08:26:43 Apr/07/04 | 210 | 86 | 20.0228 | 145.2172 | Large standing rock and sea whip. | | | R789-010 |
| 08:28:01 Apr/07/04 | 208 | 64 | 20.0229 | 145.2173 | Ahermatypic corals. The sediment is scoured around the boulders and outcrops. | | | |
| 08:29:29 Apr/07/04 | 200 | 68 | 20.0229 | 145.2174 | We are starting to see coarser sand in places. Bioturbation appears more intense. No epifaunal deposit feeders are visible. | | | |
| 08:30:22 Apr/07/04 | 197 | 59 | 20.0229 | 145.2175 | Solitary corals; Tubellaria and other Scleractinian corals. We are seeing a large pile of cobble talus. | | | |
| 08:33:50 Apr/07/04 | 195 | 35 | 20.0229 | 145.2175 | Scleractinian corals. | | | R789-011 |
| 08:34:50 Apr/07/04 | 191 | 51 | 20.0230 | 145.2175 | More corals both in density and diversity. We are now also seeing a colonial hydrozoan or Alcyonarian. | | | |
| 08:37:30 Apr/07/04 | 191 | 68 | 20.0230 | 145.2175 | We are in a boulder field and we are following a ridge upslope. A lot of hydroids are present on the edges of these boulders. | | | |
| 08:39:13 Apr/07/04 | 182 | 69 | 20.0230 | 145.2176 | We are seeing a lot of burrows again. And a lot of hydroids dangling down from the boulders. | | | |
| 08:40:24 Apr/07/04 | 175 | 66 | 20.0231 | 145.2177 | Large columnar or perhaps pillow outcrop at 175 meters. | | | R789-012 |
| 08:40:35 Apr/07/04 | 174 | 65 | 20.0231 | 145.2177 | Some evidence of oxidation. | | | |
| 08:41:15 Apr/07/04 | 171 | 66 | 20.0231 | 145.2177 | We can see a pinnacle. We are stopping briefly to take a better look at the fauna. | | | |
| 08:41:26 Apr/07/04 | 171 | 64 | 20.0231 | 145.2177 | More coral along the massive continuous outcrop. | | | R789-013 |
| 08:42:20 Apr/07/04 | 166 | 61 | 20.0231 | 145.2177 | We are at the top of this little pit on the west side of the NW cone. | | | |
| 08:43:00 Apr/07/04 | 166 | 64 | 20.0231 | 145.2177 | We are going to the bottom of the pit. 10 brittle stars on a gorgonian perched on an outcrop. | | | |
| 08:44:30 Apr/07/04 | 165 | 61 | 20.0231 | 145.2177 | Brittle stars up close. | | | R789-014 |
| 08:44:49 Apr/07/04 | 165 | 63 | 20.0231 | 145.2177 | Lots of brittle stars. | | | R789-015 |
| 08:46:19 Apr/07/04 | 164 | 56 | 20.0231 | 145.2177 | Moving the ship 100 m towards the middle of the pit. | | | |
| 08:49:08 Apr/07/04 | 160 | 49 | 20.0232 | 145.2178 | Coming upon weathered sediment; scattered boulders; outcrops. Most likely thick sediment cover. | | | |
| 08:53:21 Apr/07/04 | 161 | 356 | 20.0233 | 145.2179 | Climbing an outcrop with high density of white corals and hydroids. | | | |
| 08:54:25 Apr/07/04 | 164 | 266 | 20.0233 | 145.2180 | "Easter Fish" at base of white coral and hydroid covered outcrop. | | | R789-016 |
| 08:56:39 Apr/07/04 | 169 | 37 | 20.0233 | 145.2180 | Layered flows of columnar joints. | | | R789-017 |
| 08:57:02 Apr/07/04 | 169 | 43 | 20.0233 | 145.2180 | We are right beside a wall, which is running to the NE. We are going to the bottom. | | | |
| 08:58:21 Apr/07/04 | 168 | 6 | 20.0234 | 145.2181 | The structures are very steep with overhanging cliffs. | | | |
| 08:58:26 Apr/07/04 | 169 | 3 | 20.0234 | 145.2181 | Large high angle outcrop overhang. | | | R789-018 |
| 09:01:15 Apr/07/04 | 188 | 339 | 20.0234 | 145.2182 | The wall is still vertical. We see a beautiful striking NE structural feature on the sonar screen. | | | |
| 09:02:14 Apr/07/04 | 197 | 346 | 20.0234 | 145.2182 | NE striking vertical dike (100m tall) contact with sediment at bottom. | | | R789-019 |
| 09:02:16 Apr/07/04 | 197 | 348 | 20.0234 | 145.2182 | At the bottom of the wall we see thick sediment. The wall is over 100 m tall. Surprisingly we see no talus. | | | |
| 09:03:11 Apr/07/04 | 198 | 342 | 20.0234 | 145.2182 | We are now going to follow the wall to the NE. | | | |
| 09:03:40 Apr/07/04 | 198 | 326 | 20.0235 | 145.2182 | Dikes are very resistant and it may be why do not see talus. | | | |
| 09:04:30 Apr/07/04 | 197 | 314 | 20.0235 | 145.2182 | A hint of the columnar jointing in the large dike. | | | R789-020 |
| 09:04:31 Apr/07/04 | 197 | 307 | 20.0235 | 145.2182 | It looks like there are steps on the wall. Heading 304. The structures on the wall look like columnar jointing. | | | |
| 09:05:46 Apr/07/04 | 195 | 285 | 20.0236 | 145.2181 | Attempting to sample some of these columnar joining. It may be too messy to do. | | | |
| 09:07:10 Apr/07/04 | 195 | 285 | 20.0236 | 145.2181 | The re-suspended sediment appears to be dissipating - perhaps because of current. We still have no Eh signal (~183). | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 09:12:40 Apr/07/04 | 195 | 284 | 20.0236 | 145.2181 | Collecting second rock sample. | | | R789-021 |
| 09:13:01 Apr/07/04 | 194 | 284 | 20.0236 | 145.2181 | Nebraska shaped rock ~20-25cm long. Port biobox. Z=194. [Maug]. | R789-RK-0003 | SROF geo team (Stern) | |
| 09:13:49 Apr/07/04 | 195 | 284 | 20.0236 | 145.2181 | Large "Nebraska" shaped rock about 25 cm across; in port bio-box. | | | R789-022 |
| 09:14:34 Apr/07/04 | 194 | 293 | 20.0236 | 145.2181 | We are going to continue towards the NE. | | | |
| 09:16:22 Apr/07/04 | 190 | 267 | 20.0237 | 145.2181 | We are seeing similar type of bottom as before. Scattered boulders with corals on top. | | | |
| 09:17:55 Apr/07/04 | 186 | 270 | 20.0237 | 145.2181 | We are seeing a small school of myctophid fish being attracted to the cage. We will attempt to record them. | | | |
| 09:19:19 Apr/07/04 | 180 | 273 | 20.0237 | 145.2180 | A rock outcrop with a steep wall. Lots of sediment right next to the wall. | | | |
| 09:21:06 Apr/07/04 | 177 | 286 | 20.0238 | 145.2179 | We are now heading NW following the outcrop. | | | |
| 09:23:37 Apr/07/04 | 171 | 269 | 20.0238 | 145.2178 | We are seeing lots of sediment. At the top of the ridge we will follow SW. | | | |
| 09:25:30 Apr/07/04 | 169 | 12 | 20.0239 | 145.2178 | We are at a big outcrop now. We are starting to head to the NE again. Occasional chutes of fine material separated by rock. | | | |
| 09:27:10 Apr/07/04 | 170 | 40 | 20.0240 | 145.2179 | Trying to stay toward the bottom of the outcrop. | | | |
| 09:28:52 Apr/07/04 | 172 | 73 | 20.0239 | 145.2180 | We are still moving along the base - circling the pit. | | | |
| 09:31:10 Apr/07/04 | 177 | 75 | 20.0238 | 145.2181 | Columnar jointing at 45-degree angle to the slope face. Could be a constructional pile that collapsed. There is a spur sticking out. This is a huge wall with tall columns. | | | |
| 09:31:52 Apr/07/04 | 177 | 99 | 20.0238 | 145.2181 | Very large northwest dipping columns, which are part of a very thick flow. | | | R789-023 |
| 09:32:51 Apr/07/04 | 177 | 64 | 20.0238 | 145.2182 | We are following the spur to the SE. | | | |
| 09:33:34 Apr/07/04 | 180 | 1 | 20.0238 | 145.2182 | The material is so weathered that it is hard to see structures on the wall. | | | |
| 09:34:06 Apr/07/04 | 183 | 358 | 20.0238 | 145.2182 | We are doing gauges. | | | |
| 09:36:22 Apr/07/04 | 188 | 312 | 20.0238 | 145.2182 | We are at the base of the wall. We are looking at an eel. Other small fish are swimming around. | | | |
| 09:37:20 Apr/07/04 | 190 | 306 | 20.0238 | 145.2182 | A type of eel. | | | R789-024 |
| 09:38:37 Apr/07/04 | 189 | 311 | 20.0238 | 145.2182 | We are looking at the east side of this dike. | | | |
| 09:39:13 Apr/07/04 | 188 | 309 | 20.0238 | 145.2182 | We continue to follow the spur to the NW. | | | |
| 09:40:58 Apr/07/04 | 184 | 295 | 20.0239 | 145.2182 | Still following the wall towards the west. No sign of staining or hydrothermal activity yet. | | | |
| 09:42:19 Apr/07/04 | 179 | 65 | 20.0239 | 145.2182 | Moving the ship 50 m towards the middle of the pit. | | | |
| 09:45:40 Apr/07/04 | 181 | 307 | 20.0240 | 145.2183 | We are still following the base of the wall and we are ~1/3 around the pit. Moving the ship so that we can get onto the northern side. | | | |
| 09:46:29 Apr/07/04 | 183 | 332 | 20.0240 | 145.2183 | We are seeing many spurs perhaps dikes running NW to SE. | | | |
| 09:47:45 Apr/07/04 | 178 | 333 | 20.0241 | 145.2184 | We are on a sediment covered slope at 180 m depth. | | | |
| 09:49:07 Apr/07/04 | 176 | 333 | 20.0242 | 145.2184 | Heading towards a steep slope to our east on the northeast side of the pit. It is the highest spot on the pit. | | | |
| 09:50:04 Apr/07/04 | 175 | 96 | 20.0242 | 145.2184 | Maybe dikes have broken down. Much weaker slope and eroded back. | | | |
| 09:54:03 Apr/07/04 | 172 | 67 | 20.0243 | 145.2188 | Some talus from the wall is on the slope. | | | |
| 09:54:52 Apr/07/04 | 172 | 78 | 20.0243 | 145.2189 | We are down in the pit. | | | |
| 09:55:39 Apr/07/04 | 170 | 54 | 20.0243 | 145.2189 | Some erosion and weathering seen. | | | |
| 09:55:52 Apr/07/04 | 170 | 55 | 20.0243 | 145.2189 | Stony corals covered hunk-o-rock. | | | R789-025 |
| 09:56:22 Apr/07/04 | 170 | 50 | 20.0243 | 145.2189 | Massive outcrops with lots of big columns. | | | |
| 09:56:51 Apr/07/04 | 169 | 73 | 20.0243 | 145.2189 | Continuing SE following the base as best we can. | | | |
| 09:57:42 Apr/07/04 | 170 | 102 | 20.0243 | 145.2189 | We are now almost ~1/2 ways around the bottom of the pit. | | | |
| 09:58:39 Apr/07/04 | 175 | 99 | 20.0242 | 145.2189 | We may be looking at a series of dikes. Following the base of the wall SE. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 10:01:10 Apr/07/04 | 181 | 103 | 20.0242 | 145.2190 | We are at 181 m depth facing east and going SE. | | | |
| 10:01:56 Apr/07/04 | 182 | 92 | 20.0242 | 145.2191 | Small unknown juvenile fish in water column with large columnar joints in background. | | | R789-026 |
| 10:04:03 Apr/07/04 | 188 | 101 | 20.0241 | 145.2192 | We are at the base of the wall again and it seems quite similar with no evidence of hydrothermal activity or staining. | | | |
| 10:04:40 Apr/07/04 | 188 | 63 | 20.0241 | 145.2192 | More columnar joints. | | | |
| 10:04:42 Apr/07/04 | 188 | 57 | 20.0241 | 145.2192 | Smaller columnar joints above the larger joints in the wall. Note fish in upper left. | | | R789-027 |
| 10:05:24 Apr/07/04 | 189 | 71 | 20.0240 | 145.2192 | At the base of slope. Sediment and some rocks have fallen off the slope - but not much else. | | | |
| 10:06:43 Apr/07/04 | 188 | 91 | 20.0240 | 145.2193 | Moving the ship again. | | | |
| 10:08:02 Apr/07/04 | 186 | 85 | 20.0240 | 145.2193 | We are heading east. | | | |
| 10:08:33 Apr/07/04 | 185 | 116 | 20.0240 | 145.2193 | We are in the saddle between the two cones. This could be the source of the fluid. It could be an area of alteration. | | | |
| 10:09:28 Apr/07/04 | 181 | 147 | 20.0240 | 145.2194 | We are getting into a talus slope, which coincides, with the saddle. | | | |
| 10:10:45 Apr/07/04 | 177 | 85 | 20.0239 | 145.2194 | Talus pile on saddle between two cones. | | | R789-028 |
| 10:13:28 Apr/07/04 | 161 | 68 | 20.0240 | 145.2197 | Large number of sea whips and corals suggesting more flow. Also gorgonians. | | | |
| 10:14:30 Apr/07/04 | 157 | 7 | 20.0241 | 145.2197 | Soft gorgonian corals on rock and others in background. | | | R789-029 |
| 10:14:59 Apr/07/04 | 157 | 356 | 20.0241 | 145.2197 | Cluster of Turbullarian coral with a Tethyan distribution. Abundant sea whips; soft corals; stone coral; gorgonian coral fans and some hydroids. Stop for digital photos. | | | |
| 10:15:22 Apr/07/04 | 157 | 1 | 20.0241 | 145.2197 | Tethyian distribution of gorgonian soft coral. | | | R789-030 |
| 10:17:14 Apr/07/04 | 156 | 49 | 20.0241 | 145.2198 | Some type of coral. | | | R789-031 |
| 10:17:28 Apr/07/04 | 156 | 54 | 20.0241 | 145.2198 | Gorgonian. | | | R789-032 |
| 10:19:14 Apr/07/04 | 154 | 313 | 20.0241 | 145.2198 | Soft corals and sea whips. | | | R789-033 |
| 10:21:01 Apr/07/04 | 149 | 27 | 20.0242 | 145.2198 | High diversity of fauna. Hydroids on a gorgonian skeleton and bottle stars on top of the hydroids. Lots of sea whips. | | | |
| 10:21:23 Apr/07/04 | 149 | 34 | 20.0242 | 145.2198 | Brittle star and hydroids. | | | R789-034 |
| 10:24:19 Apr/07/04 | 146 | 24 | 20.0242 | 145.2198 | We are going back on the north cone. | | | |
| 10:25:17 Apr/07/04 | 146 | 38 | 20.0242 | 145.2197 | We are going up a very steep wall with some more columnar joints. A massive wall. | | | |
| 10:26:06 Apr/07/04 | 144 | 35 | 20.0242 | 145.2198 | Heavily weathered and heavily populated dike. | | | R789-035 |
| 10:29:06 Apr/07/04 | 137 | 16 | 20.0242 | 145.2198 | Some white encrusting sponges. Many corals. | | | |
| 10:30:37 Apr/07/04 | 131 | 317 | 20.0242 | 145.2198 | Seeing high density of sea whips on this ridge. A red fish is swimming around. | | | |
| 10:31:41 Apr/07/04 | 125 | 323 | 20.0243 | 145.2198 | A lot of black coral (?) and brittle stars on them. We are going to the southwest to look at another outcrop because the ones we were looking at are not part of the wall. | | | |
| 10:32:54 Apr/07/04 | 126 | 257 | 20.0242 | 145.2197 | We are now going to go back to the north side of the south cone. | | | |
| 10:39:22 Apr/07/04 | 170 | 275 | 20.0240 | 145.2199 | We are back at the saddle. | | | |
| 10:41:11 Apr/07/04 | 151 | 247 | 20.0241 | 145.2199 | Tether management. | | | |
| 10:44:26 Apr/07/04 | 136 | 109 | 20.0239 | 145.2196 | We may have to circumnavigate the cone if we do not find any evidence of hydrothermal activity while we are circumnavigating the pit. | | | |
| 10:47:19 Apr/07/04 | 174 | 116 | 20.0238 | 145.2195 | We are back on the bottom of the saddle moving southeast. | | | |
| 10:48:44 Apr/07/04 | 174 | 136 | 20.0238 | 145.2195 | Talus with a number of sea whips. Some scleractinians. | | | |
| 10:51:35 Apr/07/04 | 168 | 135 | 20.0237 | 145.2196 | Uniform talus up the slope. | | | |
| 10:53:05 Apr/07/04 | 164 | 139 | 20.0237 | 145.2196 | Talus blocks are ~20 across and mostly uniform in size. | | | |
| 10:56:48 Apr/07/04 | 145 | 133 | 20.0236 | 145.2198 | We are continuing up the slope and will make it to ~125 m to see the outcrop and then we will move elsewhere. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 10:57:43 Apr/07/04 | 141 | 131 | 20.0235 | 145.2199 | We are going to do a traverse on the top of the south cone. | | | |
| 10:59:44 Apr/07/04 | 130 | 135 | 20.0235 | 145.2200 | Some fairly large coral suggesting relative stability of the substrate. Not much turbidity suggests low current at least now. | | | |
| 11:02:28 Apr/07/04 | 125 | 149 | 20.0234 | 145.2201 | More black coral and abundant serpulids. A lot of sponges. We are seeing extensive encrusting red algae. The first outcrop of the talus occurs at this depth. | | | |
| 11:03:35 Apr/07/04 | 123 | 210 | 20.0234 | 145.2201 | Coral on talus slope on the way to the peak of the second cone. | | | R789-036 |
| 11:05:39 Apr/07/04 | 116 | 151 | 20.0234 | 145.2202 | Red and maybe green algae. | | | R789-037 |
| 11:06:28 Apr/07/04 | 115 | 185 | 20.0233 | 145.2203 | We are seeing only outcrop now. | | | |
| 11:07:05 Apr/07/04 | 114 | 187 | 20.0233 | 145.2203 | Black coral (?) and red and green algae. | | | R789-038 |
| 11:07:13 Apr/07/04 | 113 | 190 | 20.0233 | 145.2202 | Extensive colonies of black coral (?) and coverage of sponges. A large coral tree. | | | |
| 11:08:22 Apr/07/04 | 111 | 150 | 20.0233 | 145.2203 | Tree root-like coral. | | | R789-039 |
| 11:09:45 Apr/07/04 | 107 | 149 | 20.0233 | 145.2203 | Orange and green sponges are starting to appear. Very high cover of encrusting organisms. | | | |
| 11:12:11 Apr/07/04 | 103 | 142 | 20.0233 | 145.2203 | High diversity of sponges. The wall is almost 100% covered by epifauna. A myriad of colors. | | | |
| 11:13:47 Apr/07/04 | 101 | 136 | 20.0233 | 145.2203 | Gorgonian and sponges. | | | R789-040 |
| 11:15:05 Apr/07/04 | 93 | 168 | 20.0233 | 145.2203 | We are noticing very abundant plankton. The pinnacle is dominated by gorgonians facing into the current. | | | |
| 11:17:15 Apr/07/04 | 95 | 91 | 20.0232 | 145.2203 | Extremely high diversity of sponges. | | | |
| 11:18:46 Apr/07/04 | 94 | 103 | 20.0232 | 145.2203 | There is A LOT of plankton (krill or amphipods?) at the cage. | | | |
| 11:18:54 Apr/07/04 | 94 | 112 | 20.0232 | 145.2203 | Gorgonians lined up along the top of the dike. | | | R789-041 |
| 11:20:07 Apr/07/04 | 92 | 123 | 20.0232 | 145.2203 | We are moving the ship. | | | |
| 11:20:38 Apr/07/04 | 91 | 134 | 20.0232 | 145.2203 | We are looking at an outcrop covered with sponges. | | | |
| 11:22:10 Apr/07/04 | 87 | 161 | 20.0232 | 145.2203 | Reef plate corals. | | | |
| 11:23:31 Apr/07/04 | 87 | 148 | 20.0232 | 145.2203 | Reef-building lace coral along the right hand side of the frame. | | | R789-042 |
| 11:24:23 Apr/07/04 | 86 | 143 | 20.0232 | 145.2203 | Colonial hermatypic coral with plate morphology. Also a lot of sponges and coralline algae. | | | |
| 11:25:57 Apr/07/04 | 81 | 168 | 20.0232 | 145.2203 | Lovely filmy coral. | | | R789-043 |
| 11:26:58 Apr/07/04 | 79 | 187 | 20.0232 | 145.2203 | Big sponges and lots of coralline algae. Tons of plankton. | | | |
| 11:29:38 Apr/07/04 | 74 | 191 | 20.0231 | 145.2204 | Large polyped corals. | | | R789-044 |
| 11:30:51 Apr/07/04 | 72 | 198 | 20.0230 | 145.2204 | We are looking at something like Halimeda; red sponges; large corals. | | | |
| 11:35:13 Apr/07/04 | 73 | 224 | 20.0230 | 145.2204 | Still flying around the pinnacle which is covered with sponges and hermatypic coral (pineapple coral). | | | |
| 11:39:14 Apr/07/04 | 67 | 210 | 20.0230 | 145.2204 | Cidaroid urchin. | | | |
| 11:40:21 Apr/07/04 | 64 | 222 | 20.0230 | 145.2204 | We have lost the big plate corals. Branching coral. | | | |
| 11:42:05 Apr/07/04 | 60 | 206 | 20.0230 | 145.2204 | Diadema and a lot of branching coral. | | | |
| 11:46:39 Apr/07/04 | 56 | 141 | 20.0230 | 145.2203 | We are seeing ~ 5 species of scleractinian coral. A fire coral. | | | |
| 11:46:49 Apr/07/04 | 56 | 123 | 20.0230 | 145.2203 | Spiny urchin. | | | R789-045 |
| 11:48:28 Apr/07/04 | 55 | 70 | 20.0229 | 145.2203 | We are seeing more Diadema. | | | |
| 11:49:06 Apr/07/04 | 56 | 128 | 20.0229 | 145.2203 | Angel fishes. | | | |
| 11:49:19 Apr/07/04 | 56 | 124 | 20.0229 | 145.2203 | Some sort of angelfish near summit. | | | R789-046 |
| 11:50:38 Apr/07/04 | 57 | 125 | 20.0229 | 145.2202 | Large branching coral on rocky outcrop near summit. | | | R789-047 |
| 11:55:51 Apr/07/04 | 51 | 60 | 20.0229 | 145.2203 | We are moving the ship to the south so we can get up the pinnacle. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 12:00:39 Apr/07/04 | 59 | 87 | 20.0224 | 145.2202 | We are continuing to climb now the ship has moved and tether is managed. | | | |
| 12:01:28 Apr/07/04 | 59 | 89 | 20.0224 | 145.2202 | Greater diversity of coral. Solid plating corals. | | | |
| 12:01:50 Apr/07/04 | 59 | 94 | 20.0224 | 145.2202 | Solid plating corals. "Now that is biology in action". | | | R789-048 |
| 12:04:14 Apr/07/04 | 55 | 112 | 20.0224 | 145.2204 | We see a mix of broken table corals and healthy coral growing on top. And we are seeing our first branching coral. | | | |
| 12:05:02 Apr/07/04 | 53 | 109 | 20.0224 | 145.2204 | Live coral growing on layers of dead coral. | | | R789-049 |
| 12:06:04 Apr/07/04 | 50 | 117 | 20.0224 | 145.2204 | We are now getting into the reef. | | | |
| 12:06:46 Apr/07/04 | 48 | 118 | 20.0224 | 145.2205 | We can see outcrop underneath the biota. | | | |
| 12:09:08 Apr/07/04 | 42 | 117 | 20.0224 | 145.2205 | We are still seeing the schlieren in the water. We are not sure what is causing it. | | | |
| 12:10:31 Apr/07/04 | 41 | 113 | 20.0224 | 145.2205 | We are back into an encrusting community and we no longer see plate corals. We see some sea grapes. | | | |
| 12:11:53 Apr/07/04 | 38 | 113 | 20.0224 | 145.2205 | Huge hydrozoan (fire coral?). | | | |
| 12:11:56 Apr/07/04 | 38 | 114 | 20.0224 | 145.2205 | Looks like a colonial hydrozoan. | | | R789-050 |
| 12:13:33 Apr/07/04 | 35 | 106 | 20.0224 | 145.2205 | Colonial hydrozoans (fire coral?). | | | R789-051 |
| 12:13:52 Apr/07/04 | 35 | 106 | 20.0224 | 145.2205 | We are starting to see some huge anemones and clown fish. | | | |
| 12:15:26 Apr/07/04 | 36 | 105 | 20.0224 | 145.2205 | Spires and clown fishes and urchin. | | | R789-052 |
| 12:16:37 Apr/07/04 | 36 | 104 | 20.0224 | 145.2205 | Clown fishes hiding in the anemone. | | | R789-053 |
| 12:20:04 Apr/07/04 | 32 | 74 | 20.0224 | 145.2205 | Crinoid at 065 degrees on the ridge. | | | |
| 12:20:43 Apr/07/04 | 31 | 100 | 20.0224 | 145.2206 | Coral reef at the top of the pinnacle. Depth is 31m. | | | |
| 12:21:18 Apr/07/04 | 32 | 76 | 20.0225 | 145.2206 | Enormous variety of biota. | | | R789-054 |
| 12:23:27 Apr/07/04 | 31 | 75 | 20.0225 | 145.2206 | Taking pictures near the top of the pinnacle. | | | |
| 12:24:10 Apr/07/04 | 27 | 150 | 20.0225 | 145.2206 | Climbing up a little more on a different pinnacle. We see pipefish. | | | |
| 12:25:15 Apr/07/04 | 26 | 86 | 20.0224 | 145.2206 | A small giant clam. | | | |
| 12:25:56 Apr/07/04 | 28 | 112 | 20.0223 | 145.2206 | Very diverse coral community. | | | |
| 12:26:52 Apr/07/04 | 25 | 151 | 20.0224 | 145.2206 | Echinometrid urchins. | | | |
| 12:27:32 Apr/07/04 | 22 | 178 | 20.0224 | 145.2206 | Sea star. | | | |
| 12:27:57 Apr/07/04 | 21 | 196 | 20.0224 | 145.2206 | We are at the top. | | | |
| 12:28:30 Apr/07/04 | 19 | 20 | 20.0222 | 145.2207 | We've reached the high point of the pinnacle at 20-21m depth. Quite a few urchins visible. ROPOS's lights are clearly visible over the side of the ship. | | | |
| 12:31:15 Apr/07/04 | 21 | 293 | 20.0222 | 145.2207 | Trigger fish near pinnacle. | | | R789-055 |
| 12:34:40 Apr/07/04 | 27 | 316 | 20.0222 | 145.2203 | The plan is to go west to the South Cone and traverse down. We are moving the ship. | | | |
| 12:38:52 Apr/07/04 | 51 | 274 | 20.0225 | 145.2194 | Moving to the 'next valley over' to look for active venting. | | | |
| 12:45:59 Apr/07/04 | 54 | 103 | 20.0225 | 145.2190 | Moving the ship another 100 m west. | | | |
| 13:10:25 Apr/07/04 | 171 | 271 | 20.0222 | 145.2171 | We are going to stop the ship. We're on the west side of the main cone. This time we'll go south along the main cone. | | | |
| 13:14:50 Apr/07/04 | 223 | 133 | 20.0222 | 145.2171 | We are on the bottom again. | | | |
| 13:15:13 Apr/07/04 | 223 | 133 | 20.0222 | 145.2171 | We will drive slightly SE. | | | |
| 13:15:48 Apr/07/04 | 224 | 131 | 20.0222 | 145.2171 | We see more juvenile fish than before. Sedimented slope with considerable bioturbation. | | | |
| 13:19:07 Apr/07/04 | 224 | 128 | 20.0221 | 145.2172 | Degraded looking flows with small sponges on them. | | | |
| 13:19:49 Apr/07/04 | 224 | 127 | 20.0221 | 145.2173 | The juvenile fish keep hitting the sediment. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 13:20:43 Apr/07/04 | 224 | 126 | 20.0221 | 145.2173 | We are following the 220 m contour. We are turning more towards the east. | | | |
| 13:21:58 Apr/07/04 | 226 | 93 | 20.0220 | 145.2174 | Many more burrows in this area. | | | |
| 13:22:48 Apr/07/04 | 224 | 87 | 20.0220 | 145.2174 | We are at the rock where we started. Seeing some coral; sea whips and sponges. | | | |
| 13:24:38 Apr/07/04 | 223 | 96 | 20.0220 | 145.2176 | Moving the ship 150 m to the east. | | | |
| 13:25:25 Apr/07/04 | 222 | 89 | 20.0220 | 145.2176 | It looks like some harder targets are coming up. | | | |
| 13:26:32 Apr/07/04 | 219 | 96 | 20.0220 | 145.2177 | Talus near the bottom of the slope. Boulders with sponges on them. | | | |
| 13:27:08 Apr/07/04 | 218 | 95 | 20.0220 | 145.2177 | We have located an outcrop. | | | |
| 13:27:08 Apr/07/04 | 218 | 95 | 20.0220 | 145.2177 | We have located an outcrop. | | | |
| 13:27:46 Apr/07/04 | 220 | 94 | 20.0219 | 145.2177 | Following along the base of the cone. | | | |
| 13:29:05 Apr/07/04 | 218 | 96 | 20.0219 | 145.2178 | Rocks sitting on the sediment with a sediment cover on them suggesting substrate stability. Bigger boulders also covered in sediment. | | | |
| 13:30:10 Apr/07/04 | 215 | 95 | 20.0219 | 145.2179 | We are on the talus slope. | | | |
| 13:30:35 Apr/07/04 | 213 | 89 | 20.0219 | 145.2180 | Climbing up slightly. Seeing more talus. This is a big boulder field with sponges on the rocks but no large epifauna. | | | |
| 13:31:53 Apr/07/04 | 206 | 94 | 20.0219 | 145.2181 | We are going as far east as we can. | | | |
| 13:32:50 Apr/07/04 | 199 | 90 | 20.0219 | 145.2182 | We need to move the ship 100 m south. | | | |
| 13:34:38 Apr/07/04 | 187 | 90 | 20.0219 | 145.2184 | Lots of serpulids on the rocks. | | | |
| 13:35:18 Apr/07/04 | 183 | 202 | 20.0218 | 145.2185 | We are heading south along the talus slope. | | | |
| 13:38:48 Apr/07/04 | 202 | 211 | 20.0213 | 145.2183 | The most exciting thing we've seen in 25 minutes. | | | R789-056 |
| 13:39:09 Apr/07/04 | 202 | 211 | 20.0213 | 145.2183 | We have found a rock that has unidentifiable white material on it. We are going to take it. We also think that we may be seeing some blue filamentous mat. | | | |
| 13:44:20 Apr/07/04 | 203 | 81 | 20.0213 | 145.2183 | Sampling from talus pile. | | | R789-057 |
| 13:44:22 Apr/07/04 | 203 | 82 | 20.0213 | 145.2183 | Rock ~15cm with unidentifiable white material on it. Port biobox. Z=203. [Maug]. | R789-RK-0004 | SROF geo team (Stern) | |
| 13:44:47 Apr/07/04 | 203 | 87 | 20.0213 | 145.2183 | Sample placed in port bio-box. | | | R789-058 |
| 13:46:20 Apr/07/04 | 201 | 93 | 20.0213 | 145.2183 | Talus covered with sediment and occasional sponges. Big white rock. | | | |
| 13:48:08 Apr/07/04 | 200 | 90 | 20.0213 | 145.2183 | Increasing frequency of this white stained rock as we move up slope. | | | R789-059 |
| 13:49:19 Apr/07/04 | 195 | 95 | 20.0213 | 145.2184 | Checking gauges. | | | |
| 13:51:08 Apr/07/04 | 187 | 92 | 20.0213 | 145.2185 | We are still heading up slope. We no longer see the white rock. | | | |
| 13:53:01 Apr/07/04 | 177 | 51 | 20.0214 | 145.2186 | More excitement. | | | R789-060 |
| 13:54:22 Apr/07/04 | 169 | 68 | 20.0214 | 145.2187 | The white rocks may be coral blocks and coral plates. We are going to head back downslope. | | | |
| 13:56:21 Apr/07/04 | 172 | 225 | 20.0212 | 145.2187 | Driving along and continue to see talus on the slopes of the cone site. | | | |
| 14:00:23 Apr/07/04 | 199 | 217 | 20.0208 | 145.2185 | Turn upslope to ESE to traverse the slopes trying to look for the venting. | | | |
| 14:04:10 Apr/07/04 | 183 | 107 | 20.0206 | 145.2187 | Blocky lavas on a scree slope. Heading 110 degrees. See white; small; solitary corals as we traverse up slope. | | | |
| 14:08:13 Apr/07/04 | 164 | 111 | 20.0206 | 145.2190 | Decided to traverse the slopes in a zigzag pattern trying to find the venting. Continue to see blocky lavas with minor corals on individual rocks. See large fan coral. | | | |
| 14:10:47 Apr/07/04 | 149 | 114 | 20.0206 | 145.2192 | Some of the lavas have a slight flow banding to them. Otherwise appear quite massive with a 'dusting' of organic material (sediment) on top. | | | |
| 14:12:11 Apr/07/04 | 145 | 111 | 20.0205 | 145.2194 | See a cliff here with outcropping lava. On the edge of a vertical wall. | | | |
| 14:13:27 Apr/07/04 | 134 | 106 | 20.0205 | 145.2195 | Hard and soft corals. | | | R789-061 |
| 14:13:42 Apr/07/04 | 134 | 112 | 20.0205 | 145.2195 | At the top of the cliff had a plateau and see a type of fluffy looking material. Not bacterial mats? Not sure what it is amongst single hard corals. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 14:15:55 Apr/07/04 | 129 | 85 | 20.0205 | 145.2196 | Sponges and corals on the side of a dyke or outcrop. | | | R789-062 |
| 14:16:50 Apr/07/04 | 124 | 15 | 20.0205 | 145.2196 | Might be looking at a dike here as is a narrow outcrop that appears to project outwards from the general rock face. Covered by sponges and corals. | | | |
| 14:22:35 Apr/07/04 | 141 | 128 | 20.0205 | 145.2193 | Moving upslope to the SE. Continue to see cliffs locally and talus. | | | |
| 14:24:39 Apr/07/04 | 125 | 69 | 20.0204 | 145.2196 | Pretty much vertical walls in this area. Talus looks jumbled here. In fact some of this does not appear as talus - rather some sort of blocky flow. | | | |
| 14:27:28 Apr/07/04 | 122 | 104 | 20.0202 | 145.2200 | Looks like more or less continuous rock outcrop above ~128 m water depth. Below is talus. Outcrop is a series of ridge coming out of the slope covered in sponges and corals locally. | | | |
| 14:29:07 Apr/07/04 | 107 | 94 | 20.0202 | 145.2202 | See vertical outcrop about 20 m + of blocky lava. | | | |
| 14:30:48 Apr/07/04 | 98 | 63 | 20.0201 | 145.2202 | Facing significant ridge that sticks out on the bathymetry on the south side of the cone. Very steep wall here. Most likely one of the radial dikes we see in the walls of the caldera. | | | |
| 14:33:59 Apr/07/04 | 136 | 67 | 20.0198 | 145.2202 | Moving back down slope. Had a very steep drop off underneath the ROPOS. | | | |
| 14:36:47 Apr/07/04 | 151 | 82 | 20.0198 | 145.2201 | Back at the bottom at 150 m. See talus slope with little biology. | | | |
| 14:40:07 Apr/07/04 | 179 | 171 | 20.0194 | 145.2202 | Left edge of cliff and going downslope a little E of S. All talus here. Left cliff at about 150 m water depth. | | | |
| 14:42:25 Apr/07/04 | 196 | 170 | 20.0190 | 145.2203 | See either an outcrop or a giant boulder? Not sure which. | | | |
| 14:43:26 Apr/07/04 | 202 | 170 | 20.0188 | 145.2204 | Taking a look at bottom here at 200m; then going to head upslope all the way to the south summit. See blocky talus covered in fine coating of organic looking material. | | | |
| 14:46:09 Apr/07/04 | 201 | 35 | 20.0191 | 145.2206 | Size range of the blocks of lava seen in talus average about 30cm and are angular and blocky. Occasionally see a larger one. See some jointing. Not much evidence for flow banding. | | | |
| 14:49:15 Apr/07/04 | 173 | 43 | 20.0195 | 145.2209 | Moving rapidly upslope and see continuous debris slope of blocky lava. | | | |
| 14:52:47 Apr/07/04 | 128 | 16 | 20.0200 | 145.2210 | Saw steep cliff of outcrop around 130 m. Looks like dikes with jointing horizontal. | | | |
| 14:53:47 Apr/07/04 | 117 | 3 | 20.0201 | 145.2210 | See steep cliff of less massive blocky lava and rather more pyroclastic like? See the blue fluffy like coral. Some fan coral also. Traversing a narrow ridge. No doubt a dike. | | | |
| 14:55:01 Apr/07/04 | 108 | 356 | 20.0202 | 145.2210 | Coming upslope east of notable ridge on map (dike). | | | |
| 14:56:57 Apr/07/04 | 97 | 3 | 20.0202 | 145.2210 | Top of the ridge we have been following. Covered in sponges and corals. | | | R789-063 |
| 14:57:01 Apr/07/04 | 97 | 358 | 20.0202 | 145.2210 | Got to top of ridge (dike) and now following along top of it. Continue to see combination of coral sponges and algae. | | | |
| 14:57:31 Apr/07/04 | 96 | 6 | 20.0202 | 145.2211 | Top of the ridge covered in red algae ? | | | R789-064 |
| 14:59:13 Apr/07/04 | 92 | 316 | 20.0204 | 145.2211 | See more sandy material and cobbles here. Then back into outcrop although hard to see rock itself as covered with corals and sponges. | | | |
| 15:00:59 Apr/07/04 | 70 | 357 | 20.0206 | 145.2210 | Some of the corals look like flanges with flat tops and almost mushroom like. | | | |
| 15:02:29 Apr/07/04 | 60 | 0 | 20.0206 | 145.2210 | Slope is much more gentle here and are starting to see tropical f ish. See some sea urchins. Possibly see some rope on the seafloor. | | | |
| 15:02:51 Apr/07/04 | 58 | 356 | 20.0208 | 145.2211 | Flat corals and urchins. | | | R789-065 |
| 15:05:31 Apr/07/04 | 52 | 347 | 20.0208 | 145.2210 | Moving up S slope of the cone in the center of Maug. All the lava outcrops completely covered with corals and sponges. Few fish here at 50 m water depth. | | | |
| 15:10:07 Apr/07/04 | 52 | 344 | 20.0209 | 145.2211 | Plate corals and an urchin. | | | R789-066 |
| 15:10:14 Apr/07/04 | 52 | 344 | 20.0209 | 145.2211 | Urchin. | | | R789-067 |
| 15:11:16 Apr/07/04 | 50 | 350 | 20.0210 | 145.2211 | Coral. | | | R789-068 |
| 15:11:17 Apr/07/04 | 50 | 350 | 20.0210 | 145.2211 | See numerous types of coral and also some urchins with quite thick spines. | | | |
| 15:11:42 Apr/07/04 | 49 | 352 | 20.0210 | 145.2211 | White thing that is not a sponge. Don't know what it is. | | | R789-069 |
| 15:13:39 Apr/07/04 | 50 | 325 | 20.0210 | 145.2211 | Sea cucumber trying to hide. | | | R789-070 |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 15:18:10 Apr/07/04 | 50 | 177 | 20.0209 | 145.2210 | Archive video has been turned off while we go back to the cage to deal with a loose recovery line that is getting involved with the tether. | | | |
| 15:22:15 Apr/07/04 | 56 | 14 | 20.0208 | 145.2210 | Archive video turned back on after dealing with tether. Back on bottom. | | | |
| 15:24:21 Apr/07/04 | 57 | 13 | 20.0209 | 145.2210 | Pencil urchin. | | | R789-071 |
| 15:25:07 Apr/07/04 | 54 | 1 | 20.0209 | 145.2210 | Passing over more platy coral - tan and purplish gray. | | | |
| 15:25:47 Apr/07/04 | 55 | 7 | 20.0209 | 145.2210 | Darker plate coral. | | | R789-072 |
| 15:26:10 Apr/07/04 | 55 | 1 | 20.0209 | 145.2210 | Close up of dark purple coral. | | | R789-073 |
| 15:27:40 Apr/07/04 | 53 | 339 | 20.0209 | 145.2210 | Butterfly fish hiding in the coral. | | | |
| 15:28:07 Apr/07/04 | 52 | 345 | 20.0209 | 145.2210 | More urchins and corals. | | | R789-074 |
| 15:30:54 Apr/07/04 | 51 | 350 | 20.0210 | 145.2210 | Moorish Idol fish. | | | |
| 15:37:39 Apr/07/04 | 45 | 280 | 20.0212 | 145.2211 | The reef. | | | R789-075 |
| 15:38:04 Apr/07/04 | 44 | 297 | 20.0212 | 145.2211 | Variety of corals. | | | R789-076 |
| 15:38:04 Apr/07/04 | 44 | 297 | 20.0212 | 145.2211 | We are still looking at coral and a few fish on our way to the top of the cone. | | | |
| 15:39:47 Apr/07/04 | 37 | 321 | 20.0213 | 145.2210 | South summit. | | | R789-077 |
| 15:40:40 Apr/07/04 | 42 | 312 | 20.0212 | 145.2211 | Cornel is now in the hot seat. The cone is completely covered with coral from a depth of at least 70 meters. | | | |
| 15:44:49 Apr/07/04 | 82 | 309 | 20.0213 | 145.2208 | Plate corals at 80m. Reef-forming corals. The summit was mainly coral - not rock. | | | R789-078 |
| 15:44:56 Apr/07/04 | 83 | 308 | 20.0213 | 145.2208 | Southern ridge almost completely covered with these plate corals and some urchins. | | | |
| 15:46:24 Apr/07/04 | 87 | 343 | 20.0210 | 145.2214 | Back to blocky talus that is not well sorted and around 10cm to half a meter in diameter. | | | |
| 15:48:10 Apr/07/04 | 89 | 357 | 20.0208 | 145.2214 | Heading around the southeast side. | | | |
| 15:50:02 Apr/07/04 | 100 | 344 | 20.0207 | 145.2214 | Entering an area of more sediment that is almost volcanic looking. Starts around 80 to 90 meters depth. | | | |
| 15:52:23 Apr/07/04 | 119 | 342 | 20.0204 | 145.2215 | Back into 20-30 cm diameter talus that is lightly dusted with sediment. | | | |
| 15:54:06 Apr/07/04 | 126 | 342 | 20.0203 | 145.2216 | Much heavier sediment covered area with some small yellowish spots. | | | |
| 15:54:56 Apr/07/04 | 129 | 331 | 20.0203 | 145.2216 | Taking a closer look at yellow spots on sediment. Yellow spots seem to be beneath the main sediment. | | | |
| 15:55:18 Apr/07/04 | 130 | 326 | 20.0203 | 145.2216 | Yellow staining at 130 m. | | | R789-079 |
| 15:57:24 Apr/07/04 | 130 | 320 | 20.0203 | 145.2216 | Some slightly translucent white material poking through the sediment. May be organic. | | | |
| 15:58:17 Apr/07/04 | 130 | 321 | 20.0203 | 145.2216 | Zoomed in on yellow staining. | | | R789-080 |
| 16:00:09 Apr/07/04 | 132 | 339 | 20.0202 | 145.2216 | Yellowish material seems more common at this depth. Unlikely that it is sulfur. | | | |
| 16:01:02 Apr/07/04 | 134 | 348 | 20.0202 | 145.2216 | Back to more coarse talus with fine dusting of sediment and still some patches of the yellow material. | | | |
| 16:03:20 Apr/07/04 | 141 | 347 | 20.0201 | 145.2217 | Talus with yellow staining. | | | R789-081 |
| 16:04:29 Apr/07/04 | 144 | 307 | 20.0201 | 145.2217 | Vertical face covered with that yellow material. Looks like a fracture. | | | |
| 16:04:29 Apr/07/04 | 144 | 307 | 20.0201 | 145.2217 | Yellow material on vertical rock outcrop. | | | R789-082 |
| 16:05:20 Apr/07/04 | 144 | 317 | 20.0201 | 145.2217 | Yellow bacterial mat? | | | R789-083 |
| 16:05:34 Apr/07/04 | 144 | 327 | 20.0201 | 145.2217 | There may be a little bit of venting here. Eh is at 167 and the yellowish material here looks more biological. May be bacterial mat. | | | |
| 16:06:22 Apr/07/04 | 144 | 303 | 20.0201 | 145.2217 | Yellow material is flocculent (stirred up by ROPOS). Probably bacterial mat. | | | R789-084 |
| 16:09:27 Apr/07/04 | 145 | 267 | 20.0201 | 145.2217 | Sitting a bit to let some of the bacterial mat we stirred up settle out. | | | |
| 16:10:10 Apr/07/04 | 145 | 266 | 20.0201 | 145.2217 | | | | R789-085 |
| 16:10:54 Apr/07/04 | 145 | 266 | 20.0201 | 145.2217 | Little fish are darting in and out of this yellow bacterial mat. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
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| 16:13:08 Apr/07/04 | 145 | 265 | 20.0201 | 145.2217 | Base of the outcrop is covered with bacterial mat. Looking at the base to see if we see any evidence of venting. Not really any mat down on the sediment except what has settled. | | | |
| 16:14:50 Apr/07/04 | 145 | 266 | 20.0201 | 145.2217 | Fish taking bites of floc. | | | R789-086 |
| 16:16:58 Apr/07/04 | 145 | 263 | 20.0201 | 145.2217 | Going to suction some of this material for Moyer. | | | |
| 16:20:18 Apr/07/04 | 145 | 315 | 20.0201 | 145.2217 | We have called this location 'egg drop soup'. | | | |
| 16:21:20 Apr/07/04 | 146 | 328 | 20.0201 | 145.2217 | Yellow material is in lots of little crevices around here. Eh is dropping steadily as we have been sitting here. It is down to 157 now. | | | |
| 16:25:05 Apr/07/04 | 146 | 324 | 20.0201 | 145.2217 | Small squid swimming in floc stirred up by ROPOS. | | | R789-087 |
| 16:27:54 Apr/07/04 | 146 | 325 | 20.0201 | 145.2217 | Moved away to let all the mat settle. Continue down slope a bit to look around. May come back to sample bacterial mat. | | | |
| 16:28:54 Apr/07/04 | 149 | 293 | 20.0201 | 145.2218 | Another fracture with yellow material? Or is this Egg Drop Soup again? | | | |
| 16:31:05 Apr/07/04 | 149 | 1 | 20.0201 | 145.2218 | Suction sample of yellow bacterial mat from the face of an outcrop into jar 5. Material is very easily disturbed. Start 1631 Stop 1635. Z=149. Filter is fairly clogged. [Maug - Egg Drop Soup]. | R789-SS-J5-0005 | Moyer | |
| 16:31:38 Apr/07/04 | 149 | 358 | 20.0201 | 145.2218 | Suction sample of yellow floc. | | | R789-088 |
| 16:37:00 Apr/07/04 | 149 | 0 | 20.0201 | 145.2218 | Heading off down slope to follow the yellow slime road. | | | |
| 16:39:08 Apr/07/04 | 149 | 5 | 20.0201 | 145.2218 | Looking back down at the rock face we just suctioned. | | | |
| 16:41:27 Apr/07/04 | 149 | 289 | 20.0201 | 145.2218 | Now we are continuing down slope. | | | |
| 16:44:36 Apr/07/04 | 150 | 30 | 20.0202 | 145.2221 | More talus slope with a light sediment covering. | | | |
| 16:46:04 Apr/07/04 | 151 | 335 | 20.0204 | 145.2222 | Lots of little yellow stony corals dotting the talus. | | | |
| 16:46:48 Apr/07/04 | 153 | 351 | 20.0204 | 145.2223 | We seem to go in and out of zones of sediment cover. No more evidence of yellow material and Eh is back up over 170. | | | |
| 16:49:41 Apr/07/04 | 170 | 313 | 20.0203 | 145.2225 | We have moved a bit northeast and we are not seeing any more of the yellow material. Head back to the southwest towards Egg Drop Soup and explore directly downslope from there. | | | |
| 16:54:23 Apr/07/04 | 162 | 297 | 20.0200 | 145.2220 | Following the same depth contour to the southwest then we will head back upslope to Egg Drop Soup then explore down slope from there. | | | |
| 16:54:49 Apr/07/04 | 163 | 269 | 20.0200 | 145.2220 | Some hydrozoans on sedimented talus slope. | | | R789-089 |
| 16:57:46 Apr/07/04 | 156 | 292 | 20.0200 | 145.2219 | Back to area of finer grained sediment. | | | |
| 16:58:47 Apr/07/04 | 151 | 324 | 20.0201 | 145.2218 | Starting to see yellow material peeking though the sediment again. Must be back in the general area of Egg Drop Soup. | | | |
| 17:00:13 Apr/07/04 | 149 | 324 | 20.0201 | 145.2218 | More of the yellow bacterial mat. | | | R789-090 |
| 17:04:04 Apr/07/04 | 153 | 257 | 20.0200 | 145.2217 | More pieces of rope or something on the bottom. | | | |
| 17:04:08 Apr/07/04 | 153 | 257 | 20.0200 | 145.2217 | More rope. | | | R789-091 |
| 17:05:09 Apr/07/04 | 153 | 267 | 20.0200 | 145.2217 | Another light colored rock off to the west. | | | |
| 17:06:43 Apr/07/04 | 154 | 253 | 20.0200 | 145.2217 | More yellow bacterial mat. | | | R789-092 |
| 17:06:51 Apr/07/04 | 154 | 252 | 20.0200 | 145.2217 | Another outcrop that is covered in yellow bacterial mat. It looks like it may be shimmering a bit. | | | |
| 17:08:26 Apr/07/04 | 154 | 256 | 20.0200 | 145.2217 | More of the yellow bacterial mat. | | | R789-093 |
| 17:10:05 Apr/07/04 | 153 | 256 | 20.0200 | 145.2217 | No obvious venting here. Continuing on down slope. | | | |
| 17:10:50 Apr/07/04 | 154 | 221 | 20.0200 | 145.2218 | Eh is going down a little again. | | | |
| 17:15:01 Apr/07/04 | 168 | 231 | 20.0198 | 145.2219 | Continuing southwest and not seeing any more evidence of bacterial mat. Go down to the southeast to 200m then work back up again. | | | |
| 17:18:15 Apr/07/04 | 180 | 109 | 20.0197 | 145.2221 | Heading southeast downslope on the SE side of the dome. | | | |

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| 17:23:43 Apr/07/04 | 203 | 126 | 20.0195 | 145.2224 | We're at 200 m so we will zigzag back up slope to the north. | | | |
| 17:26:30 Apr/07/04 | 199 | 69 | 20.0198 | 145.2227 | The plan is to contour around at this depth to the ENE until we intersect a major ridge coming down the SE flank of the dome and then we will head upslope along that ridge. EH is 173. | | | |
| 17:29:50 Apr/07/04 | 201 | 24 | 20.0201 | 145.2231 | Talus with relatively heavy sediment cover. White sponges and an occasional sea whip. | | | |
| 17:33:02 Apr/07/04 | 200 | 47 | 20.0205 | 145.2234 | Almost on the ridge in the bathymetry but we don't see much on the sonar. Turning upslope to the north. | | | |
| 17:37:40 Apr/07/04 | 187 | 323 | 20.0208 | 145.2233 | Not as much sediment with the talus now compared to 5 minutes ago. Heading upslope to the NW. | | | |
| 17:39:50 Apr/07/04 | 174 | 322 | 20.0210 | 145.2232 | Not much life on the talus. Small sponges and yellow coral. Talus getting smaller in size. Getting into some rock outcrops. | | | |
| 17:41:30 Apr/07/04 | 164 | 317 | 20.0211 | 145.2231 | Getting into rock outcrops. | | | |
| 17:44:17 Apr/07/04 | 143 | 322 | 20.0212 | 145.2230 | Going up rocky ridges and cliffs with steps and sections of talus. But mostly rock outcrops now. | | | |
| 17:46:09 Apr/07/04 | 132 | 320 | 20.0212 | 145.2230 | Cloudy water in the cage camera. It is at 112 m. It is due south of us about 30 meters. | | | |
| 17:48:15 Apr/07/04 | 122 | 320 | 20.0213 | 145.2230 | Eh going down slightly to 168-169. | | | |
| 17:49:39 Apr/07/04 | 112 | 297 | 20.0213 | 145.2230 | Green sponges and coral along with the red algae. Lots of the wispy black coral. | | | |
| 17:50:38 Apr/07/04 | 105 | 306 | 20.0213 | 145.2229 | Now at a local crest of the ridge we were following upslope. Still going upslope to the NNW. | | | |
| 17:54:10 Apr/07/04 | 75 | 302 | 20.0214 | 145.2226 | Getting into plate forming coral. | | | |
| 17:57:42 Apr/07/04 | 75 | 295 | 20.0215 | 145.2225 | Lots of plate forming coral. Some black coral. Very few fish. The rocks are totally covered now. Waiting for the ship to move. | | | |
| 17:58:21 Apr/07/04 | 75 | 298 | 20.0215 | 145.2225 | Plate forming helical coral. | | | R789-094 |
| 18:00:40 Apr/07/04 | 71 | 296 | 20.0215 | 145.2224 | Big fish zoomed around and stirred up some sparkly sediment. | | | |
| 18:03:41 Apr/07/04 | 65 | 292 | 20.0216 | 145.2223 | Jumble of plate forming coral of many different species. The big fish is still zooming around where we are apparently attracted to the lights. | | | |
| 18:05:17 Apr/07/04 | 62 | 298 | 20.0216 | 145.2223 | The elusive Blue Dude fish. | | | R789-095 |
| 18:06:52 Apr/07/04 | 59 | 293 | 20.0216 | 145.2222 | Platy corals are getting very large. Severe competition for space on the rock outcrops. | | | |
| 18:09:17 Apr/07/04 | 51 | 303 | 20.0216 | 145.2222 | Eh has stayed at 169. | | | |
| 18:15:13 Apr/07/04 | 43 | 314 | 20.0216 | 145.2222 | Going to turn east and go downslope. Slope of platy coral that looked like terraces on a slope. Eh is down to 156. | | | |
| 18:15:32 Apr/07/04 | 44 | 4 | 20.0217 | 145.2221 | Coral slope. | | | R789-096 |
| 18:17:39 Apr/07/04 | 49 | 7 | 20.0218 | 145.2222 | Looking north and lateraling down to the east. Slope is getting steeper. | | | |
| 18:19:58 Apr/07/04 | 62 | 9 | 20.0218 | 145.2224 | Going by a vertical rib of rock possibly a radial dike. | | | |
| 18:21:10 Apr/07/04 | 72 | 348 | 20.0217 | 145.2226 | At the top of a vertical cliff. Eh is 164. | | | |
| 18:23:41 Apr/07/04 | 94 | 293 | 20.0217 | 145.2228 | Going down big vertical cliff. Big fish is still swimming around with us. Looking WSW at the moment. | | | |
| 18:26:41 Apr/07/04 | 106 | 108 | 20.0217 | 145.2229 | We are into cloudy water suddenly. Milky water. Eh at 166. | | | |
| 18:27:43 Apr/07/04 | 105 | 79 | 20.0217 | 145.2230 | We are in some milky cloud. Can't see anything. Eh is not changing. | | | |
| 18:34:01 Apr/07/04 | 130 | 272 | 20.0219 | 145.2232 | Very steep wall of massive flows and talus. Trying to find extent and source of milky water. | | | |
| 18:36:28 Apr/07/04 | 127 | 215 | 20.0219 | 145.2232 | Rising up again along the wall looking for the milky plume. | | | |
| 18:39:29 Apr/07/04 | 126 | 357 | 20.0217 | 145.2232 | The Blue Dude fish. | | | R789-097 |
| 18:42:48 Apr/07/04 | 123 | 1 | 20.0221 | 145.2231 | Fish. | | | R789-098 |
| 18:43:42 Apr/07/04 | 117 | 4 | 20.0221 | 145.2231 | Gradually going upslope. Water getting milkier. Visibility going down. Eh not moving. | | | |
| 18:45:28 Apr/07/04 | 104 | 356 | 20.0221 | 145.2230 | Still in the plume. Going to continue upward to see what depth the top of it is. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
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| 18:48:09 Apr/07/04 | 83 | 329 | 20.0221 | 145.2229 | Since we first saw the milky plume we have moved north about 50 m. We are going to keep going to the north while going up and down through this depth interval for a while (90-120 m). Ridges of rock are sticking out of the slope. | | | |
| 18:49:57 Apr/07/04 | 102 | 2 | 20.0220 | 145.2230 | We seem to still be in the milky plume. | | | |
| 18:52:17 Apr/07/04 | 112 | 24 | 20.0221 | 145.2230 | We are into cloudy water again close to the bottom. Is it stirred up sediment? Probably. We have two fish escorts now. We are going to head E and NE and go downslope. | | | |
| 18:58:13 Apr/07/04 | 133 | 325 | 20.0223 | 145.2232 | Onto a talus slope with outcrops and ridges sticking out. | | | |
| 18:59:39 Apr/07/04 | 141 | 347 | 20.0223 | 145.2233 | Another shear vertical cliff. Going down very steep slope. | | | |
| 19:01:25 Apr/07/04 | 142 | 331 | 20.0223 | 145.2234 | Eh going down and is now at 161. | | | |
| 19:05:45 Apr/07/04 | 169 | 321 | 20.0223 | 145.2235 | See sediment-covered talus slope with poorly sorted boulders and smaller rocks. | | | |
| 19:06:50 Apr/07/04 | 175 | 314 | 20.0223 | 145.2236 | Slope fairly even and not as steep as previously seen upslope. Mostly sediment with some outcropping talus. | | | |
| 19:07:16 Apr/07/04 | 178 | 319 | 20.0223 | 145.2236 | One fish. Two fish. White fish. Blue fish. | | | R789-099 |
| 19:10:16 Apr/07/04 | 193 | 325 | 20.0224 | 145.2238 | Some sort of an eel. | | | R789-100 |
| 19:10:16 Apr/07/04 | 193 | 325 | 20.0224 | 145.2238 | Saw an eel swimming by. Have about 3-4 larger reef fish that have stayed with us for some time. Sediment appears quite old sitting on top of the rock talus. | | | |
| 19:12:43 Apr/07/04 | 200 | 323 | 20.0225 | 145.2240 | Going to move northwards for a few tens of meters then will move back upslope (westwards) to around 145m. From there we'll go northwards along that slope and see if can find source of Eh anomaly. | | | |
| 19:15:41 Apr/07/04 | 206 | 357 | 20.0226 | 145.2240 | Up close and personal. | | | R789-101 |
| 19:15:42 Apr/07/04 | 206 | 358 | 20.0226 | 145.2240 | Here at 200 m water depth slope is more flattened out with talus 20 cm in size and reasonably well sorted. Not as much sediment as seen in other localities. | | | |
| 19:18:37 Apr/07/04 | 196 | 269 | 20.0229 | 145.2239 | More heavily sedimented here as we move westwards up slope. | | | |
| 19:20:30 Apr/07/04 | 176 | 269 | 20.0229 | 145.2236 | Moved out of the sediment and back into blocky talus. | | | |
| 19:21:29 Apr/07/04 | 166 | 264 | 20.0229 | 145.2235 | School of small fish. | | | R789-102 |
| 19:22:00 Apr/07/04 | 162 | 268 | 20.0229 | 145.2234 | Slope is becoming steeper and now very steep. Lots of talus blocks and some sediment as we approach 150 m depth. | | | |
| 19:23:26 Apr/07/04 | 145 | 285 | 20.0229 | 145.2232 | Eh went down from 166 to 162 at this depth. Would appear to be the horizon. Now Eh to 159. This depth is significant. | | | |
| 19:25:34 Apr/07/04 | 149 | 285 | 20.0231 | 145.2229 | Moving northwards at 145 m depth. Eh is now 153 so lowest value seen. Now 152..... | | | |
| 19:26:54 Apr/07/04 | 144 | 285 | 20.0232 | 145.2228 | Eh down to 141 so possibly near the venting now. See some yellow bacterial mat material. | | | |
| 19:28:04 Apr/07/04 | 147 | 237 | 20.0233 | 145.2228 | More of the yellow bacterial mat in an area of the lowest Eh we have seen yet. | | | R789-103 |
| 19:28:25 Apr/07/04 | 147 | 256 | 20.0233 | 145.2228 | Eh now 138. See a lot of bacterial mat material at this depth and Eh continuing to drop. 136 and going down...See what appears now to be a more bluish/white bacterial mat. | | | |
| 19:29:55 Apr/07/04 | 148 | 279 | 20.0223 | 145.2225 | Now moving into more white bacterial mat. | | | R789-104 |
| 19:31:12 Apr/07/04 | 149 | 279 | 20.0233 | 145.2228 | Eh continuing to plummet to 119. We found it! Shimmering fluid. Clear water coming out of cracks and fissures in the talus. Ambient is around 24 C so diffuse must be slightly more than this. Eh down to 90. | | | |
| 19:32:14 Apr/07/04 | 149 | 277 | 20.0233 | 145.2228 | Bacterial mat with visible shimmering. | | | R789-105 |
| 19:35:03 Apr/07/04 | 150 | 271 | 20.0233 | 145.2228 | See a small squid. Now calling this area of venting "Egg White Spring"! | | | |
| 19:36:09 Apr/07/04 | 150 | 273 | 20.0233 | 145.2228 | Appears there may be a correlation between temperature and the type of bacteria seen. We see white filamentous bacteria where there is visible diffuse venting. Where there is no visible diffuse venting (lower temperature) get the yellow material. | | | |
| 19:37:49 Apr/07/04 | 150 | 273 | 20.0233 | 145.2228 | Filamentous bacteria. | | | R789-106 |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 19:41:11 Apr/07/04 | 150 | 260 | 20.0233 | 145.2227 | Took some digital photos of the white bacterial mat. | | | |
| 19:46:20 Apr/07/04 | 149 | 265 | 20.0233 | 145.2228 | Rock sample number four from Egg White Springs. | | | R789-107 |
| 19:46:27 Apr/07/04 | 149 | 265 | 20.0233 | 145.2228 | Sampled rock at diffuse venting site. Placed in the boot. Z=149. [Maug - Egg White Springs.] | R789-RK-0006 | SROF geo team | |
| 19:50:13 Apr/07/04 | 149 | 259 | 20.0233 | 145.2228 | Looking around the egg-white vent site some more with Eh=86. Relatively large patch of white bacterial mat. NE corner of main cone. | | | |
| 19:51:48 Apr/07/04 | 150 | 254 | 20.0234 | 145.2227 | More of the yellow mat with no visible flow. | | | R789-108 |
| 19:52:28 Apr/07/04 | 147 | 222 | 20.0233 | 145.2227 | More white bacterial mat. | | | R789-109 |
| 19:53:20 Apr/07/04 | 147 | 254 | 20.0233 | 145.2227 | More extensive area of white mats. Lots of big fish. | | | |
| 19:54:39 Apr/07/04 | 145 | 218 | 20.0234 | 145.2227 | White mats and venting occur through cobble talus and in outcrops along fractures; which occur here. | | | |
| 19:58:19 Apr/07/04 | 146 | 222 | 20.0234 | 145.2226 | Extensive white mat above a small cavern in which shimmering water is coming out. Nav marker at Cave Site. Blue-ish-gray mat occurs farther from the vents. Eh is at 71 mV. | | | |
| 20:00:27 Apr/07/04 | 146 | 243 | 20.0234 | 145.2227 | Nav marker called 'The Cave' with flow and floc coming out. | | | R789-110 |
| 20:02:03 Apr/07/04 | 145 | 243 | 20.0234 | 145.2227 | Moving ship to present ROPOS location. | | | |
| 20:07:43 Apr/07/04 | 145 | 210 | 20.0234 | 145.2226 | Continuing to move around the N side of the dome complex. Staying around the 145 m contour. Mostly angular cobble and boulder talus. Ridge projecting out from the talus. | | | |
| 20:09:55 Apr/07/04 | 147 | 245 | 20.0234 | 145.2226 | Steep rock-wall outcrop. Tuna swim by now and then. Rock wall is overhung in places and strongly jointed. Eh is now 94 mV. | | | |
| 20:12:05 Apr/07/04 | 145 | 211 | 20.0234 | 145.2226 | Mostly rock outcrop with talus piles in narrow valleys between outcrops. Eh is now down to 71 mV. | | | |
| 20:12:29 Apr/07/04 | 145 | 204 | 20.0234 | 145.2226 | Traversing a talus slope with lots of sediments. Still looking for signs of venting. | | | R789-111 |
| 20:15:06 Apr/07/04 | 145 | 216 | 20.0234 | 145.2226 | Back into mostly talus boulders and cobbles. Eh went from 71 at last entry back up to 80 and now down to 66 mV. | | | |
| 20:16:38 Apr/07/04 | 143 | 227 | 20.0234 | 145.2226 | Found another venting area with white mat covering 1-2 square meters of rock talus. Eh at its lowest so far; 21 mV. No shimmering water noted. Nav. maker at Talus Vent site. | | | |
| 20:16:58 Apr/07/04 | 143 | 211 | 20.0234 | 145.2226 | Small area with bacterial coating on rocks. May be some diffuse venting too. | | | R789-112 |
| 20:21:57 Apr/07/04 | 144 | 259 | 20.0237 | 145.2220 | Continuing to move along the 145 m contour and seeing additional white mat vent sites. Eh back to 50 mV. | | | |
| 20:23:03 Apr/07/04 | 145 | 220 | 20.0237 | 145.2220 | About 20 m from Talus Vent Site is another relatively large vent site. Site is located along contact of outcrop and talus and within the talus pile. Eh is ~55. This venting covers several square meters. Named "Egg Salad Vent Site". | | | |
| 20:24:28 Apr/07/04 | 142 | 219 | 20.0237 | 145.2220 | Another area of bacterial mat and diffuse venting. | | | R789-113 |
| 20:27:14 Apr/07/04 | 143 | 243 | 20.0237 | 145.2220 | Detail of mat on talus boulder. | | | R789-114 |
| 20:28:07 Apr/07/04 | 143 | 246 | 20.0242 | 145.2214 | Continuing Egg Salad Vent site. Eh is down to 28 mV. Minor shimmering water noted. Will collect a rock. | | | |
| 20:36:30 Apr/07/04 | 143 | 234 | 20.0237 | 145.2220 | Rock sample - reddish-brown. ~12-15cm and covered with bluish-white bacterial mat. Placed in the boot. Bigger than other samples in the boot. Eh+13mV. Z=143. [Maug - Egg Salad.] | R789-RK-0007 | SROF geo team (Stern) | |
| 20:36:35 Apr/07/04 | 143 | 235 | 20.0237 | 145.2220 | Grabbing a bacteria covered rock from a diffuse venting area. | | | R789-115 |
| 20:37:33 Apr/07/04 | 143 | 234 | 20.0237 | 145.2220 | Close-up of rock from diffuse venting area named "Egg Salad". | | | R789-116 |
| 20:40:35 Apr/07/04 | 143 | 238 | 20.0237 | 145.2220 | Continuing W transit around main cone at about 145 m contour. Talus pile with mat over a large area. Mat is also growing on sand and gravel between cobble talus. | | | |
| 20:43:52 Apr/07/04 | 145 | 233 | 20.0238 | 145.2218 | At contact of outcrop with talus on surface and sediment shows extensive white bacterial mat. The outcrop has mat over at least 10 square meters. | | | |
| 20:46:30 Apr/07/04 | 144 | 197 | 20.0238 | 145.2217 | At N end of main cone facing S and moving W. Mostly talus with lots of fluffy yellow floc and yellow mat. | | | |
| 20:49:40 Apr/07/04 | 142 | 169 | 20.0239 | 145.2215 | Some sort of sea cucumber (?) on sediment covered talus slope. | | | R789-117 |

| UTC | Z(m) | Hdg | Lat (N) | Long (W) | R789 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 20:49:59 Apr/07/04 | 142 | 193 | 20.0239 | 145.2215 | Sea cucumber on cobble talus slope on north flank of cone. Continuing transect at about 140-145 m moving W. | | | |
| 20:54:39 Apr/07/04 | 144 | 237 | 20.0240 | 145.2214 | No bacterial mat characteristic of venting has been seen for a while now and Eh is up to 93 mV. Talus slope of cobbles with some yellow corals. | | | |
| 20:56:31 Apr/07/04 | 145 | 227 | 20.0240 | 145.2213 | Traversing a boulder slope. Soft corals (?) visible on boulders. | | | R789-118 |
| 20:58:53 Apr/07/04 | 145 | 164 | 20.0240 | 145.2211 | Area with yellowish mats and yellowish sand between talus blocks. Eh is about 104 mV. Also some white mats. | | | |
| 20:59:40 Apr/07/04 | 146 | 182 | 20.0240 | 145.2210 | Some light staining and mat on rocks. | | | R789-119 |
| 21:01:10 Apr/07/04 | 142 | 188 | 20.0240 | 145.2209 | Increased staining and floc in water. | | | R789-120 |
| 21:01:10 Apr/07/04 | 142 | 188 | 20.0240 | 145.2209 | Increasing yellow staining; yellow floc; and yellowish sand between cobble talus. Eh is 108. | | | |
| 21:01:56 Apr/07/04 | 144 | 172 | 20.0240 | 145.2209 | Heavy layer of floc. | | | R789-121 |
| 21:03:58 Apr/07/04 | 143 | 216 | 20.0239 | 145.2208 | Back to talus slope without mats. Rocks dusted by sediment and pockets of sediment between talus blocks. | | | |
| 21:08:31 Apr/07/04 | 146 | 188 | 20.0239 | 145.2205 | Continuing transect along NW slope of main cone now. Continuing cobble talus with sparse sea whips and coral. | | | |
| 21:08:45 Apr/07/04 | 146 | 204 | 20.0239 | 145.2205 | Sea fan on sediment covered boulder in talus slope. | | | R789-122 |
| 21:09:44 Apr/07/04 | 146 | 177 | 20.0239 | 145.2204 | We are seeing an anchor chain and taking digital photo. Now moving ROPOS up to the cage. Nav marker at chain - which is end of dive. | | | |
| 21:09:53 Apr/07/04 | 145 | 175 | 20.0239 | 145.2204 | Large links of anchor chain. | | | R789-123 |
| 21:10:02 Apr/07/04 | 146 | 169 | 20.0239 | 145.2204 | Large links of anchor chain. | | | R789-124 |
| 21:19:13 Apr/07/04 | 94 | 91 | 20.0240 | 145.2207 | Cannot come up until 0800 local time, so waiting near the cage. | | | |
| 21:21:35 Apr/07/04 | 125 | 344 | 20.0239 | 145.2207 | Going back down for about another half hour on the bottom. | | | |
| 21:22:23 Apr/07/04 | 136 | 353 | 20.0238 | 145.2207 | Back on the bottom. Sediment and talus are seen. | | | |
| 21:23:12 Apr/07/04 | 136 | 44 | 20.0239 | 145.2207 | We're on the bottom again. | | | |
| 21:24:29 Apr/07/04 | 138 | 92 | 20.0239 | 145.2208 | Jim's in the hot seat. We're heading out to the anchor chain for another peek. Looking at talus with a coating of sediment. | | | |
| 21:25:36 Apr/07/04 | 136 | 263 | 20.0239 | 145.2207 | We're back on the bottom. | | | R789-125 |
| 21:27:36 Apr/07/04 | 146 | 277 | 20.0239 | 145.2205 | Area of talus with lots of floc in the water; sea whips. | | | |
| 21:31:13 Apr/07/04 | 155 | 207 | 20.0240 | 145.2205 | Top of anchor. | | | R789-126 |
| 21:32:05 Apr/07/04 | 154 | 235 | 20.0240 | 145.2205 | Anchor at end of chain. | | | R789-127 |
| 21:32:11 Apr/07/04 | 153 | 229 | 20.0240 | 145.2205 | Anchor. | | | R789-128 |
| 21:33:22 Apr/07/04 | 153 | 186 | 20.0240 | 145.2205 | Took several digital images of an anchor and chain on the bottom here. | | | |
| 21:33:56 Apr/07/04 | 154 | 169 | 20.0240 | 145.2205 | We're going back to the 145m contour and going to follow it to the west. | | | |
| 21:37:40 Apr/07/04 | 147 | 255 | 20.0238 | 145.2203 | The archive tape has been off since we previously thought we were coming up. We're continuing west along the 145m contour. | | | |
| 21:43:47 Apr/07/04 | 139 | 180 | 20.0234 | 145.2201 | Moving ahead with the ship now to get the cage in a position good for recovery. We're going to move towards the cage. | | | |
| 22:04:26 Apr/07/04 | 2 | 258 | 20.0237 | 145.2215 | ROPOS at the surface. | | | |
| 22:06:12 Apr/07/04 | 2 | 222 | 20.0237 | 145.2215 | ROPOS is on deck. End of dive. | | | |

## 8.9 R790 Dive Log: Maug

| **R790: Maug** |
|---|
| wet time (UTC): 4/8 0316 - 4/8 0733. JD 99. 4.28 hrs. |
| bottom time (UTC): 4/8 0332 -4/8 0709. 3.62 hrs. [16 samples] |
| **R790 DSC information:** There were 50 original DSCs taken and 37 final ones were kept starting with R790_DSC_040804_041200_01124.jpg and ending with R790_DSC_040804_071050_01172.jpg |
| HFS and suction sampling dive at Maug. Samples: **Talus Vent**: 1 gas tight. **Egg Foo Young**: 1 HFS. **Cave Vent**: 2 gas tights, 8 HFS; 1 rock, 2 suctions (bacterial mat). Another gas tight was tripped on the sub's ascent at Z=66, seawater was sampled. |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R790 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 03:32:53 Apr/08/04 | 226 | 199 | 20.0247 | 145.2229 | 0316 ROPOS in the water. 0332 ROPOS on bottom. | | | |
| 03:34:18 Apr/08/04 | 225 | 205 | 20.0246 | 145.2229 | Muddy bottom but with some rocks. | | | |
| 03:36:50 Apr/08/04 | 212 | 207 | 20.0243 | 145.2229 | Mud covered talus with some biology. | | | |
| 03:37:48 Apr/08/04 | 205 | 206 | 20.0242 | 145.2229 | Eh = 136. | | | |
| 03:41:35 Apr/08/04 | 186 | 212 | 20.0240 | 145.2228 | Blocky talus. Not much change in Eh (138). | | | |
| 03:43:14 Apr/08/04 | 176 | 205 | 20.0238 | 145.2228 | Scleractinian coral on talus pile. | | | R790-001 |
| 03:44:34 Apr/08/04 | 169 | 175 | 20.0237 | 145.2228 | Eh starts to drop. | | | |
| 03:47:27 Apr/08/04 | 158 | 196 | 20.0235 | 145.2228 | Downhill from talus vent. Whitish-orange staining around margins of rocks - probably bacteria. | | | |
| 03:47:40 Apr/08/04 | 158 | 221 | 20.0235 | 145.2228 | This is view of staining near vent site. | | | R790-002 |
| 03:48:33 Apr/08/04 | 158 | 212 | 20.0235 | 145.2228 | We are down hill from Talus vent. Floc is bacterial mat. | | | R790-003 |
| 03:49:57 Apr/08/04 | 158 | 212 | 20.2810 | 113.9377 | Bacterial mat downhill from Talus vent. | | | R790-004 |
| 03:50:57 Apr/08/04 | 158 | 213 | 20.0235 | 145.2228 | Bacteria line small (dime-sized) holes. No fluid is seen issuing from the vents. Eh has climbed a bit - 122. | | | |
| 03:50:59 Apr/08/04 | 158 | 212 | 20.0235 | 145.2228 | Holes near vent site. We are looking for flow coming out of them. Holes are less than a centimeter across. | | | R790-005 |
| 03:53:29 Apr/08/04 | 153 | 269 | 20.0235 | 145.2227 | White mat that is different from the brownish mat we saw earlier. We will park here and look for flow. | | | R790-006 |
| 03:53:35 Apr/08/04 | 153 | 272 | 20.0235 | 145.2227 | Lots of bacterial mat and floc. Eh is 122. | | | |
| 03:54:21 Apr/08/04 | 153 | 254 | 20.0235 | 145.2227 | Ambient temperature is 23C; so we may not see shimmering. Eh = 120. | | | |
| 03:55:56 Apr/08/04 | 153 | 236 | 20.0235 | 145.2227 | Eh is plummeting; down to 67 now. | | | |
| 03:56:36 Apr/08/04 | 153 | 237 | 20.0235 | 145.2227 | There is a little flow out of this area. There is quite a bit of filamentous bacterial mat here. We will sample here. | | | R790-007 |
| 03:57:04 Apr/08/04 | 153 | 236 | 20.0235 | 145.2227 | HFS unfiltered bag 8. Start=0359 Stop=0404. Tmax=24.4 Tavg=24.0 T2=23.8 Vol=603ml Z=153.1. NE side of central cone. Downslope from talus vents. [Maug - Egg Foo Young]. | R790-HFS-8-0001 | Butterfield | |
| 03:58:51 Apr/08/04 | 153 | 236 | 20.0235 | 145.2227 | We are taking our first sample (R790-HFS-8-001). Only about 1 degree over ambient. | | | R790-008 |
| 04:02:08 Apr/08/04 | 153 | 237 | 20.0235 | 145.2227 | Gas Tight Sample #1 (HIL GTB 9) from same vent as first sample. T=23.7C; ambient is 23C. Z=153.2. NE side of dome. [Maug - Talus Vent]. | R790-GTB-1-0002 | Lupton | |
| 04:03:03 Apr/08/04 | 153 | 236 | 20.0235 | 145.2227 | Triggered GTB #1 at temperature 23.7 degrees. | | | R790-009 |
| 04:05:37 Apr/08/04 | 153 | 236 | 20.0235 | 145.2227 | Rock surfaces near sample. Maximum temperature was 24.4 degrees. | | | R790-010 |
| 04:07:57 Apr/08/04 | 151 | 230 | 20.0235 | 145.2227 | White staining on rocks as we are headed uphill to Cave vent. | | | R790-011 |
| 04:08:06 Apr/08/04 | 150 | 226 | 20.0235 | 145.2227 | Bacterial mats on talus slope. Eh back up to mid 90's. No multicellular organisms present. | | | |
| 04:08:33 Apr/08/04 | 148 | 229 | 20.0235 | 145.2227 | More white staining at 148 meters depth. | | | R790-012 |
| 04:09:37 Apr/08/04 | 145 | 223 | 20.0234 | 145.2227 | Steep wall; Eh is 97. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R790 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 04:09:49 Apr/08/04 | 145 | 242 | 20.0234 | 145.2227 | We are at the location of Cave vent. | | | R790-013 |
| 04:12:30 Apr/08/04 | 147 | 243 | 20.0234 | 145.2227 | Eh has dropped again; down to 77. Temperature is back down to 23.3C. | | | |
| 04:14:02 Apr/08/04 | 146 | 229 | 20.0234 | 145.2227 | Shot of local fish taken near cave vent. | | | R790-014 |
| 04:16:26 Apr/08/04 | 145 | 219 | 20.0234 | 145.2226 | We are not sure if this is Cave vent or Talus vent. Eh dropped to 44. Think it is Cave vent from the depth (145.3m). Some shimmering water coming out of vertical crack. | | | |
| 04:16:38 Apr/08/04 | 145 | 226 | 20.0234 | 145.2226 | Shot of cave vent; slightly below it. | | | R790-015 |
| 04:20:14 Apr/08/04 | 145 | 255 | 20.0234 | 145.2226 | Although not very clear in this picture - there is quite a bit of shimmering water. It is just a question of whether we can reach it. | | | R790-016 |
| 04:21:43 Apr/08/04 | 145 | 238 | 20.0234 | 145.2226 | Huge cloud of floc coming out of v ent. | | | |
| 04:22:20 Apr/08/04 | 144 | 235 | 20.0234 | 145.2226 | Snowblower bacterial mats and there are also some filamentous bacteria here. | | | R790-017 |
| 04:24:07 Apr/08/04 | 144 | 257 | 20.0234 | 145.2226 | Another view of shimmering up the side of the face of cave vent. | | | R790-018 |
| 04:25:36 Apr/08/04 | 145 | 261 | 20.0234 | 145.2226 | Eh dropped; down to 40. | | | |
| 04:27:00 Apr/08/04 | 145 | 261 | 20.0234 | 145.2226 | Preparing to take another bag sample. | | | R790-019 |
| 04:27:14 Apr/08/04 | 145 | 262 | 20.0227 | 145.2234 | HFS #9 taken from vertic al crack. Start=0436 Stop=0441 T1max 27.4; Tavg 27.0; T2=26.2. Vol=672mL Z=144.5. [Maug - Cave]. | R790-HFS-9-0003 | Butterfield | |
| 04:30:50 Apr/08/04 | 145 | 261 | 20.0234 | 145.2226 | We are getting a temperature of 26.9 and may move to a crack. | | | R790-020 |
| 04:34:45 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | We are grabbing the fluid sampler nozzle end to get better reach. | | | R790-021 |
| 04:36:18 Apr/08/04 | 144 | 263 | 20.0234 | 145.2226 | We have locked off at this site and our temperature is 26.6. | | | R790-022 |
| 04:38:38 Apr/08/04 | 145 | 259 | 20.0234 | 145.2226 | This is another view of the sampling site for R790-HFS-9-0003. | | | R790-023 |
| 04:40:05 Apr/08/04 | 145 | 258 | 20.0234 | 145.2226 | GTB sample #2 (HIL GTB 5) from the Cave vent. Z=144.5. [Maug - Cave]. | R790-GTB-2-0004 | Lupton | |
| 04:40:57 Apr/08/04 | 144 | 258 | 20.0234 | 145.2226 | Gas-tight 2 is fired at Cave Vent at 27.4 degrees. | | | R790-024 |
| 04:43:06 Apr/08/04 | 144 | 259 | 20.0234 | 145.2226 | HFS Filtered bag 11. Eh=80. Start=0442 Stop 0446. T1 & Tmax are bad. Tavg=28. Vol=560. Z=144.4. Problem with sampler - the rest of that samples will not have T1 and Tmax. [Maug - Cave]. | R790-HFS-11-0005 | Butterfield | |
| 04:51:15 Apr/08/04 | 144 | 266 | 20.0234 | 145.2226 | We had to get back into position to sample at Cave vent. | | | R790-025 |
| 04:53:03 Apr/08/04 | 144 | 276 | 20.0234 | 145.2226 | Still trying to get into position. T=25. | | | R790-026 |
| 04:53:09 Apr/08/04 | 144 | 275 | 20.0234 | 145.2226 | HFS filtered bag 14. T2=26.2 Start=0457 Stop=0500 Vol=410ml. Z=144.2. Background T=23.2. Sampler is having issues like a leak or something. [Maug - Cave]. | R790-HFS-14-0006 | Butterfield | |
| 04:53:53 Apr/08/04 | 144 | 273 | 20.0234 | 145.2226 | About to take bag 14 filtered. | | | R790-027 |
| 04:55:38 Apr/08/04 | 144 | 275 | 20.0234 | 145.2226 | In position for bag 14 but temperature is not stable. | | | R790-028 |
| 04:57:12 Apr/08/04 | 144 | 275 | 20.0234 | 145.2226 | Sample R790-HFS-14-0006 locked and sampling. Just right at the lip is the ideal position. | | | R790-029 |
| 05:02:45 Apr/08/04 | 145 | 267 | 20.0234 | 145.2226 | GTB #3 (HIL GTB 11) same spot at Cave Vent. Temp=25.8. Z=144.5. [Maug - Cave]. | R790-GTB-3-0007 | Lupton | |
| 05:03:30 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | This is a close-up of the site in which we will take gtb 3. | | | R790-030 |
| 05:06:47 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | We are still poking around for the best temperat ure for gtb #3. | | | R790-031 |
| 05:08:01 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | Sample nozzle locked into position and waiting for T2 to respond. | | | R790-032 |
| 05:10:01 Apr/08/04 | 145 | 261 | 20.0234 | 145.2226 | Temperature is 26.2 and we are taking a sterivex filter #13. | | | R790-033 |
| 05:10:59 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | T2=25.8. GTB-3 has been triggered. | | | R790-034 |
| 05:11:11 Apr/08/04 | 145 | 261 | 20.0234 | 145.2226 | HFS Sterivex DNA filter #13. T2=26.2 Start=0509 Stop=0517 Vol=1001ml. Z=144.7. [Maug - Cave]. | R790-HFS-13-0008 | Butterfield | |
| 05:12:32 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | Another frame grab of sample R790-HFS-13-0008's position. We are getting negative numbers on the Eh probe. | | | R790-035 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R790 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 05:18:36 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | HFS FISH filter #7. T2=26.2 Start=0518 Stop=0520 Vol=290ml. Z=144.8. [Maug - Cave]. | R790-HFS-7-0009 | Butterfield | |
| 05:19:43 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | There is a big blob of bacterial mat floating directly above the fluid sampler nozzle. | | | R790-036 |
| 05:21:38 Apr/08/04 | 145 | 261 | 20.0234 | 145.2226 | Comparison to previous frame to highlight the size of the floating bacterial blob. | | | R790-037 |
| 05:22:14 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | HFS unfiltered bag 19. Start=0522 Stop=0527 T2=26.2 Vol=635ml. Z=144.7. [Maug - Cave]. | R790-HFS-19-0010 | Butterfield | |
| 05:28:09 Apr/08/04 | 145 | 259 | 20.0234 | 145.2226 | HFS filtered bag #18. Start=0527 Stop=0531 T2=26.2 Vol=667ml. Z=144.7. [Maug - Cave]. | R790-HFS-18-0011 | Butterfield | |
| 05:28:41 Apr/08/04 | 145 | 259 | 20.0234 | 145.2226 | This sample is b18 filtered and the previous one listed as b18 was really b19. | | | R790-038 |
| 05:30:33 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | Shimmering from sample tube from distilled water being pumped out of b18. | | | R790-039 |
| 05:32:40 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | HFS RNA filter 12. Start=0532 Stop=0542 T2=26.2 Vol=1201ml. Z=144.7. Background T=23.2. [Maug - Cave]. | R790-HFS-12-0012 | Butterfield | |
| 05:38:37 Apr/08/04 | 145 | 260 | 20.0234 | 145.2226 | Another view of the site now taking RNA filter. | | | R790-040 |
| 05:42:59 Apr/08/04 | 144 | 265 | 20.0234 | 145.2226 | Rock sample at Cave vent from talus slope (20 cm) wedge shape. Z=144.1. [Maug - Cave]. | R790-RK-0013 | SROF geo team (Stern) | |
| 05:43:08 Apr/08/04 | 143 | 254 | 20.0234 | 145.2226 | We are putting away the fluid sampler and will commence suction sampling at the same site. | | | R790-041 |
| 05:49:25 Apr/08/04 | 147 | 245 | 20.0234 | 145.2226 | Picture of rock sample. | | | R790-042 |
| 05:49:34 Apr/08/04 | 146 | 245 | 20.0234 | 145.2226 | Picture of rock sample. | | | R790-043 |
| 05:50:46 Apr/08/04 | 145 | 204 | 20.0235 | 145.2226 | Now we are headed for suction sampling and we are running out of time. | | | |
| 05:51:41 Apr/08/04 | 145 | 267 | 20.0234 | 145.2226 | We are moving into position with the suction sampler. | | | |
| 05:55:21 Apr/08/04 | 144 | 241 | 20.0234 | 145.2226 | Getting into position with suction sampler. | | | R790-044 |
| 06:00:29 Apr/08/04 | 144 | 265 | 20.0234 | 145.2226 | Positioning for suction sample. | | | R790-045 |
| 06:01:39 Apr/08/04 | 144 | 238 | 20.0234 | 145.2226 | Suction sampling. | | | R790-046 |
| 06:02:02 Apr/08/04 | 144 | 238 | 20.0234 | 145.2226 | Suction sampling. | | | R790-047 |
| 06:02:44 Apr/08/04 | 144 | 238 | 20.0234 | 145.2226 | Suction sampling. | | | R790-048 |
| 06:05:03 Apr/08/04 | 144 | 233 | 20.0234 | 145.2226 | Bacterial mat. | | | R790-049 |
| 06:06:39 Apr/08/04 | 143 | 220 | 20.0234 | 145.2226 | White and grey bacteria. | | | R790-050 |
| 06:08:45 Apr/08/04 | 145 | 226 | 20.0234 | 145.2226 | We have been scouting around for a good place to suction sample. All the snow-blowing areas that we saw when we first got here are gone so we are trying to suction off the wall. | | | |
| 06:08:57 Apr/08/04 | 144 | 226 | 20.0234 | 145.2226 | White and grey bacterial mats. | | | R790-051 |
| 06:10:31 Apr/08/04 | 144 | 268 | 20.0234 | 145.2226 | Grey and white bacterial mats. | | | R790-052 |
| 06:10:50 Apr/08/04 | 144 | 257 | 20.0234 | 145.2226 | We have reached an area of filamentous bacteria and are moving in to suction. | | | |
| 06:11:31 Apr/08/04 | 143 | 251 | 20.0234 | 145.2226 | Suction sampling near the Cave vent. | | | R790-053 |
| 06:12:55 Apr/08/04 | 143 | 250 | 20.0234 | 145.2226 | Suction sampling near the Cave vent. | | | R790-054 |
| 06:13:38 Apr/08/04 | 143 | 249 | 20.0234 | 145.2226 | Suction sample of white filamentous bacteria into jar 5. Z=143.3. Subsample: snails. [Maug - Cave]. | R790-SS-J5-014 | Moyer | |
| 06:14:41 Apr/08/04 | 142 | 208 | 20.0234 | 145.2226 | Suction sample of white filamentous bacterial mat into jar# 6. Start 0625 Stop 0629. Temperature probe not working. Not much of a sample. [Maug - Cave]. | R790-SS-J6-0015 | Moyer | |
| 06:15:36 Apr/08/04 | 142 | 280 | 20.0234 | 145.2226 | Bacterial mats near the cave vent. | | | R790-055 |
| 06:16:51 Apr/08/04 | 147 | 247 | 20.0234 | 145.2227 | Bacterial mats near Cave Vent. | | | R790-056 |
| 06:18:59 Apr/08/04 | 144 | 179 | 20.0234 | 145.2226 | Floc and bacterial mat. | | | R790-057 |
| 06:20:12 Apr/08/04 | 142 | 198 | 20.0234 | 145.2226 | Bacterial mat. | | | R790-058 |
| 06:21:21 Apr/08/04 | 143 | 281 | 20.0234 | 145.2226 | Bacterial mat. | | | R790-059 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R790 Comments: Maug | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 06:23:12 Apr/08/04 | 143 | 235 | 20.0234 | 145.2226 | Lots of white bacteria. | | | R790-060 |
| 06:24:08 Apr/08/04 | 143 | 228 | 20.0234 | 145.2226 | Suction sampling bacterial mat. | | | R790-061 |
| 06:25:12 Apr/08/04 | 143 | 227 | 20.0234 | 145.2226 | Suction sampling bacterial mat. | | | R790-062 |
| 06:27:19 Apr/08/04 | 143 | 231 | 20.0234 | 145.2226 | Suction sampling bacterial mat. | | | R790-063 |
| 06:32:53 Apr/08/04 | 134 | 188 | 20.0233 | 145.2226 | Moving towards another vent site. | | | R790-064 |
| 06:34:13 Apr/08/04 | 132 | 269 | 20.0233 | 145.2226 | Yellow color here - either bacteria or hydrothermal material. | | | R790-065 |
| 06:36:52 Apr/08/04 | 119 | 174 | 20.0232 | 145.2226 | Other side of dike - some white staining. | | | R790-066 |
| 06:41:28 Apr/08/04 | 142 | 201 | 20.0230 | 145.2230 | Scleractinian corals and a sea whip. | | | R790-067 |
| 06:42:48 Apr/08/04 | 143 | 261 | 20.0229 | 145.2231 | Another sea whip on a talus pile. | | | R790-068 |
| 06:44:54 Apr/08/04 | 132 | 283 | 20.0227 | 145.2231 | Heading towards Milky. Hope we have time to see it. | | | |
| 06:45:06 Apr/08/04 | 130 | 269 | 20.0227 | 145.2231 | Heading for a known vent site. This is an exposed dike with scleractinian corals. | | | R790-069 |
| 06:46:55 Apr/08/04 | 107 | 174 | 20.0224 | 145.2230 | Corals on the side of a pinnacle. | | | R790-070 |
| 06:49:22 Apr/08/04 | 121 | 309 | 20.0221 | 145.2230 | Talus pile as we are headed downslope. | | | R790-071 |
| 06:50:01 Apr/08/04 | 127 | 263 | 20.0220 | 145.2231 | There is a sea cucumber as we are again heading downslope. | | | R790-072 |
| 06:55:40 Apr/08/04 | 140 | 248 | 20.0219 | 145.2233 | Scleractinian coral on dike. | | | R790-073 |
| 07:00:27 Apr/08/04 | 143 | 310 | 20.0218 | 145.2233 | Picture of sea whips. Saw some currents from right to left in picture. | | | R790-074 |
| 07:01:50 Apr/08/04 | 136 | 317 | 20.0219 | 145.2233 | Dikes are trending towards 310 to 320 degrees. | | | R790-075 |
| 07:04:51 Apr/08/04 | 108 | 310 | 20.0219 | 145.2230 | More coral and sponges. | | | R790-076 |
| 07:05:19 Apr/08/04 | 105 | 307 | 20.0219 | 145.2230 | Large coral hanging from dike and are trying to get a digital picture. | | | R790-077 |
| 07:06:54 Apr/08/04 | 95 | 283 | 20.0219 | 145.2229 | Transition from sponge dominance to more black corals(?) on outcrop. Now seeing hermatypic corals. | | | |
| 07:07:20 Apr/08/04 | 89 | 271 | 20.0219 | 145.2229 | Going up slope; due west; another dike. | | | R790-078 |
| 07:07:36 Apr/08/04 | 88 | 279 | 20.0219 | 145.2229 | Outcrops obscured by biota. About a 50% cover sponges and Lithothamnion corallines. | | | |
| 07:08:14 Apr/08/04 | 87 | 256 | 20.0219 | 145.2229 | Same dike with more biology including sponges and coral. | | | R790-079 |
| 07:09:09 Apr/08/04 | 85 | 249 | 20.0219 | 145.2229 | Top of dike. | | | R790-080 |
| 07:09:20 Apr/08/04 | 86 | 242 | 20.0219 | 145.2229 | Greater cover on dyke top. | | | |
| 07:09:49 Apr/08/04 | 80 | 240 | 20.0219 | 145.2229 | Back to cage and terminate dive. Pressure to pull so we can exit Maug during daylight. | | | |
| 07:33:45 Apr/08/04 | 2 | 6 | 20.0219 | 145.2233 | ROPOS on the surface. | | | |
| 07:36:31 Apr/08/04 | 2 | 351 | 20.0219 | 145.2233 | ROPOS on deck. End of dive. | | | |

# 8.10 R791 Dive Log: NW Eifuku

**R791: Northwest Eifuku**

wet time (UTC): 4/9 0216 - 4/9 2207. JD 100. 19.85 hrs.

bottom time (UTC): 4/9 0352 -4/9 2020. 16.47 hrs. [37 samples]

**R791 DSC information:** There were 394 original DSCs taken and 339 final ones were kept starting with R791_DSC_040904_041000_01174.jpg and ending with R791_DSC_040904_202449_01566.jpg

Exciting HFS, biology and geology dive at NW Eifuku. Set down near yellow bacterial mat rolling down steep slope. The area was named Bacterial Balls. Ascended upslope toward the summit and discovered Mussel Mound and More Mussels. The mussels were found living in low-flow areas. Lots of biota. Moved on to discover Champagne area! Champagne is an area of small white chimneys pouring out white smoke and large CO2 bubbles. Liquid Co2 bubbles escaping from the seafloor in the area. Lots of sampling. The top of the volcano is blanketed with yellow bacterial mat. Samples: Near **Point B**: 1 rock. **Bacterial Balls**: 3 suctions (bacterial mat). **Yellow Top**: 1 suction (bacterial mat). **More Mussels**: 1 biology sample (mussels). **Icefall**: 2 HFS; 1 gas tight. **Top Tower**: 1 suction (bacterial mat and biology), 1 rock. **Champagne**: 9 HFS, 3 gas tights, 3 suctions (fauna, particulate debris and bacterial mat), 1 biology (mussel). **Champagne-2;** 1 HFS. **Cliff House**: 7 HFS. **Mussel Mound area**: Plankton net tow (port and stbd). When ROPOS neared the surface gas bubbles poured out of the HFS flush hose. Most HFS samples from Champagne site collected on this dive were lost.

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 02:18:58 Apr/09/04 | 19 | 319 | 0.0000 | 0.0000 | ROPOS in the water at 0216. | | | |
| 02:45:02 Apr/09/04 | 450 | 115 | 21.4918 | 144.0407 | Godzilla Gabberjaw and Gumby all reporting fine diving conditions. | | | |
| 03:52:54 Apr/09/04 | 1861 | 178 | 21.4914 | 144.0409 | On the bottom. NW Eifuku volcano. | | | |
| 03:53:46 Apr/09/04 | 1865 | 184 | 21.4911 | 144.0408 | Yellow staining - mats are apparent. Eh=127 at bottom. Ripple effect on bottom. | | | |
| 03:56:30 Apr/09/04 | 1860 | 202 | 21.4911 | 144.0408 | Starting upslope towards point "B". | | | |
| 03:56:31 Apr/09/04 | 1860 | 202 | 21.4911 | 144.0408 | On bottom 1865 N.W. Eifuku. | | | R791-001 |
| 03:57:53 Apr/09/04 | 1856 | 223 | 21.4911 | 144.0408 | Streaking and rippling along (oblique with respect to) contours. Still more yellow mat present in patches. | | | |
| 03:59:47 Apr/09/04 | 1852 | 218 | 21.4911 | 144.0407 | Columnar jointing in basalt flow. Steeper here. Pillows and boulders. Sand intermixed with yellow mat material. | | | |
| 04:00:38 Apr/09/04 | 1851 | 220 | 21.4909 | 144.0407 | Lava outcrops on volcaniclastic sand. | | | R791-002 |
| 04:04:26 Apr/09/04 | 1840 | 196 | 21.4908 | 144.0406 | A pelagic shrimp. | | | R791-003 |
| 04:05:35 Apr/09/04 | 1838 | 219 | 21.4908 | 144.0405 | Stopped briefly for shrimp pictures. | | | |
| 04:07:53 Apr/09/04 | 1834 | 233 | 21.4909 | 144.0406 | Eel. | | | R791-004 |
| 04:08:33 Apr/09/04 | 1833 | 266 | 21.4909 | 144.0403 | Very heavy talus slope. Source of some low-level vent activity. More yellow mat material with the occasional white patches. | | | |
| 04:10:35 Apr/09/04 | 1823 | 224 | 21.4907 | 144.0403 | 1820 meters; starting up very steep slope. | | | |
| 04:12:07 Apr/09/04 | 1817 | 236 | 21.4904 | 144.0404 | Many boulders with hydrothermal staining. All talus going up slope. | | | |
| 04:13:47 Apr/09/04 | 1812 | 230 | 21.4902 | 144.0403 | Transition between talus slope and younger lava flow. Mats along transition edge. Marked spot as transition zone "contact". | | | |
| 04:13:47 Apr/09/04 | 1812 | 230 | 21.4902 | 144.0403 | Contact of lava and lava talus on mottled yellow and gray sediment. | | | R791-005 |
| 04:16:09 Apr/09/04 | 1797 | 290 | 21.4904 | 144.0402 | Lava flow contact edge with yellow mats. | | | R791-006 |
| 04:17:07 Apr/09/04 | 1790 | 278 | 21.4903 | 144.0399 | Massive lava flow overhanging lower flow. More yellow mats. | | | R791-007 |
| 04:20:02 Apr/09/04 | 1768 | 312 | 21.4906 | 144.0399 | Much more volcaniclastic sand present. | | | |
| 04:20:45 Apr/09/04 | 1758 | 252 | 21.4905 | 144.0399 | Now going up vertical wall along edge of flow. More yellow mat in cracks. No changes in Eh(126). | | | |
| 04:22:14 Apr/09/04 | 1744 | 237 | 21.4904 | 144.0397 | Lava flows; volcaniclastic sand and yellow mats on lava. | | | R791-008 |
| 04:25:22 Apr/09/04 | 1724 | 210 | 21.4902 | 144.0396 | This is not a rattail fish. | | | R791-009 |
| 04:28:47 Apr/09/04 | 1716 | 212 | 21.4898 | 144.0394 | Matrix of sand and large boulders. Following ridge upslope. Yellow staining (more stain less mats) on rocks too. eH=121 no major changes. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 04:30:50 Apr/09/04 | 1708 | 185 | 21.4897 | 144.0393 | Talus resting on black volcaniclastic sand near top of ridge. | | | R791-010 |
| 04:32:58 Apr/09/04 | 1703 | 185 | 21.4895 | 144.0393 | Rock with glassy coating and possible phenocrysts. Placed into purse. Z=1702. [NW Eifuku - Point B]. | R791-RK-0001 | SROF geo team (Stern) | |
| 04:39:25 Apr/09/04 | 1702 | 204 | 21.4895 | 144.0392 | RK-0001 lava with glassy rind. Past point B by ~30 meters. | | | R791-011 |
| 04:45:23 Apr/09/04 | 1684 | 185 | 21.4896 | 144.0393 | Pillow lava. | | | R791-012 |
| 04:48:33 Apr/09/04 | 1667 | 225 | 21.4894 | 144.0393 | Must return to cage. Intermission. Tether management. eH at 111 slight drop. | | | |
| 04:53:54 Apr/09/04 | 1668 | 165 | 21.4895 | 144.0393 | Back to bottom. Driving along ridge feature. Young pillow ridge. 1664 meters. Transecting to point "C". | | | |
| 04:53:55 Apr/09/04 | 1667 | 163 | 21.4895 | 144.0393 | Young pillow ridge area. | | | R791-013 |
| 04:54:39 Apr/09/04 | 1667 | 171 | 21.4894 | 144.0393 | Multiple pillows on ridge top. | | | R791-014 |
| 04:56:52 Apr/09/04 | 1669 | 211 | 21.4892 | 144.0394 | Contact of pillow with lower flow. | | | R791-015 |
| 04:56:59 Apr/09/04 | 1668 | 207 | 21.4892 | 144.0394 | Contact of de-gassing surface "hyaloclastite". | | | R791-016 |
| 04:57:05 Apr/09/04 | 1668 | 202 | 21.4893 | 144.0394 | Pillows are sloughing off to generate sand as they degas. "Hyaloclastite". | | | |
| 04:59:10 Apr/09/04 | 1668 | 166 | 21.4894 | 144.0394 | Close-up of hyaloclastite surface. | | | R791-017 |
| 05:02:16 Apr/09/04 | 1665 | 144 | 21.4891 | 144.0395 | Geologic context developing as we follow narrow ridge. Newer lavas with sedentary macrofauna present (not sessile). Not likely to support an extensive hydrothermal system. | | | |
| 05:07:25 Apr/09/04 | 1669 | 168 | 21.4890 | 144.0396 | Climbing spine of ridge. | | | R791-018 |
| 05:10:28 Apr/09/04 | 1664 | 157 | 21.4889 | 144.0396 | Cobra-head pillow. | | | R791-019 |
| 05:11:36 Apr/09/04 | 1661 | 99 | 21.4887 | 144.0399 | Attempting to intersect the slope so we don't have to dive deeper. eH=119. | | | |
| 05:18:16 Apr/09/04 | 1714 | 176 | 21.4890 | 144.0406 | Back to the bottom again. Going to transect to the summit. Cobbles with sand and lots of yellow floc rolling down hill. | | | |
| 05:18:53 Apr/09/04 | 1718 | 177 | 21.4889 | 144.0407 | Steep slope of talus; sediment and rocks. | | | R791-020 |
| 05:19:37 Apr/09/04 | 1715 | 178 | 21.4889 | 144.0406 | Flocs flowing downslope. | | | R791-021 |
| 05:20:57 Apr/09/04 | 1711 | 185 | 21.4888 | 144.0406 | Muco-polysaccharides balled up. | | | R791-022 |
| 05:22:42 Apr/09/04 | 1709 | 201 | 21.4888 | 144.0406 | Moving down slope to find pile up of yellow mats. | | | |
| 05:24:57 Apr/09/04 | 1716 | 155 | 21.4888 | 144.0407 | Giant balls of floc. | | | R791-023 |
| 05:26:21 Apr/09/04 | 1716 | 149 | 21.4888 | 144.0406 | Rolling bacterial balls. | | | R791-024 |
| 05:28:05 Apr/09/04 | 1715 | 202 | 21.4888 | 144.0406 | Thick mats on slope. | | | R791-025 |
| 05:28:16 Apr/09/04 | 1716 | 201 | 21.4888 | 144.0406 | Moyer sample site for orange floc. | | | R791-026 |
| 05:28:26 Apr/09/04 | 1716 | 198 | 21.4888 | 144.0406 | Craig is going to do a suction of this yellow bacterial mat. Strange stuff - bacterial balls rolling down the slope. | | | |
| 05:29:34 Apr/09/04 | 1716 | 204 | 21.4888 | 144.0406 | Suction sample into jar 5 - yellow bacterial mat. Polysaccharide-microbial byproduct (bacterial mucus with cells). Start 0530 Stop 0545. Eh=83 Z=1716. [NW Eifuku - Bacterial Balls]. | R791-SS-J5-0002 | Moyer | |
| 05:32:36 Apr/09/04 | 1716 | 184 | 21.4887 | 144.0406 | Moyer suction site. | | | R791-027 |
| 05:35:04 Apr/09/04 | 1716 | 178 | 21.4889 | 144.0405 | Nav target: This area of yellow bacterial mat and balls rolling down the steep slope has been called "Bacterial Balls". | | | |
| 05:39:19 Apr/09/04 | 1716 | 164 | 21.4888 | 144.0406 | The bacterial floc is floating and rolling down slope when disturbed. This is a large area of bacterial mat. More biological stuff than mineral - according to Craig. | | | |
| 05:41:18 Apr/09/04 | 1716 | 173 | 21.4888 | 144.0406 | Eh has dropped to 83 - a drop of 30 points. | | | |
| 05:42:29 Apr/09/04 | 1716 | 172 | 21.4888 | 144.0405 | Sampling dense mat. | | | R791-028 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 05:46:13 Apr/09/04 | 1716 | 175 | 21.4890 | 144.0407 | Eh=58 now. Once we settled on the bottom the Eh went way down. We've moved slightly to continue sampling. No temperature anomaly here. | | | |
| 05:50:46 Apr/09/04 | 1716 | 174 | 21.4889 | 144.0406 | We're looking around the area for another spot to sample more bacteria. It's everywhere. Eh is at 23. | | | |
| 05:53:59 Apr/09/04 | 1722 | 252 | 21.4890 | 144.0406 | Moving down slope to look for another mat to sample. Huge areas of mat many square meters. | | | |
| 05:55:10 Apr/09/04 | 1718 | 206 | 21.4890 | 144.0406 | Mat accumulation. | | | R791-029 |
| 05:56:05 Apr/09/04 | 1717 | 183 | 21.4888 | 144.0404 | | | | R791-030 |
| 05:56:19 Apr/09/04 | 1718 | 183 | 21.4888 | 144.0407 | Ball belcher. | | | R791-031 |
| 05:56:52 Apr/09/04 | 1718 | 161 | 21.4888 | 144.0406 | Digital photo of area of coarse-grained bacterial balls. A group of darker colored balls in a small pit. | | | |
| 05:57:50 Apr/09/04 | 1716 | 207 | 21.4890 | 144.0404 | White sea cucumber. | | | |
| 05:57:51 Apr/09/04 | 1716 | 197 | 21.4889 | 144.0405 | Tiny cuke. | | | R791-032 |
| 05:59:18 Apr/09/04 | 1715 | 190 | 21.4889 | 144.0405 | Iron-oxide mats. | | | R791-033 |
| 05:59:51 Apr/09/04 | 1715 | 191 | 21.4888 | 144.0406 | Thick mat. | | | R791-034 |
| 06:00:06 Apr/09/04 | 1715 | 190 | 21.4888 | 144.0406 | Eh down to 15 mV. Brown crusts buried in the yellow mat forming small cave-like structures. These may be Fe replacement of bacterial mat? | | | |
| 06:01:38 Apr/09/04 | 1715 | 189 | 21.4888 | 144.0405 | Moyer suction #2. | | | R791-035 |
| 06:02:17 Apr/09/04 | 1715 | 188 | 21.4889 | 144.0406 | Suction sample of yellow bacterial mat into jar 6. Eh=13 mV. Mat is up to 2-3 cm thick in places. Z=1715. [NW Eifuku - Bacterial Balls]. | R791-SS-J6-0003 | Moyer | |
| 06:06:12 Apr/09/04 | 1715 | 182 | 21.4889 | 144.0406 | Same suction but shifted a bit - shows depth of mat. | | | R791-036 |
| 06:13:19 Apr/09/04 | 1715 | 198 | 21.4888 | 144.0407 | Sampled iron crust. | | | R791-037 |
| 06:13:44 Apr/09/04 | 1715 | 198 | 21.4888 | 144.0406 | Suction sample into jar 8 of bacterial mat and bits of crust - likely Fe mineralization of the mat. Z=1715. [NW Eifuku - Bacterial Balls]. | R791-SS-J8-0004 | Moyer | |
| 06:18:26 Apr/09/04 | 1710 | 194 | 21.4888 | 144.0406 | Now heading upslope. Less of the mats; not as thick as sample site. | | | |
| 06:21:06 Apr/09/04 | 1685 | 191 | 21.4886 | 144.0405 | Climbing ridge. | | | R791-038 |
| 06:22:08 Apr/09/04 | 1673 | 168 | 21.4884 | 144.0404 | Top of ridge (local) with lighter colored mats. | | | |
| 06:23:17 Apr/09/04 | 1675 | 147 | 21.4885 | 144.0404 | Dense mat on ridge crest. | | | R791-039 |
| 06:23:47 Apr/09/04 | 1675 | 143 | 21.4885 | 144.0404 | Dense mat filaments on ridge crest. | | | R791-040 |
| 06:25:01 Apr/09/04 | 1674 | 165 | 21.4886 | 144.0404 | Checking temp in mat at top of ridge. | | | |
| 06:27:07 Apr/09/04 | 1674 | 163 | 21.4884 | 144.0404 | Temperature anomaly of 1.3C. Will collect mat here. | | | |
| 06:27:51 Apr/09/04 | 1675 | 163 | 21.4884 | 144.0404 | Suction thick layer (5+ cm) of bacterial mat with a T anomaly of 1.3C into jar 7. On a knife-like ridge a few meters wide. Eh=51 mV (higher than previous mat sample). Z=1674. [NW Eifuku - Yellow Top]. | R791-SS-J7-0005 | Moyer | |
| 06:30:53 Apr/09/04 | 1674 | 165 | 21.4887 | 144.0404 | Nav Marker called Yellow Top. Sample of yellow bacterial mat with 1.3C T anomaly. Eh is varying from 51 to 54 mV. After some time the Eh dropped to 28 after the site was significant stirred. | | | |
| 06:45:14 Apr/09/04 | 1675 | 199 | 21.4885 | 144.0403 | Finished sampling bacterial mat and will move along line to the SE. | | | |
| 06:46:47 Apr/09/04 | 1675 | 197 | 21.4886 | 144.0403 | 340 meters to point "C". Watching eH drop to 25 after sampling. | | | |
| 06:50:31 Apr/09/04 | 1667 | 132 | 21.4885 | 144.0405 | Continuing to follow ridge. Ridge heavily covered by yellow bacteria mat. | | | R791-041 |
| 06:50:57 Apr/09/04 | 1667 | 141 | 21.4884 | 144.0405 | Following this same ridge upslope. More of same type of micro mats; large areas. | | | |
| 06:51:53 Apr/09/04 | 1660 | 144 | 21.4883 | 144.0406 | Ridge is almost completely covered with yellow mats. | | | R791-042 |
| 06:52:55 Apr/09/04 | 1652 | 134 | 21.4883 | 144.0406 | Mat stops rather abruptly and we transition into darker sand with occasional rocks. | | | R791-043 |
| 06:59:34 Apr/09/04 | 1642 | 154 | 21.4882 | 144.0408 | Extremely thick mats here. Ski slope of mats. | | | |
| 07:00:21 Apr/09/04 | 1640 | 133 | 21.4882 | 144.0408 | Whole slope looks to be covered with yellow mat. | | | R791-044 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 07:02:23 Apr/09/04 | 1625 | 134 | 21.4882 | 144.0411 | Plume of turbidity. Eh dropping to 0. | | | |
| 07:04:57 Apr/09/04 | 1640 | 138 | 21.4882 | 144.0413 | Seeing mussels and squat lobsters. | | | |
| 07:07:50 Apr/09/04 | 1622 | 126 | 21.4881 | 144.0415 | Close-up of squat lobster (?). | | | R791-045 |
| 07:09:21 Apr/09/04 | 1614 | 134 | 21.4881 | 144.0415 | Crabs and some sort of mussel in lower left corner. | | | R791-046 |
| 07:10:17 Apr/09/04 | 1602 | 136 | 21.4881 | 144.0416 | More squat lobsters mussels and shrimp. Vent area eminent. eH=-25! | | | |
| 07:11:49 Apr/09/04 | 1599 | 171 | 21.4880 | 144.0417 | Steep slope with galatheid crabs and white mats. eH at -33! | | | R791-047 |
| 07:12:17 Apr/09/04 | 1599 | 207 | 21.4879 | 144.0417 | Two mussels attached to boulder with galatheid crabs. | | | R791-048 |
| 07:14:02 Apr/09/04 | 1599 | 204 | 21.4879 | 144.0416 | We're seeing mussels and crabs so there must be something near here. | | | R791-049 |
| 07:16:49 Apr/09/04 | 1595 | 213 | 21.4879 | 144.0417 | Scattered shrimp; swimming squat lobster; mussels and bacterial mat. | | | R791-050 |
| 07:17:34 Apr/09/04 | 1594 | 184 | 21.4879 | 144.0416 | High-spired gastropod on the rocks. | | | R791-051 |
| 07:18:57 Apr/09/04 | 1592 | 203 | 21.4879 | 144.0417 | This spot named "Mussel Mound". | | | R791-052 |
| 07:19:11 Apr/09/04 | 1592 | 254 | 21.4880 | 144.0417 | More plume action and eH dropped to -39! | | | |
| 07:23:01 Apr/09/04 | 1599 | 221 | 21.4878 | 144.0415 | Large area of "just" white mat located. Still only seeing diffuse flow over a large area. | | | |
| 07:23:49 Apr/09/04 | 1601 | 198 | 21.4878 | 144.0414 | Mussels on top of the rocks. | | | R791-053 |
| 07:26:17 Apr/09/04 | 1600 | 210 | 21.4878 | 144.0415 | eH now at -52! Mussels are getting thinker. | | | |
| 07:27:21 Apr/09/04 | 1599 | 206 | 21.4877 | 144.0415 | Spotted mussel shells. | | | R791-054 |
| 07:28:56 Apr/09/04 | 1597 | 228 | 21.4877 | 144.0414 | Mussels all around! | | | R791-055 |
| 07:34:01 Apr/09/04 | 1597 | 135 | 21.4877 | 144.0414 | Flying squat lobsters and shrimp. | | | R791-056 |
| 07:34:20 Apr/09/04 | 1597 | 134 | 21.4877 | 144.0414 | We are settling down to collect some of these mussels for species identification. We are taking digital images for species identification. | | | |
| 07:34:32 Apr/09/04 | 1597 | 133 | 21.4877 | 144.0413 | Mussels close-up. Spots are where byssal thread attached. | | | R791-057 |
| 07:38:15 Apr/09/04 | 1597 | 131 | 21.4878 | 144.0413 | Mussels. | | | R791-058 |
| 07:39:16 Apr/09/04 | 1597 | 131 | 21.4877 | 144.0414 | Another mussel area. | | | R791-059 |
| 07:39:55 Apr/09/04 | 1597 | 130 | 21.4877 | 144.0414 | Another mussel area. | | | R791-060 |
| 07:40:14 Apr/09/04 | 1597 | 132 | 21.4877 | 144.0414 | We shot a series of digital images to do size structure of these mussel populations. | | | |
| 07:41:20 Apr/09/04 | 1597 | 128 | 21.4878 | 144.0414 | A picture to size shells. | | | R791-061 |
| 07:41:53 Apr/09/04 | 1597 | 130 | 21.4878 | 144.0414 | Collecting 3 mussels. Port side of purse. Eh=-62. Z=1597. [NW Eifuku - More Mussels]. | R791-Bio-0006 | Tunnicliffe | |
| 07:44:48 Apr/09/04 | 1597 | 130 | 21.4877 | 144.0413 | Smaller mussels are in the open spaces in between the stacks of big ones; possibly because that is the only place where they can settle. | | | |
| 07:47:13 Apr/09/04 | 1597 | 128 | 21.4877 | 144.0413 | Mussel sample number 3. | | | R791-062 |
| 07:49:35 Apr/09/04 | 1597 | 129 | 21.4877 | 144.0414 | Here at More Mussels - lots of squat lobsters; a few limpets; and a scale worm. | | | R791-063 |
| 07:50:08 Apr/09/04 | 1597 | 126 | 21.4877 | 144.0414 | There are also scale worms and a few limpets. Galatheids and some shrimp. | | | |
| 07:51:59 Apr/09/04 | 1598 | 129 | 21.4877 | 144.0414 | Adjusting the rope on the purse. The mussels are about 7 cm. | | | R791-064 |
| 07:54:46 Apr/09/04 | 1599 | 174 | 21.4879 | 144.0413 | We tried to collect some galatheids but were not successful. We are now moving to locate the source of fluid in this area to take fluid samples. | | | |
| 07:55:33 Apr/09/04 | 1599 | 238 | 21.4878 | 144.0412 | Possibly in the neutral buoyant plume. | | | R791-065 |
| 07:59:09 Apr/09/04 | 1603 | 201 | 21.4878 | 144.0414 | Population of mussels less dense towards the top of the ridge. They are concentrated on rocks and not on the sediment. | | | R791-066 |
| 07:59:11 Apr/09/04 | 1603 | 202 | 21.4878 | 144.0413 | We are going upslope looking for evidence of fluid. We are seeing fewer mussels. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 08:01:36 Apr/09/04 | 1595 | 234 | 21.4878 | 144.0414 | We are up above the top of the mussel location and the plume is getting thick. | | | |
| 08:01:45 Apr/09/04 | 1595 | 220 | 21.4878 | 144.0414 | The plume is getting very thick. | | | R791-067 |
| 08:02:43 Apr/09/04 | 1600 | 49 | 21.4879 | 144.0413 | The Eh has dropped to -90. | | | |
| 08:05:12 Apr/09/04 | 1620 | 83 | 21.4878 | 144.0411 | Appear to be inside of the plume. | | | R791-068 |
| 08:05:14 Apr/09/04 | 1621 | 84 | 21.4878 | 144.0411 | It looks like we are in the plume and seeing some staining on the rock across the way. | | | |
| 08:05:51 Apr/09/04 | 1626 | 80 | 21.4878 | 144.0411 | A lot of white staining on the rocks now; probably very near the vent. | | | R791-069 |
| 08:05:52 Apr/09/04 | 1626 | 81 | 21.4877 | 144.0410 | A lot of floc in the water column. | | | |
| 08:07:52 Apr/09/04 | 1636 | 117 | 21.4878 | 144.0409 | At depth of 1645 there is a lot of white staining; possibly hydrothermally altered rock near the plume source. Difficulty locating it. | | | R791-070 |
| 08:08:08 Apr/09/04 | 1635 | 83 | 21.4877 | 144.0408 | We are in an active flow area. Lots of staining and some flow. We are not sure whether it is diffuse or focused. | | | |
| 08:09:25 Apr/09/04 | 1645 | 138 | 21.4876 | 144.0408 | The lavas appear relatively new from the distance. | | | |
| 08:10:08 Apr/09/04 | 1649 | 78 | 21.4877 | 144.0408 | This appears to be the local bottom with some crabs and white unidentified spots (limpets; mussels?) no evidence of intense flow. | | | |
| 08:13:23 Apr/09/04 | 1643 | 97 | 21.4877 | 144.0407 | Lots of shrimp and white staining near the shimmering water at Ice Fall. | | | R791-071 |
| 08:13:34 Apr/09/04 | 1643 | 99 | 21.4877 | 144.0408 | We are trying to land at a white spot where we see some shimmering and as we land many shrimp just float up. We think we are seeing both species of shrimp. | | | |
| 08:14:11 Apr/09/04 | 1643 | 99 | 21.4877 | 144.0407 | Discovered the shimmering water source, which is just below the breccia in the center of the frame. This site is known as Ice Fall. | | | R791-072 |
| 08:17:10 Apr/09/04 | 1643 | 98 | 21.4877 | 144.0407 | We have sat down and trying to take a temperature measurement at Iceflow before taking fluid samples. The highest we have recorded so far is 3 degrees. | | | |
| 08:17:26 Apr/09/04 | 1643 | 98 | 21.4876 | 144.0407 | Mussels and shrimp and squat lobster at Ice Fall. | | | R791-073 |
| 08:22:34 Apr/09/04 | 1643 | 114 | 21.4875 | 144.0407 | Three degrees at top of diffuse flow. | | | R791-074 |
| 08:23:57 Apr/09/04 | 1643 | 113 | 21.4876 | 144.0407 | We are measuring in shimmering water down in the crack. Anomaly is up to 11 degrees. | | | |
| 08:24:49 Apr/09/04 | 1643 | 113 | 21.4877 | 144.0407 | Still poking around and found a spot with a 7-degree anomaly. We are locking the sampling hose at a spot with 12.6. | | | |
| 08:25:05 Apr/09/04 | 1644 | 114 | 21.4877 | 144.0407 | 13 degrees above ambient temperature. Starting water samples here. | | | R791-075 |
| 08:26:08 Apr/09/04 | 1643 | 114 | 21.4876 | 144.0408 | HFS Unfiltered Bag-8. Start=0826 Stop=0829. Tmax=13.5 Tav g=12.5(sd=0.5) T2=8. Vol=127. The pumps stopped on their own.<br><br>Start2=0841 Stop2=0845. Tmax=13.5 Tavg=10.6(sd=0.7) T2=8. Vol-collected=642ml. Vol-recovered=100ml. Z=1643. [NW Eifuku - IceFall]. | R791-HFS-8-0007 | Butterfield | |
| 08:28:34 Apr/09/04 | 1643 | 112 | 21.4876 | 144.0407 | Vesicular blocky lava covered with bacterial mat near diffuse venting. | | | R791-076 |
| 08:30:13 Apr/09/04 | 1643 | 114 | 21.4876 | 144.0407 | The sampler stopped on its own and we are waiting for it come back on line. | | | |
| 08:33:57 Apr/09/04 | 1643 | 113 | 21.4877 | 144.0407 | Still waiting to establish communications with the HFS. | | | |
| 08:36:55 Apr/09/04 | 1643 | 114 | 21.4876 | 144.0407 | Butterfield is rebooting his computer. A Windows problem but now we are reconnecting the fluid sampler. | | | |
| 08:38:43 Apr/09/04 | 1643 | 111 | 21.4876 | 144.0408 | Mussels about 10 cm in length. | | | R791-077 |
| 08:39:44 Apr/09/04 | 1643 | 111 | 21.4876 | 144.0407 | Background temperature is 1.8 degrees. | | | |
| 08:39:53 Apr/09/04 | 1643 | 112 | 21.4877 | 144.0407 | 10 cm long mussels with what may be a large yellow mantle. | | | R791-078 |
| 08:40:47 Apr/09/04 | 1643 | 115 | 21.4876 | 144.0407 | Gas tight bottle-1 (HIL GTB 2). Fired=0841. T=10.9 T2=8.0. Z=1643. It seems like it snagged and did not retreat all the way back. [NW Eifuku - IceFall]. | R791-GTB-1-0008 | Lupton | |
| 08:42:25 Apr/09/04 | 1643 | 111 | 21.4876 | 144.0407 | Shrimps and squat lobsters on water sampling cylinders during sampling. | | | R791-079 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 08:44:51 Apr/09/04 | 1643 | 112 | 21.4877 | 144.0407 | Shrimp and bacterial matte at diffuse flow site. | | | R791-080 |
| 08:45:55 Apr/09/04 | 1643 | 114 | 21.4876 | 144.0407 | Brecciated locale of diffuse venting. | | | R791-081 |
| 08:46:32 Apr/09/04 | 1643 | 113 | 21.4877 | 144.0407 | HFS Sterivex filter-3. Start=0847 Stop=0906. Tmax=15.0 Tavg=12.1(sd=1.45) T2=9.0. Vol=1809ml. Z=1643. [NW Eifuku - IceFall]. | R791-HFS-3-0009 | Butterfield | |
| 08:48:15 Apr/09/04 | 1643 | 114 | 21.4876 | 144.0407 | One of two species of shrimp observed at Ice Fall. | | | R791-082 |
| 08:54:41 Apr/09/04 | 1643 | 113 | 21.4876 | 144.0407 | Still taking the temperature in the shimmering water. | | | R791-083 |
| 08:59:57 Apr/09/04 | 1643 | 111 | 21.4876 | 144.0407 | Vesicular light and dark colored lithologies; bacterial mat and large mussels at Ice Fall. | | | R791-084 |
| 09:02:33 Apr/09/04 | 1643 | 114 | 21.4876 | 144.0407 | We are still collecting fluid samples at Icefall. | | | |
| 09:04:37 Apr/09/04 | 1643 | 111 | 21.4876 | 144.0408 | Trying to plan strategy. | | | |
| 09:06:27 Apr/09/04 | 1643 | 114 | 21.4877 | 144.0407 | Maximum temperature here was 15.0 degrees. | | | R791-085 |
| 09:08:11 Apr/09/04 | 1640 | 117 | 21.4876 | 144.0408 | Going SE along the 1641 m contour. | | | |
| 09:08:56 Apr/09/04 | 1638 | 119 | 21.4877 | 144.0407 | Moving laterally searching for vent site. More white staining or bacterial mat. | | | R791-086 |
| 09:11:21 Apr/09/04 | 1636 | 133 | 21.4873 | 144.0407 | We are now facing E and moving laterally up the face of this slope going up to z=1636. Coming back across some venting. | | | |
| 09:11:54 Apr/09/04 | 1637 | 84 | 21.4875 | 144.0407 | Facing east; moving laterally back and forth while we move up the slope. | | | R791-087 |
| 09:13:31 Apr/09/04 | 1637 | 42 | 21.4878 | 144.0407 | Found a spot with small mussels and galatheids. Orange sediment. | | | |
| 09:14:13 Apr/09/04 | 1634 | 34 | 21.4878 | 144.0406 | Moving up 5 meters and lateral to the south. Brown sediment and lava flow with lower populations of mussels. | | | R791-088 |
| 09:14:20 Apr/09/04 | 1632 | 34 | 21.4878 | 144.0406 | Moving up to 1631 and move laterally to the south around a promontory. | | | |
| 09:15:32 Apr/09/04 | 1632 | 71 | 21.4876 | 144.0408 | More mussels and some white staining. Low level venting and lots of shrimp. Coming over a big ridge running east/west. | | | |
| 09:16:33 Apr/09/04 | 1632 | 79 | 21.4875 | 144.0409 | An extensive area of white material and mussels buried in the white mat. There is diffuse flow and a buoyant plume - which is clear. | | | |
| 09:16:58 Apr/09/04 | 1632 | 93 | 21.4876 | 144.0409 | White staining showing reason for namesake of this site: Ice Fall. | | | R791-089 |
| 09:17:56 Apr/09/04 | 1632 | 105 | 21.4874 | 144.0408 | We are going to move another 5 m up slope. More abundant galatheids and white staining. | | | |
| 09:20:01 Apr/09/04 | 1627 | 73 | 21.4873 | 144.0409 | Moving at constant elevation to the south search for active venting. | | | R791-090 |
| 09:20:34 Apr/09/04 | 1627 | 84 | 21.4872 | 144.0409 | Seeing some little spots of white staining and seeing darker fluid. Eh is -0.62. | | | |
| 09:21:46 Apr/09/04 | 1626 | 62 | 21.4870 | 144.0409 | We are in cloudy water. | | | |
| 09:22:36 Apr/09/04 | 1626 | 75 | 21.4870 | 144.0410 | We are now in a talus slope with some discoloration in the rocks. | | | |
| 09:22:39 Apr/09/04 | 1627 | 55 | 21.4870 | 144.0410 | Minor pockets of white staining among talus pile. | | | R791-091 |
| 09:23:38 Apr/09/04 | 1627 | 72 | 21.4870 | 144.0412 | Moving laterally along this slope at 1626 m. White staining giving rise to orange sediment. We are on the south side of the band of white staining. | | | |
| 09:23:46 Apr/09/04 | 1627 | 87 | 21.4870 | 144.0412 | Still moving laterally to the south along the slope. White staining turns to yellowish sediment to the south. | | | R791-092 |
| 09:25:54 Apr/09/04 | 1622 | 357 | 21.4871 | 144.0411 | Moving back along ridge at depth 1620 facing north but moving west. Seeing shimmering water. | | | |
| 09:26:46 Apr/09/04 | 1622 | 347 | 21.4872 | 144.0410 | Shimmering water again while we move north laterally. | | | R791-093 |
| 09:27:03 Apr/09/04 | 1622 | 339 | 21.4873 | 144.0409 | Loose floc in water; confusing murky water - source direction not earlier. | | | |
| 09:28:03 Apr/09/04 | 1622 | 62 | 21.4874 | 144.0409 | 1621 meters; probably just above Ice Sheet. Massive amounts of white staining. | | | R791-094 |
| 09:29:25 Apr/09/04 | 1622 | 67 | 21.4875 | 144.0409 | Mussels and shrimp on steep slope. | | | R791-095 |
| 09:30:18 Apr/09/04 | 1622 | 56 | 21.4876 | 144.0410 | More solid lava flow it looks like it has come down as sheet. | | | |
| 09:30:54 Apr/09/04 | 1619 | 71 | 21.4876 | 144.0409 | The white material mats seem to be running downhill. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 09:32:21 Apr/09/04 | 1621 | 44 | 21.4877 | 144.0409 | Mussels grouped on what appears to be pillow lavas. | | | R791-096 |
| 09:33:19 Apr/09/04 | 1621 | 343 | 21.4878 | 144.0408 | We are coming to the end of the ridge covered with mussels. Moving up 5 m to 1616 up slope to the east and then going back south. Lots of intact flows. | | | |
| 09:33:54 Apr/09/04 | 1617 | 88 | 21.4879 | 144.0408 | Moving up five meters and laterally back to the south. Large intact lava flows. This could be the surface of the flow here. | | | R791-097 |
| 09:34:57 Apr/09/04 | 1617 | 100 | 21.4876 | 144.0409 | Seeing more white staining and lots of mussels. Lots of low level diffuse venting. | | | |
| 09:35:48 Apr/09/04 | 1617 | 97 | 21.4876 | 144.0409 | We are at an area with lots of white staining. | | | |
| 09:36:22 Apr/09/04 | 1617 | 81 | 21.4877 | 144.0411 | Shrimp grazing on the white mat. | | | |
| 09:36:48 Apr/09/04 | 1617 | 81 | 21.4875 | 144.0410 | Hundreds of shrimp evenly distributed along the bacterial mat. | | | R791-098 |
| 09:37:29 Apr/09/04 | 1617 | 81 | 21.4875 | 144.0410 | More shrimp relaxing on the large surface of white staining. | | | R791-099 |
| 09:37:44 Apr/09/04 | 1617 | 78 | 21.4875 | 144.0410 | Large numbers of shrimp at Icecream. They are evenly spaced. | | | |
| 09:39:11 Apr/09/04 | 1617 | 104 | 21.4875 | 144.0411 | Moving laterally to the south again on an E heading. | | | |
| 09:39:19 Apr/09/04 | 1617 | 115 | 21.4875 | 144.0411 | Moving laterally to the south again and back into mussel-covered talus. | | | R791-100 |
| 09:40:13 Apr/09/04 | 1617 | 117 | 21.4873 | 144.0410 | Mussels here seem to form patches on the top of rocks. | | | |
| 09:42:14 Apr/09/04 | 1620 | 99 | 21.4872 | 144.0410 | We are settling down to take some pictures. There is some shimmering. | | | |
| 09:43:51 Apr/09/04 | 1621 | 113 | 21.4873 | 144.0411 | Clusters of large mussels on the largest blocks of the lava flow. There are also shrimp. | | | R791-101 |
| 09:44:36 Apr/09/04 | 1621 | 124 | 21.4873 | 144.0410 | Continuing to head south. | | | |
| 09:46:33 Apr/09/04 | 1619 | 90 | 21.4872 | 144.0411 | We seem to have less mat; fewer mussels. Checking gauges. | | | |
| 09:48:06 Apr/09/04 | 1618 | 112 | 21.4870 | 144.0412 | We are at the southern end of our transects and we can see more mat and mussels further south. | | | |
| 09:49:25 Apr/09/04 | 1617 | 94 | 21.4869 | 144.0413 | Lava flow and some white staining. We are moving up to 1608. We're in the smoke. | | | |
| 09:49:43 Apr/09/04 | 1612 | 95 | 21.4869 | 144.0412 | Towards the southern extent of our traverse. | | | R791-102 |
| 09:50:42 Apr/09/04 | 1606 | 127 | 21.4868 | 144.0413 | We're at a vertical slope and lava is coming down. Ledges are really steep. Not much left to this hill We're at the top of the hill. Where is the fluid coming from? | | | |
| 09:51:24 Apr/09/04 | 1606 | 114 | 21.4868 | 144.0412 | This does not appear to be a lav a flow. | | | R791-103 |
| 09:51:59 Apr/09/04 | 1606 | 135 | 21.4869 | 144.0413 | We're at a hill but are confused about what is made of? Cemented talus? Strange lava extrusion? Poking it to see consistency. Mineralized talus? | | | |
| 09:52:13 Apr/09/04 | 1606 | 134 | 21.4869 | 144.0413 | Top of 'spire'. It looks like cemented talus rather than a lava flow. | | | R791-104 |
| 09:54:00 Apr/09/04 | 1606 | 137 | 21.4869 | 144.0413 | Oxide stained rocks with gray 'cement' and mussels and squat lobsters on Top Towers. | | | R791-105 |
| 09:54:13 Apr/09/04 | 1605 | 131 | 21.4870 | 144.0413 | Some matrix has cemented the tower. The material is very white. The location is named Top Towers. Fauna consists of mussels; galatheids and a few anemones. | | | |
| 09:55:33 Apr/09/04 | 1605 | 123 | 21.4869 | 144.0413 | Massive amounts of oxide coated rocks. Could be cemented talus. | | | R791-106 |
| 09:57:37 Apr/09/04 | 1605 | 124 | 21.4869 | 144.0413 | Eh has dropped to -90. The brown material looks quite friable. | | | |
| 09:58:14 Apr/09/04 | 1605 | 120 | 21.4869 | 144.0413 | Rock sample: friable brown; grey and red coating. Rectangular shape. In the purse. The structure is multiphased. Z=1605. [NW Eifuku - Top Tower]. | R791-RK-0010 | SROF geo team (Hein) | |
| 10:03:35 Apr/09/04 | 1605 | 123 | 21.4868 | 144.0413 | Sampling cobble sized red and gray rock. | | | R791-107 |
| 10:03:42 Apr/09/04 | 1605 | 119 | 21.4868 | 144.0413 | Red and gray cobble sized rock going into the purse. | | | R791-108 |
| 10:04:40 Apr/09/04 | 1605 | 117 | 21.4870 | 144.0414 | We are going to suction some of the matrix. | | | |
| 10:06:04 Apr/09/04 | 1605 | 118 | 21.4868 | 144.0412 | Suction sample of the grey and orange matrix into jar 1. The orange matrix may be old bacterial mat. Also 2 shrimp; 5 galatheids; 2 mussels; 1 polynoid; possibly 4 snails. Z=1604. [NW Eifuku - Top Tower]. | R791-SS-J1-0011 | SROF geo team (Hein) | |
| 10:07:03 Apr/09/04 | 1605 | 113 | 21.4868 | 144.0413 | Slurp sampling gray sediment. | | | R791-109 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 10:08:40 Apr/09/04 | 1605 | 115 | 21.4869 | 144.0413 | Eh has increased to -60 while we have been sitting here. | | | |
| 10:09:34 Apr/09/04 | 1605 | 115 | 21.4869 | 144.0413 | Pale orange material may be old bacterial mat. | | | R791-110 |
| 10:10:49 Apr/09/04 | 1605 | 115 | 21.4868 | 144.0413 | Slurp sampled a shrimp. | | | R791-111 |
| 10:12:26 Apr/09/04 | 1605 | 112 | 21.4869 | 144.0413 | Crab stuffing his face with mussel. Note his left claw at his mouth with mussel meat. | | | R791-112 |
| 10:16:00 Apr/09/04 | 1605 | 119 | 21.4868 | 144.0413 | Slurp sampled a crab. Hopefully it gets along with the shrimp. | | | R791-113 |
| 10:20:20 Apr/09/04 | 1605 | 112 | 21.4869 | 144.0413 | Slurp sampled two crabs and a mussel. | | | R791-114 |
| 10:27:30 Apr/09/04 | 1605 | 113 | 21.4868 | 144.0412 | Slurp sampling a mussel. | | | R791-115 |
| 10:30:24 Apr/09/04 | 1605 | 115 | 21.4869 | 144.0412 | Doing time. | | | R791-116 |
| 10:32:26 Apr/09/04 | 1602 | 116 | 21.4869 | 144.0412 | Shrimp in the flush jar but we do not know where it came form. | | | |
| 10:33:28 Apr/09/04 | 1602 | 116 | 21.4869 | 144.0413 | We will continue the systematic search going all the way to the top. | | | |
| 10:33:57 Apr/09/04 | 1600 | 76 | 21.4869 | 144.0412 | We are facing northeast and moving laterally on a north heading. | | | |
| 10:34:49 Apr/09/04 | 1598 | 33 | 21.4871 | 144.0412 | 1596 meters; facing east moving north. | | | R791-117 |
| 10:34:53 Apr/09/04 | 1598 | 42 | 21.4871 | 144.0412 | We are seeing alot more white staining (mat and/or mineralized material). | | | |
| 10:36:09 Apr/09/04 | 1596 | 32 | 21.4874 | 144.0412 | We found a vent. Low temperature (white) smoker. Champagne. Bubbles are coming up all over the place. | | | |
| 10:37:06 Apr/09/04 | 1604 | 52 | 21.4874 | 144.0411 | Champagne vent. | | | R791-118 |
| 10:38:42 Apr/09/04 | 1606 | 65 | 21.4875 | 144.0412 | Chimneys of Champagne. | | | R791-119 |
| 10:39:00 Apr/09/04 | 1607 | 64 | 21.4875 | 144.0412 | Dozens of shrimp just below chimneys. | | | R791-120 |
| 10:39:05 Apr/09/04 | 1607 | 61 | 21.4875 | 144.0412 | On the white structure there are shrimp and scale worms. Many large bubbles. | | | |
| 10:39:19 Apr/09/04 | 1607 | 68 | 21.4875 | 144.0412 | Upper left hand corner: very large bubbles. | | | R791-121 |
| 10:42:37 Apr/09/04 | 1607 | 55 | 21.4876 | 144.0413 | The chimneys don't look like the typical white anhydrite. Pretty good-sized bubbles coming out. | | | |
| 10:43:52 Apr/09/04 | 1607 | 55 | 21.4876 | 144.0413 | It is possible that gas hydrites escaping. | | | |
| 10:45:02 Apr/09/04 | 1607 | 55 | 21.4875 | 144.0412 | Highlights are on as we pan around the whole area. T=3.3. | | | |
| 10:45:45 Apr/09/04 | 1608 | 54 | 21.4875 | 144.0412 | Bubbles in top right. | | | R791-122 |
| 10:45:59 Apr/09/04 | 1608 | 58 | 21.4875 | 144.0412 | Seeing huge plentiful bubbles escaping; must be gas hydrate. Could be CO2 hydrates. | | | |
| 10:47:04 Apr/09/04 | 1608 | 45 | 21.4875 | 144.0413 | Temperature probe at Champagne. | | | R791-123 |
| 10:50:06 Apr/09/04 | 1608 | 45 | 21.4875 | 144.0412 | Champagne soft chimney sequence. About 20 cm across at the base and maybe 50 cm tall. | | | R791-124 |
| 10:50:29 Apr/09/04 | 1608 | 43 | 21.4876 | 144.0413 | Very soft chimneys. Bubbles are hard to identify in the frame. | | | R791-125 |
| 10:50:34 Apr/09/04 | 1608 | 42 | 21.4876 | 144.0413 | Bubble near top of left hand chimney. These could be anhydrite chimneys. | | | R791-126 |
| 10:50:46 Apr/09/04 | 1608 | 42 | 21.4876 | 144.0412 | Chimney is extremely soft. No temperature anomaly noticed. | | | |
| 10:51:30 Apr/09/04 | 1608 | 42 | 21.4876 | 144.0413 | Temperature just spiked. Rising quickly; highest temp=44C. | | | |
| 10:52:32 Apr/09/04 | 1608 | 43 | 21.4876 | 144.0414 | Chimneys are pretty small about 20cm across at the base and maybe 50cm tall. | | | |
| 10:54:15 Apr/09/04 | 1608 | 42 | 21.4876 | 144.0413 | Temperature measured to 44 degrees. | | | R791-127 |
| 10:56:42 Apr/09/04 | 1607 | 42 | 21.4876 | 144.0412 | We're having trouble seeing with all the smoke. Trying to decide where to move if we move. | | | |
| 10:57:32 Apr/09/04 | 1607 | 47 | 21.4876 | 144.0413 | We're backing up to get a better angle on the chimneys. Suddenly we're seeing tons of small bubbles everywhere. | | | |
| 10:57:43 Apr/09/04 | 1605 | 43 | 21.4876 | 144.0412 | These are CO2 bubbles. | | | R791-128 |
| 10:58:57 Apr/09/04 | 1606 | 66 | 21.4876 | 144.0411 | Bubbles appear oily; perhaps because they are liquid CO2. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 11:00:06 Apr/09/04 | 1606 | 43 | 21.4876 | 144.0413 | Champagne with few bubbles observed in left hand cloudy region. | | | R791-129 |
| 11:00:17 Apr/09/04 | 1607 | 39 | 21.4876 | 144.0413 | Overhead shot of Champagne. | | | R791-130 |
| 11:00:49 Apr/09/04 | 1607 | 21 | 21.4876 | 144.0413 | When we disturb the ground we might be getting clathrates?? | | | |
| 11:01:10 Apr/09/04 | 1607 | 28 | 21.4876 | 144.0413 | Continuous CO2 bubbling. | | | R791-131 |
| 11:01:36 Apr/09/04 | 1607 | 29 | 21.4876 | 144.0413 | Abundant CO2 bubbles. | | | R791-132 |
| 11:03:09 Apr/09/04 | 1607 | 7 | 21.4876 | 144.0414 | Temperature is going up a bit. At 23C. | | | |
| 11:08:40 Apr/09/04 | 1607 | 7 | 21.4876 | 144.0414 | Large globular CO2 bubble in left of frame. | | | R791-133 |
| 11:09:03 Apr/09/04 | 1607 | 4 | 21.4876 | 144.0414 | We want to come back with cylinder on to collect the bubbles. | | | |
| 11:14:03 Apr/09/04 | 1607 | 2 | 21.4876 | 144.0414 | We are locking the arm. Temperature anomaly got up to 64 degrees. When sample started temperature went up to 89. | | | |
| 11:14:34 Apr/09/04 | 1607 | 0 | 21.4876 | 144.0414 | HFS Unfiltered Bag-9. Start=1114 Stop=1119. Tmax=88 Tavg=83.5(sd=6) T2=10. Vol-collected=205ml. [Broke in the cylinder; compromised sample] Z=1607. [NW Eifuku - Champagne]. | R791-HFS-9-0012 | Butterfield | |
| 11:14:34 Apr/09/04 | 1607 | 0 | 21.4876 | 144.0414 | Gas tight bottle #4 (HIL GTB 11). Fired=1114 T=99. Z=1607. T2=58. [NW Eifuku - Champagne]. | R791-GTB-4-0013 | Lupton | |
| 11:17:23 Apr/09/04 | 1607 | 3 | 21.4876 | 144.0415 | Starting unfiltered bag #9. | | | R791-134 |
| 11:19:19 Apr/09/04 | 1607 | 1 | 21.4876 | 144.0414 | End of sampling. | | | R791-135 |
| 11:20:11 Apr/09/04 | 1607 | 3 | 21.4877 | 144.0413 | HFS bag-11. Start=1120 Stop=1123. Tmax=101.3 Tavg=99.7(sd=0.9) T2=59. Vol-collected=209ml. Z=1607. [cylinder exploded; sample lost] [NW Eifuku - Champagne]. | R791-HFS-11-0014 | Butterfield | |
| 11:23:33 Apr/09/04 | 1607 | 2 | 21.4876 | 144.0413 | Gas Tight Bottle #2 (HIL GTB 7). Fired=11:24. T1=100 T2=59. Z=1607. [NW Eifuku - Champagne]. | R791-GTB-2-0015 | Lupton | |
| 11:23:37 Apr/09/04 | 1607 | 1 | 21.4876 | 144.0413 | Large 'oily' globular CO2 bubbles. | | | R791-136 |
| 11:23:58 Apr/09/04 | 1607 | 4 | 21.4876 | 144.0414 | HFS Bag-14. Start=1125 Stop=1127. Tmax=101.3 Tavg=100.7(sd=0.45) T2=59. Vol-collected=221ml. Z=1607. [cylinder exploded; sample lost] [NW Eifuku - Champagne]. | R791-HFS-14-0016 | Butterfield | |
| 11:27:39 Apr/09/04 | 1607 | 2 | 21.4876 | 144.0415 | HFS Filtered Piston-20. Start=1128 Stop=1130. Tmax=104 Tavg=103.5(sd=0.4) T2=59. Vol-collected=254ml. Z=1607. [unknown problem; no sample] [NW Eifuku - Champagne]. | R791-HFS-20-0017 | Butterfield | |
| 11:28:27 Apr/09/04 | 1607 | 1 | 21.4876 | 144.0415 | Couldn't help taking this shot of the CO2 bubbles. | | | R791-137 |
| 11:31:35 Apr/09/04 | 1607 | 4 | 21.4876 | 144.0415 | HFS Chemistry filter-15. Start=1132. Stop=1136. Tmax=105.9. Tavg=103.1 (sd=1.0). T2=58. Vol=442. Z=1607. [NW Eifuku - Champagne]. | R791-HFS-15-0018 | Butterfield | |
| 11:33:17 Apr/09/04 | 1607 | 3 | 21.4876 | 144.0415 | Some bubbles are very flat and undulate on the way up. Others stay perfectly still. | | | R791-138 |
| 11:33:33 Apr/09/04 | 1607 | 3 | 21.4874 | 144.0416 | Large CO2 bubbles. | | | R791-139 |
| 11:33:46 Apr/09/04 | 1607 | 4 | 21.4875 | 144.0415 | Bubbles and chimneys. | | | R791-140 |
| 11:33:47 Apr/09/04 | 1607 | 1 | 21.4875 | 144.0415 | Gas tight bottle #3 (HIL GTB 9). T=105.9. Fired=1135. Z=1607. [NW Eifuku - Champagne]. | R791-GTB-3-0019 | Lupton | |
| 11:37:05 Apr/09/04 | 1607 | 2 | 21.4876 | 144.0415 | HFS Steriv ex filter-13. Start=1137 Stop=1145. Tmax=103 Tavg=102(sd=0.6) T2=59. Vol=1000ml. Z=1607. [NW Eifuku - Champagne]. | R791-HFS-13-0020 | Butterfield | |
| 11:42:24 Apr/09/04 | 1607 | 2 | 21.4876 | 144.0415 | Still sampling at Champagne. Eh is -165. | | | |
| 11:46:42 Apr/09/04 | 1607 | 3 | 21.4876 | 144.0415 | HFS FISH Filter-7. Start=1147 Stop=1149. Tmax=103.5 Tavg=103(sd=0.3) T2=57. Vol=249ml. Z=1607. [NW Eifuku - Champagne]. | R791-HFS-7-0021 | Butterfield | |
| 11:50:06 Apr/09/04 | 1607 | 1 | 21.4876 | 144.0414 | HFS Unfiltered Piston-4. Start=1150 Stop=1152. Tmax=103.9 Tavg=102.8(sd=0.8) T2=49. Vol-collected=230ml. Z=1607. [aprox. 100ml recovered with 200ml gas] [NW Eifuku - Champagne]. | R791-HFS-4-0022 | Butterfield | |
| 11:52:58 Apr/09/04 | 1607 | 2 | 21.4876 | 144.0415 | One more look at the chimneys and bubbles. | | | R791-141 |
| 11:54:20 Apr/09/04 | 1607 | 4 | 21.4876 | 144.0416 | HFS Chemistry filter-1. Start=1154 Stop=1158. Tmax=103.7 Tavg=102.6(sd=0.5) T2=25. Vol=366ml. Z=1607.[NW Eifuku - Champagne]. | R791-HFS-1-0023 | Butterfield | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 11:54:58 Apr/09/04 | 1607 | 3 | 21.4876 | 144.0415 | Bubbles accumulating along the bottom of the ROPOS arm. | | | R791-142 |
| 11:56:25 Apr/09/04 | 1607 | 2 | 21.4876 | 144.0415 | The frame grab of the exhaust was lost. | | | |
| 11:56:48 Apr/09/04 | 1607 | 4 | 21.4876 | 144.0415 | The bubbles here are transparent unlike the ones on the Okinawa Trough where they are opaque. | | | |
| 11:57:16 Apr/09/04 | 1607 | 1 | 21.4876 | 144.0414 | Bubbles coalescing on arm. | | | R791-143 |
| 11:58:08 Apr/09/04 | 1607 | 1 | 21.4876 | 144.0415 | This is a better grab showing the accumulated bubbles along the bottom of the arm at Champagne. | | | R791-144 |
| 11:59:09 Apr/09/04 | 1607 | 4 | 21.4875 | 144.0415 | More bubbles under ROPOS. | | | R791-145 |
| 12:00:49 Apr/09/04 | 1607 | 1 | 21.4876 | 144.0415 | Bubbles are very sticky and form froth on the underside of the arm. | | | |
| 12:01:33 Apr/09/04 | 1607 | 2 | 21.4876 | 144.0415 | Underside of ROPOS completely covered by CO2 bubbles. | | | R791-146 |
| 12:01:40 Apr/09/04 | 1607 | 1 | 21.4876 | 144.0415 | CO2 bubbles adhered to bottom of ROPOS. | | | R791-147 |
| 12:06:28 Apr/09/04 | 1607 | 3 | 21.4876 | 144.0415 | Repositioning to collect suction samples for Juniper | | | |
| 12:07:04 Apr/09/04 | 1605 | 101 | 21.4876 | 144.0415 | The sticky bubbles come together and form groups because the surface tension is not enough to join the bubbles into one. | | | R791-148 |
| 12:07:20 Apr/09/04 | 1606 | 71 | 21.4876 | 144.0415 | The bubbles adhere to each other and form large 'grape bunches'. | | | R791-149 |
| 12:12:09 Apr/09/04 | 1598 | 266 | 21.4878 | 144.0413 | We are going back to the cage. | | | |
| 12:18:39 Apr/09/04 | 1530 | 101 | 21.4883 | 144.0408 | We are still managing our tether. | | | |
| 12:19:37 Apr/09/04 | 1531 | 222 | 21.4884 | 144.0409 | We are going back to the bottom to sample fauna at Champagne. | | | |
| 12:20:22 Apr/09/04 | 1540 | 237 | 21.4884 | 144.0410 | Moving the ship 50 m south. | | | |
| 12:28:34 Apr/09/04 | 1609 | 94 | 21.4877 | 144.0409 | Still moving the ship. | | | |
| 12:29:39 Apr/09/04 | 1609 | 91 | 21.4877 | 144.0412 | We are back on the wall slightly north of the sampling site at Champagne. | | | |
| 12:29:41 Apr/09/04 | 1609 | 90 | 21.4877 | 144.0412 | 1610 meters; back on the wall, which is slightly north of the sample sight. | | | R791-150 |
| 12:31:41 Apr/09/04 | 1605 | 62 | 21.4876 | 144.0414 | Back at Champagne. At least 7-8 little orifices. | | | |
| 12:32:12 Apr/09/04 | 1605 | 63 | 21.4876 | 144.0414 | At least 7 or 8 little orifices. Plenty of shrimp around the bottoms. | | | R791-151 |
| 12:33:15 Apr/09/04 | 1606 | 45 | 21.4875 | 144.0415 | Looking for shrimp to sample for Juniper. | | | |
| 12:34:25 Apr/09/04 | 1608 | 75 | 21.4876 | 144.0414 | Saw some other gastropods that we cannot identify. | | | |
| 12:35:41 Apr/09/04 | 1608 | 58 | 21.4876 | 144.0415 | Large bubbles on the right and what was originally thought of as snails on the left two rocks. | | | R791-152 |
| 12:37:15 Apr/09/04 | 1608 | 50 | 21.4876 | 144.0414 | Suctioning fauna into jar 2: 6 shrimp; 2 scale worms; 5 limpets; 5-6 provanid snails. Z=1608. [NW Eifuku - Champagne]. | R791-SS-J2-0024 | Juniper | |
| 12:38:05 Apr/09/04 | 1608 | 50 | 21.4877 | 144.0415 | Slurp sampling shrimp. | | | R791-153 |
| 12:39:09 Apr/09/04 | 1608 | 75 | 21.4876 | 144.0415 | These bubbles were released when the submarine rammed the substrate. | | | R791-154 |
| 12:49:34 Apr/09/04 | 1609 | 45 | 21.4876 | 144.0415 | Unidentified gastropods appear to be limpets. | | | |
| 12:52:06 Apr/09/04 | 1609 | 47 | 21.4876 | 144.0415 | Sampling unidentified gastropods and shrimp. | | | R791-155 |
| 12:58:21 Apr/09/04 | 1609 | 43 | 21.4876 | 144.0415 | Sampling small shrimp. | | | R791-156 |
| 13:00:09 Apr/09/04 | 1609 | 43 | 21.4875 | 144.0416 | Trying to sample limpets. | | | R791-157 |
| 13:02:50 Apr/09/04 | 1609 | 42 | 21.4876 | 144.0415 | Still attempting to sample limpets and shrimp at Champagne. | | | |
| 13:06:08 Apr/09/04 | 1609 | 44 | 21.4876 | 144.0416 | It has been five minutes...looking for shrimp. | | | R791-158 |
| 13:09:01 Apr/09/04 | 1609 | 43 | 21.4875 | 144.0415 | The captives include limpets scale worms and shrimp. | | | R791-159 |
| 13:10:05 Apr/09/04 | 1609 | 43 | 21.4876 | 144.0415 | Suctioning (into jar 3) particulate debris from the rock surface rather than on the gravely sediment substrate between the rocks. From 3 different rocks. Z=1609. [NW Eifuku - Champagne]. | R791-SS-J3-0025 | Juniper | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 13:11:45 Apr/09/04 | 1609 | 43 | 21.4876 | 144.0415 | Mussels; bubblers; and smokers. | | | R791-160 |
| 13:13:07 Apr/09/04 | 1609 | 43 | 21.4876 | 144.0415 | There is a brachyuran crab wandering around on the white mat. Eh is -123. | | | |
| 13:18:24 Apr/09/04 | 1609 | 32 | 21.4876 | 144.0415 | Preparing to take a particulate suction sample into bottle number three. | | | R791-161 |
| 13:22:12 Apr/09/04 | 1609 | 32 | 21.4876 | 144.0415 | Rock that is preparing to be sampled. | | | R791-162 |
| 13:23:50 Apr/09/04 | 1609 | 46 | 21.4875 | 144.0415 | Lovely community of gastropods and shrimp habitating upon this vesiculated rock. | | | R791-163 |
| 13:25:09 Apr/09/04 | 1608 | 54 | 21.4875 | 144.0416 | Frame grab of flange things. | | | R791-164 |
| 13:25:27 Apr/09/04 | 1609 | 52 | 21.4875 | 144.0416 | Moving around slightly repositioning to continue suctioning mat. | | | |
| 13:27:22 Apr/09/04 | 1608 | 50 | 21.4876 | 144.0415 | Crab in the upper left; shrimp on gastropod in top of frame. | | | R791-165 |
| 13:29:11 Apr/09/04 | 1608 | 51 | 21.4876 | 144.0415 | Sampling from a rock that is either scoriaceous or honeycombed silica cemented rock. | | | |
| 13:30:52 Apr/09/04 | 1608 | 51 | 21.4875 | 144.0415 | Trying to break up a small piece of the rock. But it is too hard and cannot break it. | | | |
| 13:31:35 Apr/09/04 | 1608 | 49 | 21.4876 | 144.0415 | This scoriaceous rock crumbled like a chimney when it was pulled out. | | | R791-166 |
| 13:36:08 Apr/09/04 | 1608 | 50 | 21.4876 | 144.0415 | We are going to try picking up a piece of flange instead. | | | |
| 13:37:16 Apr/09/04 | 1608 | 55 | 21.4876 | 144.0415 | Trying to sample the flange. It was not possible because it crumbled. | | | R791-167 |
| 13:38:39 Apr/09/04 | 1608 | 56 | 21.4876 | 144.0415 | The flange breaks apart and could not be collected. | | | |
| 13:40:16 Apr/09/04 | 1608 | 55 | 21.4876 | 144.0416 | Moving the probe out of the way for suction sampling. | | | R791-168 |
| 13:42:05 Apr/09/04 | 1608 | 56 | 21.4876 | 144.0415 | Attempting to sample the oily surface material off of this rock. | | | R791-169 |
| 13:48:38 Apr/09/04 | 1608 | 55 | 21.4875 | 144.0416 | Mussels do not have a foot. | | | R791-170 |
| 13:50:28 Apr/09/04 | 1608 | 55 | 21.4875 | 144.0415 | This "mussel" appears to have a foot and moving around. | | | |
| 13:50:31 Apr/09/04 | 1608 | 54 | 21.4875 | 144.0415 | Is it using this to feed or to move? | | | R791-171 |
| 13:52:02 Apr/09/04 | 1608 | 55 | 21.4877 | 144.0415 | "Foot" of mussel. | | | R791-172 |
| 13:52:11 Apr/09/04 | 1608 | 55 | 21.4876 | 144.0415 | This mussel has morphed into a clam! | | | R791-173 |
| 13:52:58 Apr/09/04 | 1608 | 55 | 21.4875 | 144.0415 | Back of mussel/clam/mussel. | | | R791-174 |
| 13:54:20 Apr/09/04 | 1608 | 56 | 21.4876 | 144.0416 | Suctioning mussel. | | | R791-175 |
| 13:55:01 Apr/09/04 | 1608 | 55 | 21.4875 | 144.0417 | Mussel that had the foot exposed was sampled and will be placed in the purse. Z=1608. Juniper confirms it was a mussel. [NW Eifuku - Champagne]. | R791-Bio-0026 | Tunnicliffe | |
| 13:56:17 Apr/09/04 | 1608 | 55 | 21.4876 | 144.0416 | We are stowing the HFS probe so that we can place the mussel in the purse. | | | |
| 14:01:24 Apr/09/04 | 1608 | 49 | 21.4876 | 144.0416 | The mussel with both limpets and snails on it was placed in the left hand side of the purse. | | | |
| 14:03:04 Apr/09/04 | 1608 | 49 | 21.4876 | 144.0415 | Champagne vent. Rocks with shrimp on them. | | | R791-176 |
| 14:05:10 Apr/09/04 | 1608 | 50 | 21.4875 | 144.0416 | Resumed suction sampling into Jar #3. | | | |
| 14:13:28 Apr/09/04 | 1608 | 52 | 21.4876 | 144.0415 | Completed suction sampling. | | | |
| 14:14:01 Apr/09/04 | 1608 | 52 | 21.4876 | 144.0415 | Going to sample now into Jar #4 for white yellowish material. | | | |
| 14:15:29 Apr/09/04 | 1608 | 51 | 21.4876 | 144.0415 | Suction sample into Jar #4 of white-yellowish material seen on a flange. Small pieces going into suction tube. Z=1608. [NW Eifuku - Champagne]. | R791-SS-J4-0027 | Juniper | |
| 14:21:13 Apr/09/04 | 1608 | 87 | 21.4876 | 144.0416 | Sampled the white/yellow material that commonly makes up the matrix to the talus around here. Is this sulfur? Or perhaps has some carbonate in it? Hard to say. | | | |
| 14:39:02 Apr/09/04 | 1608 | 81 | 21.4876 | 144.0415 | Maximum of 117 C for fluid near where we sampled yellowish material in suction sample #4. | | | |
| 14:41:12 Apr/09/04 | 1608 | 80 | 21.4876 | 144.0416 | HFS unfiltered piston-24. Start=1440 Stop=1441. Tmax=88.8 Tavg=76.5 T2=30. Vol=227ml. Z=1607. [NW Eifuku - Champagne-2]. | R791-HFS-24-0028 | Butterfield | |
| 14:41:13 Apr/09/04 | 1608 | 80 | 21.4876 | 144.0416 | Second sampling location at Champagne Vent. Taking a piston sample here. | | | R791-177 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 14:50:30 Apr/09/04 | 1608 | 97 | 21.4877 | 144.0415 | Backed off the slope and will traverse along the slope at this depth in a southerly direction. | | | |
| 14:52:20 Apr/09/04 | 1606 | 39 | 21.4876 | 144.0416 | Nice shot of chimneys and some DSC shots looking down on the chimneys as we fly above them. Moving southerly direction. See some steep slopes covered in mussels and hydrothermally altered matrix to the talus. | | | |
| 14:52:25 Apr/09/04 | 1605 | 33 | 21.4876 | 144.0416 | Small white chimneys with white staining all around. | | | R791-178 |
| 14:52:29 Apr/09/04 | 1605 | 34 | 21.4876 | 144.0416 | Small chimneys emanating more white smoke in the Champagne area. | | | R791-179 |
| 14:55:06 Apr/09/04 | 1600 | 110 | 21.4875 | 144.0417 | Very steep slopes here almost vertical. Continue to see blocky lavas and lots of mussels and crabs. Also see patches of alteration amongst the breccia/talus. | | | |
| 14:57:29 Apr/09/04 | 1600 | 13 | 21.4873 | 144.0419 | See a pillar of rock outcrop with a colony of mussel. Background to this pillar outcrop are highly altered steep walls. | | | |
| 14:57:36 Apr/09/04 | 1600 | 20 | 21.4873 | 144.0419 | Mussel community on top a large pillar with white staining in the background. | | | R791-180 |
| 14:57:53 Apr/09/04 | 1600 | 26 | 21.4873 | 144.0418 | Close up of pillar-top mussel community. | | | R791-181 |
| 14:59:53 Apr/09/04 | 1600 | 148 | 21.4869 | 144.0421 | See some more resistive pillars of rock from time to time extending out from the slope of mainly talus and breccias. | | | |
| 15:01:45 Apr/09/04 | 1599 | 80 | 21.4871 | 144.0419 | Matrix to all the breccias here are infilled with white yellowish material. Must be very permeable. Very steep slopes locally. | | | |
| 15:03:30 Apr/09/04 | 1599 | 84 | 21.4871 | 144.0418 | See some very steep what appear to be ends of blocky lava flows. | | | |
| 15:04:26 Apr/09/04 | 1598 | 45 | 21.4871 | 144.0417 | Where see steep almost shear walls of lava flows see yellowish staining along fractures in the face of the lava. | | | |
| 15:05:46 Apr/09/04 | 1594 | 346 | 21.4870 | 144.0418 | Moving upslope NE direction and see hydrothermally altered and stained breccias. | | | |
| 15:07:00 Apr/09/04 | 1592 | 10 | 21.4871 | 144.0419 | Continue to see white stained alteration on slope with lots of bacterial mat coming off in places. | | | |
| 15:08:23 Apr/09/04 | 1590 | 51 | 21.4872 | 144.0419 | See a lot of alteration within the breccia and infilling the matrix to the larger boulders that make up the talus. | | | |
| 15:10:13 Apr/09/04 | 1591 | 133 | 21.4873 | 144.0419 | Moving up slope about 10 m then traversing back in opposite direction. See patch of open shells of mussels here. | | | |
| 15:12:11 Apr/09/04 | 1586 | 9 | 21.4874 | 144.0419 | See breccia that is intensely altered with bacterial mat and locally more yellow and stained by sulfur. | | | |
| 15:12:22 Apr/09/04 | 1587 | 19 | 21.4873 | 144.0419 | Sulfur stained rock in the side of a large mat-encrusted outcrop. | | | R791-182 |
| 15:14:58 Apr/09/04 | 1586 | 20 | 21.4875 | 144.0419 | As we move north see massive blocky lavas that locally change to more sediment covered breccias. | | | |
| 15:17:26 Apr/09/04 | 1585 | 61 | 21.4876 | 144.0418 | Lots of volcanic breccias here. We're upslope of the Champagne vents area. See Eh go down here. Lots of mussels and continue to see white bacterial mat. Probably sulfur staining of the matrix. | | | |
| 15:19:55 Apr/09/04 | 1582 | 145 | 21.4879 | 144.0419 | Going upslope another 10 m to 1575 m then will move back southwards. Continue to see lots of mussels and white bacterial mats especially in sediment matrix. | | | |
| 15:20:38 Apr/09/04 | 1577 | 147 | 21.4877 | 144.0419 | Mussels and crabs and shrimp. Oh my! | | | R791-183 |
| 15:21:44 Apr/09/04 | 1572 | 187 | 21.4877 | 144.0418 | See a contact in the outcrop and below have more solid lava but above it more permeable. See lots of diffuse flow coming out at the contact above which is extremely hydrothermally altered. Site is Cliff House. | | | |
| 15:22:37 Apr/09/04 | 1573 | 158 | 21.4877 | 144.0418 | Cliff House with venting to the right of the mussel colony. | | | R791-184 |
| 15:24:10 Apr/09/04 | 1573 | 153 | 21.4877 | 144.0419 | Will sit in front of the mussels and take some close up pics and video. | | | |
| 15:25:27 Apr/09/04 | 1574 | 174 | 21.4877 | 144.0418 | Mound of mussels covered in shrimp at Cliff House. | | | R791-185 |
| 15:25:45 Apr/09/04 | 1574 | 174 | 21.4877 | 144.0419 | See a mound of mussels intermingled with shrimp and bacterial mats immediately in front of the Cliff House site. Shrimps like to sit on top of the mussels and appear to be grazing together. | | | |
| 15:26:17 Apr/09/04 | 1574 | 173 | 21.4877 | 144.0418 | Shrimp covering mound of mussels. | | | R791-186 |
| 15:26:51 Apr/09/04 | 1574 | 175 | 21.4877 | 144.0418 | Shrimp and snails on mussels. | | | R791-187 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 15:29:13 Apr/09/04 | 1574 | 176 | 21.4878 | 144.0418 | Appears that the shrimp are grazing bacterial mat on top of the mussels. The mussels are open and the shrimp swim in and out of the mussels, which also have diffuse fluid flowing through them. | | | |
| 15:32:40 Apr/09/04 | 1572 | 194 | 21.4877 | 144.0418 | Contact of white mat area above venting and lava below. | | | R791-188 |
| 15:32:48 Apr/09/04 | 1572 | 204 | 21.4877 | 144.0418 | See nice contrast between less permeable lava beneath and perhaps more brecciated material above. It is at this contact that the fluids are flowing. | | | |
| 15:35:51 Apr/09/04 | 1575 | 136 | 21.4877 | 144.0419 | Potential sampling site at Cliff House. | | | R791-189 |
| 15:36:17 Apr/09/04 | 1575 | 126 | 21.4877 | 144.0419 | Have sat down at Cliff House vent site to sample the hydrothermal fluids here. See fluids emanating out of the crack between the two geological units. Eh is -165 here. | | | |
| 15:44:01 Apr/09/04 | 1575 | 125 | 21.4876 | 144.0419 | Also a couple small scale worms right near the venting. | | | |
| 15:47:44 Apr/09/04 | 1575 | 127 | 21.4877 | 144.0417 | Trying to sample fluids as Cliff House vents but hard to find orifice. Rock appears very friable with lots of bacterial matter coming off into the water column. | | | |
| 15:54:32 Apr/09/04 | 1575 | 123 | 21.4877 | 144.0418 | Still measuring the temperature of Cliff House Vent. Highest temperature so far had been 60C. The sampler may not be working properly. We're having trouble getting T2. | | | |
| 16:00:15 Apr/09/04 | 1575 | 128 | 21.4877 | 144.0418 | T2 is starting to come up slowly. | | | |
| 16:01:11 Apr/09/04 | 1575 | 124 | 21.4876 | 144.0418 | Sampling position at Cliff House. | | | R791-190 |
| 16:01:31 Apr/09/04 | 1575 | 126 | 21.4877 | 144.0418 | HFS unfiltered bag-19. Start1=1601 Stop1=1602. Start2=1602 Stop2=1605. Tmax=71.4. Tavg=71.4(sd=.06) T2=42. Vol-collected=351ml. Z=1574.5. [no sample recovered] [NW Eifuku - Cliff House]. | R791-HFS-19-0029 | Butterfield | |
| 16:06:50 Apr/09/04 | 1575 | 126 | 21.4876 | 144.0419 | HFS unfiltered bag #18. Start=1607 Stop=1610. Tmax=71.5 Tavg=71.4(sd=0.04) T2=42.8. Vol-collected=361ml. Z=1574.5. [bag broken but recovered some water] [NW Eifuku - Cliff House]. | R791-HFS-18-0030 | Butterfield | |
| 16:08:40 Apr/09/04 | 1575 | 126 | 21.4877 | 144.0418 | Shrimp on a mussel. | | | R791-191 |
| 16:12:22 Apr/09/04 | 1575 | 126 | 21.4878 | 144.0418 | HFS unfiltered piston #22. Start=1612 Stop=1616. Tmax=71.7 Tavg=71.5(sd=0.15). Vol-collected=398ml. Z=1574.5. [recovered 100 ml] [NW Eifuku - Cliff House]. | R791-HFS-22-0031 | Butterfield | |
| 16:18:16 Apr/09/04 | 1574 | 127 | 21.4877 | 144.0419 | HFS filtered bag #17. Start=1618 Stop=1622. Tmax=71.3 Tavg=70.4(sd=0.75). Vol-collected=367ml Z=1574.4. [recovered 100ml sample] [NW Eifuku - Cliff House]. | R791-HFS-17-0032 | Butterfield | |
| 16:22:43 Apr/09/04 | 1575 | 125 | 21.4877 | 144.0418 | HFS Sterivex filter #21. Start=1623 Stop=1642. Tmax=71.7 Tavg=70.8(sd=0.8). Vol=2032ml. Z=1574.5. Eh=-174. Trying for 2L. [NW Eifuku - Cliff House]. | R791-HFS-21-0033 | Butterfield | |
| 16:43:47 Apr/09/04 | 1575 | 127 | 21.4877 | 144.0419 | HFS FISH filter #2. Start=1643 Stop=1647. Tmax=71.9 Tavg=71.7. Vol=476ml. Z=1574. [NW Eifuku - Cliff House]. | R791-HFS-2-0034 | Butterfield | |
| 16:48:58 Apr/09/04 | 1575 | 124 | 21.4878 | 144.0418 | HFS RNA Filter #10. Start=1650 Stop=1659. Tmax=71.8 T2=42.7. Vol=1006ml. Z=1574. [NW Eifuku - Cliff House]. | R791-HFS-10-0035 | Butterfield | |
| 17:01:37 Apr/09/04 | 1575 | 124 | 21.4877 | 144.0418 | Fluid sampling at Cliff House. | | | R791-192 |
| 17:01:53 Apr/09/04 | 1575 | 125 | 21.4877 | 144.0418 | Continuing the survey. | | | |
| 17:06:55 Apr/09/04 | 1578 | 130 | 21.4877 | 144.0418 | Probe is stowed so now continuing survey to the south. | | | |
| 17:08:45 Apr/09/04 | 1573 | 136 | 21.4877 | 144.0419 | Contact near Cliff House. | | | R791-193 |
| 17:10:13 Apr/09/04 | 1570 | 49 | 21.4877 | 144.0418 | As we move south we continue to see breccias with alteration in the matrix of the boulders of lava. See pillars of less altered lavas. | | | |
| 17:16:07 Apr/09/04 | 1570 | 54 | 21.4877 | 144.0418 | Continue to see hydrothermal alteration of the matrix material in these slopes and sometimes steep cliffs. | | | |
| 17:18:58 Apr/09/04 | 1572 | 55 | 21.4877 | 144.0418 | See some shimmering water coming out of some of the alteration patches. Occasional bubbles drifting past the camera. | | | |
| 17:19:57 Apr/09/04 | 1571 | 357 | 21.4876 | 144.0419 | See some flow banding here with the lava perhaps flowing down the slope? | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 17:20:34 Apr/09/04 | 1572 | 62 | 21.4876 | 144.0419 | Mussels and white staining. | | | R791-194 |
| 17:21:03 Apr/09/04 | 1571 | 59 | 21.4875 | 144.0420 | Continue to see steep cliffs here at 1570 m. Alteration is common amongst the breccias. Fluids tend to emanate from the matrix. See mussels. | | | |
| 17:21:40 Apr/09/04 | 1568 | 24 | 21.4875 | 144.0420 | Breccia and white staining of cliff face. | | | R791-195 |
| 17:24:13 Apr/09/04 | 1566 | 120 | 21.4874 | 144.0422 | Vertical cliffs of mostly lava flows. Staining common (yellowish) with some white patches also. Less staining as we move southwards. See nice overhang here. | | | |
| 17:26:33 Apr/09/04 | 1562 | 54 | 21.4873 | 144.0421 | Overhang of flow contact? | | | R791-196 |
| 17:31:11 Apr/09/04 | 1566 | 96 | 21.4874 | 144.0422 | Appear to be out of the white staining here although still see some mussels on the rocks. Thick massive lava outcrops. See some 'ridges' projecting out of the slope. | | | |
| 17:33:16 Apr/09/04 | 1560 | 60 | 21.4871 | 144.0422 | See surface coating of alteration over the rocks here both sediments and boulders of the talus. Looks older than seen before. Mostly breccia and massive lavas. | | | |
| 17:33:17 Apr/09/04 | 1560 | 57 | 21.4871 | 144.0422 | Light colored alteration. | | | R791-197 |
| 17:38:52 Apr/09/04 | 1563 | 340 | 21.4870 | 144.0424 | Tether management. | | | |
| 17:43:36 Apr/09/04 | 1556 | 125 | 21.4871 | 144.0424 | Continuing up the slope to see the summit. Continue to see breccia slope with much of the matrix in between the boulders hydrothermally altered by yellow-white material. | | | |
| 17:45:59 Apr/09/04 | 1549 | 32 | 21.4871 | 144.0425 | Yellow stained hydrothermal sediment (ash) in-between blocks of lava. Low temperature fluids must have flowed right through these rocks. | | | |
| 17:46:08 Apr/09/04 | 1548 | 24 | 21.4871 | 144.0426 | Hydrothermal sediment covering slope with breccia. | | | R791-198 |
| 17:47:15 Apr/09/04 | 1537 | 45 | 21.4872 | 144.0426 | Jellyfish at summit of volcano. | | | R791-199 |
| 17:47:45 Apr/09/04 | 1539 | 45 | 21.4871 | 144.0426 | At 1539 m see little mounds of alteration possibly composed of sulfur on the sediment. See bacterial mat covering this altered sediment. Look like Fe-silica crusts. | | | |
| 17:53:07 Apr/09/04 | 1547 | 123 | 21.4872 | 144.0425 | Moving southwards down slope but facing towards the slope. Slope here is covered with this yellow mat with covering of white bacterial mat on top. | | | |
| 17:55:15 Apr/09/04 | 1553 | 133 | 21.4869 | 144.0425 | Have a really nice outcrop of breccia where the sediment (ash) matrix is covered by this yellow mat. Took DSC. | | | |
| 17:55:17 Apr/09/04 | 1554 | 133 | 21.4869 | 144.0425 | Slope with breccia and yellow mat. | | | R791-200 |
| 17:57:15 Apr/09/04 | 1569 | 121 | 21.4868 | 144.0425 | Steeper slopes here at 1568 m with massive lava flows and less of the yellow colored material. No obvious crabs. | | | |
| 18:00:38 Apr/09/04 | 1599 | 121 | 21.4867 | 144.0422 | See good example of yellow colored material completely covering matrix of breccia with more fresh lava boulders poking through. Labeled "yellow top south". | | | |
| 18:00:47 Apr/09/04 | 1599 | 125 | 21.4866 | 144.0422 | More breccia and yellow mat. | | | R791-201 |
| 18:03:15 Apr/09/04 | 1616 | 129 | 21.4865 | 144.0420 | See what appears to be flow banding. | | | |
| 18:03:16 Apr/09/04 | 1616 | 127 | 21.4865 | 144.0420 | Vertical rock face. | | | R791-202 |
| 18:05:25 Apr/09/04 | 1618 | 78 | 21.4866 | 144.0420 | Yellow mat material on the slope. | | | R791-203 |
| 18:05:54 Apr/09/04 | 1617 | 74 | 21.4867 | 144.0420 | We are now near the depth of Cliffhouse vent and we are going to head north at this depth. Lots of yellow mat on the slope. | | | |
| 18:09:03 Apr/09/04 | 1607 | 50 | 21.4870 | 144.0422 | The amount of yellow mat we see depends on how much matrix there is in the outcrop and how permeable it is. Where there are massive flows you only see staining along cracks. | | | |
| 18:11:36 Apr/09/04 | 1608 | 343 | 21.4870 | 144.0418 | Outcrop with a lot of crabs on it and some mussels. A little more white staining than we've seen lately. | | | |
| 18:16:50 Apr/09/04 | 1612 | 63 | 21.4873 | 144.0416 | Steep slopes with white bacterial mat. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 18:17:59 Apr/09/04 | 1606 | 53 | 21.4875 | 144.0417 | Getting close to Champagne vent. Now we see it. Chimneys are 30 cm high and whitish yellow. The smoke is grey. | | | |
| 18:18:11 Apr/09/04 | 1605 | 48 | 21.4875 | 144.0416 | Chimneys coming into the Champagne Vent area again. | | | R791-204 |
| 18:18:38 Apr/09/04 | 1604 | 57 | 21.4876 | 144.0417 | Chimneys at Champagne. | | | R791-205 |
| 18:19:00 Apr/09/04 | 1605 | 60 | 21.4876 | 144.0415 | See 10-11 individual vents with white plumes coming up. The smoke rises upward somewhat lazily. | | | |
| 18:20:13 Apr/09/04 | 1604 | 73 | 21.4876 | 144.0416 | Plumes moving up slope at Champagne. | | | R791-206 |
| 18:21:15 Apr/09/04 | 1603 | 46 | 21.4876 | 144.0415 | Plumes don't seem to rise very high. Most of the vents are coming right out of the ground with no chimneys. | | | |
| 18:24:50 Apr/09/04 | 1606 | 21 | 21.4875 | 144.0417 | Chimneys at Champagne. | | | R791-207 |
| 18:25:38 Apr/09/04 | 1606 | 36 | 21.4876 | 144.0416 | Chimneys and CO2 bubbles at Champagne. | | | R791-208 |
| 18:26:17 Apr/09/04 | 1607 | 53 | 21.4876 | 144.0417 | Great views of bubbles coming out of the small chimneys at Champaign vent. There are about 4 or 5 chimneys. The other vents come right out of the slope. The chimneys have little flanges. | | | |
| 18:26:48 Apr/09/04 | 1606 | 41 | 21.4876 | 144.0416 | Chimneys and CO2 bubbles at Champagne. | | | R791-209 |
| 18:28:35 Apr/09/04 | 1603 | 38 | 21.4877 | 144.0417 | We're going to head north to Mussel Mound to do the plankton tow. Highlights off. Got some great highlight video at Champagne vent. | | | |
| 18:30:15 Apr/09/04 | 1591 | 49 | 21.4877 | 144.0418 | We're already into a thick colony of mussels. We are in very cloudy water -the depth of Mussel Mound. Poor visibility. We're facing downslope. | | | |
| 18:33:53 Apr/09/04 | 1590 | 83 | 21.4878 | 144.0416 | Back on the bottom and it is covered with mussels and crabs. There are so many that we cannot even see the rock underneath. | | | |
| 18:34:12 Apr/09/04 | 1591 | 104 | 21.4878 | 144.0417 | Mussel covered outcrop. | | | R791-210 |
| 18:35:08 Apr/09/04 | 1593 | 123 | 21.4879 | 144.0416 | Lower down on the outcrop completely covered in mussels. | | | R791-211 |
| 18:37:41 Apr/09/04 | 1597 | 178 | 21.4880 | 144.0416 | Plankton tow over Mussel Cliff and Mussel Mound. Flying just above the bottom over the mussel beds. Nets open at 18:39. Nets closed at 19:19. [NW Eifuku - Mussel Mound]. | R791-net-P-0036 | Metaxas | |
| 18:40:56 Apr/09/04 | 1591 | 206 | 21.4878 | 144.0416 | Plankton tow over Mussel Cliff and Mussel Mound. Flying just above the bottom over the mussel beds. Nets open at 18:39. Nets closed at 19:19. [NW Eifuku - Mussel Mound]. | R791-net-S-0037 | Metaxas | |
| 18:43:39 Apr/09/04 | 1609 | 25 | 21.4879 | 144.0414 | Every square inch of rock outcrop is covered with mussels! There is at least a 10-meter vertical extent to this mussel field. Probably 15 crabs per square meter on top of the mussels. | | | |
| 18:47:38 Apr/09/04 | 1588 | 127 | 21.4877 | 144.0416 | Still going upslope in mussel field and the vertical extent is now at least 20 meters. Can see plume from Champagne vent. It is starting to get thinner. Now we can see exposed rock. Can see active venting. | | | |
| 18:49:49 Apr/09/04 | 1575 | 158 | 21.4877 | 144.0417 | Now we are at Cliffhouse vent. We followed the mussel field all the way up to here. The total vertical extent 35m and the horizontal extent was 50m. Lower depth 1606m and the upper depth 1575m. | | | |
| 18:51:32 Apr/09/04 | 1577 | 4 | 21.4878 | 144.0419 | Turning to go back downslope now. Highlights off. | | | |
| 18:58:16 Apr/09/04 | 1604 | 226 | 21.4881 | 144.0413 | Turning to go upslope again over Mussel Paradise. | | | |
| 19:02:15 Apr/09/04 | 1575 | 108 | 21.4877 | 144.0417 | Continuing plankton tow over mussel fields. | | | |
| 19:08:26 Apr/09/04 | 1589 | 138 | 21.4879 | 144.0416 | Heading SE and continuing plankton tows over mussel fields. | | | |
| 19:11:25 Apr/09/04 | 1587 | 336 | 21.4878 | 144.0416 | Turning NW again and continuing the plankton tows. | | | |
| 19:14:23 Apr/09/04 | 1602 | 156 | 21.4880 | 144.0415 | Turning and heading SE again and continuing plankton tows. | | | |
| 19:21:09 Apr/09/04 | 1579 | 41 | 21.4877 | 144.0416 | Done with plankton tows. We are just below Cliff House. We are going to head downslope to 1600m and follow the contour to the NE. | | | |
| 19:25:14 Apr/09/04 | 1603 | 116 | 21.4881 | 144.0416 | We are down at 1600m depth just down slope of Mussel Mound. Traversing to the NE. There is contact below. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 19:26:25 Apr/09/04 | 1596 | 49 | 21.4881 | 144.0417 | Lots of white staining and possibly fractures in the base. | | | |
| 19:27:25 Apr/09/04 | 1596 | 119 | 21.4881 | 144.0418 | Mussels are much more thin here on the outcrop. | | | |
| 19:32:01 Apr/09/04 | 1601 | 130 | 21.4883 | 144.0417 | Continuing traverse to the NE. | | | |
| 19:33:03 Apr/09/04 | 1600 | 51 | 21.4883 | 144.0418 | Waiting for the cage to catch up. | | | |
| 19:35:24 Apr/09/04 | 1609 | 145 | 21.4884 | 144.0418 | Went around a large ridge and came back down to the depth of Cliff House. There is a thin coat of white mat on the cliff face here as we face to the South. | | | |
| 19:37:44 Apr/09/04 | 1606 | 213 | 21.4884 | 144.0420 | Another steep slope of breccias with fine covers of mat every now and then. | | | |
| 19:39:15 Apr/09/04 | 1603 | 200 | 21.4884 | 144.0421 | Still some crabs here on the outcrops and a few mussels. | | | |
| 19:39:44 Apr/09/04 | 1601 | 212 | 21.4883 | 144.0422 | Going up slope 10 meters to the south. | | | |
| 19:41:07 Apr/09/04 | 1592 | 229 | 21.4883 | 144.0420 | Continuing to the East now along 1600 meter contour. | | | |
| 19:42:26 Apr/09/04 | 1590 | 190 | 21.4882 | 144.0420 | Very steep slopes with a lot of alteration here. | | | |
| 19:43:33 Apr/09/04 | 1589 | 209 | 21.4882 | 144.0421 | There seems to be some sort of little wee chimney on top a large outcrop that is covered in yellowish sediment. It may be some sort of snail egg case. | | | |
| 19:44:27 Apr/09/04 | 1589 | 196 | 21.4882 | 144.0421 | Wee chimney or snail egg cases?? | | | R791-212 |
| 19:46:03 Apr/09/04 | 1588 | 189 | 21.4882 | 144.0420 | Looks like the little chimney may have some minor shimmering around it. | | | |
| 19:46:14 Apr/09/04 | 1588 | 182 | 21.4881 | 144.0420 | Close-up of "Yellow Cone." | | | R791-213 |
| 19:47:10 Apr/09/04 | 1589 | 180 | 21.4882 | 144.0421 | Itsy bisty teeny weeny yellow topped ventini. AKA Yellow Cone. | | | R791-214 |
| 19:47:54 Apr/09/04 | 1589 | 178 | 21.4882 | 144.0420 | We are calling this site "Yellow Cone". There is very weak venting coming from these tiny chimneys. | | | |
| 19:51:10 Apr/09/04 | 1596 | 143 | 21.4881 | 144.0423 | N flank exploration showing steep slopes of outcrop; talus and black sand. Some yellow mat is also present. | | | |
| 19:55:17 Apr/09/04 | 1603 | 144 | 21.4881 | 144.0425 | Continuing exploration of N flank. No venting is yet evident here. | | | |
| 19:56:51 Apr/09/04 | 1600 | 164 | 21.4881 | 144.0428 | Moving E along N flank. Yellow mat concentrated along contacts of rock units and along fractures; likely indicating once active diffuse venting. No mussels; crabs or other flow biota occur here. | | | |
| 20:03:04 Apr/09/04 | 1602 | 181 | 21.4881 | 144.0434 | Alternating outcrops and areas of mottled yellow and black sediment. Large fish noted (rattail?). | | | |
| 20:05:55 Apr/09/04 | 1603 | 39 | 21.4879 | 144.0435 | Will begin a traverse up to the top of the N flank. We are on the NE side of the volcano. Beginning on a scree slope with a patch of white mat and sand with cobbles on the surface. | | | |
| 20:08:13 Apr/09/04 | 1599 | 215 | 21.4878 | 144.0433 | At 1600 m getting into outcrops of flow breccia and pillow lavas. Also mottled black and yellow mat covered sand is present. | | | |
| 20:10:27 Apr/09/04 | 1586 | 230 | 21.4877 | 144.0432 | At 1585 m we find same mottled sand with boulders of lava. Some nearly vertical slopes. | | | |
| 20:12:58 Apr/09/04 | 1576 | 239 | 21.4876 | 144.0432 | At 1575 m we see same mottled sand and some outcrops of pillow lavas and large boulders of lava. Some sand areas are covered with extensive yellow mats. | | | |
| 20:13:50 Apr/09/04 | 1567 | 236 | 21.4876 | 144.0431 | Climbing sandy slope with occasional pillows and outcrops. | | | R791-215 |
| 20:15:01 Apr/09/04 | 1558 | 208 | 21.4875 | 144.0430 | At 1557 m we see extensive outcrops of massive lava; pillow lava and flow breccia. Some brown altered looking rock. Continuing with outcrops to 1545 m. | | | |
| 20:15:59 Apr/09/04 | 1554 | 179 | 21.4874 | 144.0430 | Close-up of pillow extrusion. | | | R791-216 |
| 20:17:17 Apr/09/04 | 1547 | 232 | 21.4874 | 144.0429 | Extensive yellow mat on outcrop and summit sediment mounds start here that are also covered with extensive and thick mats. | | | |
| 20:17:32 Apr/09/04 | 1545 | 241 | 21.4872 | 144.0429 | Nearing summit coated with yellow mat and fine sediment. | | | R791-217 |
| 20:19:44 Apr/09/04 | 1539 | 271 | 21.4873 | 144.0427 | Continuing up the last part of the summit with thick yellow mats; talus cobbles and sediments. At 1536 m is the top of the volcano. A small pillow lava outcrop occurs just below the summit. End of dive and ROPOS is coming up. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R791 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 20:20:38 Apr/09/04 | 1537 | 287 | 21.4873 | 144.0428 | Top of summit completely covered by yellow mat. | | | R791-218 |
| 20:21:44 Apr/09/04 | 1535 | 330 | 21.4873 | 144.0425 | Some small outcrops poking through on top of summit. ROPOS left the bottom. | | | R791-219 |
| 20:51:45 Apr/09/04 | 942 | 43 | 21.4866 | 144.0428 | Looking at the HFS while on ascent. Wondering if we can see bubbles. We don't see anything. | | | |
| 22:02:39 Apr/09/04 | 55 | 316 | 21.4865 | 144.0431 | ROPOS is in the cage. | | | |
| 22:04:14 Apr/09/04 | 10 | 318 | 21.4865 | 144.0431 | Bubbles coming out of the big hose (flush pump exhaust) on the HFS. | | | R791-220 |
| 22:04:21 Apr/09/04 | 7 | 326 | 21.4865 | 144.0431 | Bubbles coming out of the big hose (flush pump exhaust) on the HFS. | | | R791-221 |
| 22:04:28 Apr/09/04 | 4 | 329 | 21.4865 | 144.0431 | Bubbles coming out of the big hose (flush pump exhaust) on the HFS. Highlights were on for part of this. Turned off at the surface. | | | R791-222 |
| 22:04:45 Apr/09/04 | 3 | 343 | 21.4865 | 144.0431 | Bubbles coming out of the big hose (flush pump exhaust) on the HFS. | | | R791-223 |
| 22:05:13 Apr/09/04 | 2 | 342 | 21.4865 | 144.0431 | Bubbles pouring out of Dave's sampler. It started as soon as we got to the warm surface water. | | | |
| 22:06:36 Apr/09/04 | 2 | 351 | 21.4865 | 144.0431 | ROPOS at the surface 2205. On deck at 2207. | | | |

# 8.11 R792 Dive Log: NW Eifuku

| **R792: Northwest Eifuku** |
|---|
| wet time (UTC): 4/10 0334 - 4/10 1550. JD 101. 12.26 hrs. |
| bottom time (UTC): 4/10 0507 - 4/10 1427. 9.33 hrs. [23 samples] |
| **R792 DSC information:** There were 201 original DSCs taken and 185 final ones were kept starting with R792_DSC_041004_054902_01570.jpg and ending with R792_DSC_041004_153502_01767.jpg |
| Geological and biological sampling at NW Eifuku. Deployed shrimp/crab trap at Champagne. Samples: **Transiting from SE of summit to summit**: 1 mini-water sample, 2 rocks, 1 Fe-oxide crust. **Orange Rind**: 1 push core of yellow/orange mound. **Mussel Mound to Fouling**: 1 stbd McLane pump. **Fouling area**: 1 biology (~26 mussels). 2 suctions (mussel assemblage fauna, assemblage particulates). **Champagne**: 4 rocks (chimney material, elemental sulphur, fresh lava), 5 suctions (particulates, bacterial mat, meiofauna), 1 bio/geo (limpets on rock), 1 gas tight, 2 plankton nets, 1 port McLane pump. Attempted a modified core sample of bubbles - but they didn't make it to the surface. Dive was aborted due to ROPOS hydraulic leak. |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 03:32:37 Apr/10/04 | 1 | 324 | 21.4865 | 144.0431 | ROPOS off the deck. | | | |
| 03:33:24 Apr/10/04 | 1 | 331 | 21.4865 | 144.0431 | ROPOS in the water. | | | |
| 05:07:27 Apr/10/04 | 1655 | 265 | 21.4856 | 144.0444 | On the bottom at 1659 m. White colored rocks. Steep slope encountered. | | | |
| 05:11:29 Apr/10/04 | 1661 | 265 | 21.4857 | 144.0443 | Contemplating the acquisition of a deep rock sample semi-in situ and glassy surface. eH=156. | | | |
| 05:13:19 Apr/10/04 | 1660 | 273 | 21.4856 | 144.0444 | Ascending up the SE face toward summit. | | | R792-001 |
| 05:14:51 Apr/10/04 | 1653 | 3 | 21.4857 | 144.0443 | Intact pillows - tannish blocky rocks. Yellow flock-balls rolling down the hill. | | | |
| 05:15:38 Apr/10/04 | 1649 | 357 | 21.4857 | 144.0444 | Volcaniclastic sand coming down chute on SE face. | | | R792-002 |
| 05:16:36 Apr/10/04 | 1645 | 317 | 21.4858 | 144.0444 | Ripple marks along strike of about 320 degrees. | | | R792-003 |
| 05:17:11 Apr/10/04 | 1644 | 325 | 21.4858 | 144.0444 | Oblique ripple marks in the sand observed. Cobbles where sand is winnowed. Approaching large outcrop. | | | |
| 05:20:05 Apr/10/04 | 1641 | 320 | 21.4860 | 144.0443 | Rocky outcrop in volcaniclastic sand is a candidate for rock sample. | | | R792-004 |
| 05:23:51 Apr/10/04 | 1640 | 315 | 21.4859 | 144.0443 | Sediment push core and Tunnicliffe water sampler. We are about to use the water sampler. | | | R792-005 |
| 05:26:32 Apr/10/04 | 1640 | 319 | 21.4860 | 144.0443 | Deploying the Verena's mini-water sampler to get background sample. Triggered at 5:28 and leaving open for 2 minutes. Placed into starboard side biobox. Z=1640. [NW Eifuku - SE of Summit]. | R792-water-1-0001 | Tunnicliffe | |
| 05:27:45 Apr/10/04 | 1640 | 320 | 21.4860 | 144.0443 | Sampler valve is open. | | | R792-006 |
| 05:29:33 Apr/10/04 | 1640 | 321 | 21.4860 | 144.0443 | Sampler valve is closed again. Will stow in bio box. | | | R792-007 |
| 05:32:19 Apr/10/04 | 1638 | 308 | 21.4859 | 144.0444 | Moving upslope towards summit site. | | | |
| 05:33:30 Apr/10/04 | 1631 | 291 | 21.4860 | 144.0443 | Pillow lavas on SE slope. | | | R792-008 |
| 05:37:11 Apr/10/04 | 1623 | 287 | 21.4860 | 144.0441 | More large pillows with surfaces sloughed off producing volcaniclastic sand. Moving upslope continued. | | | |
| 05:38:36 Apr/10/04 | 1616 | 307 | 21.4861 | 144.0440 | Sheet-like blocks of lava are mixed in with pillows. | | | R792-009 |
| 05:39:54 Apr/10/04 | 1610 | 302 | 21.4861 | 144.0439 | Entering a hazy plume cloud. Venting may be near. eH=145. | | | |
| 05:41:25 Apr/10/04 | 1608 | 290 | 21.4863 | 144.0439 | Starting to see some hydrothermal coloring over volcanics. | | | R792-010 |
| 05:45:58 Apr/10/04 | 1608 | 281 | 21.4862 | 144.0439 | Ready to grab this rock sample but it turned out to be too large. No sample taken. | | | R792-011 |
| 05:49:41 Apr/10/04 | 1604 | 247 | 21.4862 | 144.0438 | Lava tube. | | | R792-012 |
| 05:50:35 Apr/10/04 | 1604 | 252 | 21.4862 | 144.0439 | Located lava tube with drip. Trying to get a chunk on the shelf. | | | |
| 05:54:01 Apr/10/04 | 1604 | 255 | 21.4861 | 144.0439 | Rock sample from lava shelf in lava tube put in the boot. | | Stern et al. | R792-013 |
| 05:54:03 Apr/10/04 | 1604 | 254 | 21.4861 | 144.0439 | Rock (lava shelf from lava tube) placed in the forward port corner of the boot. Z=1604. [NW Eifuku - Bob's Rocks]. | R792-RK-0002 | SROF geo team (Stern) | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 05:56:52 Apr/10/04 | 1596 | 330 | 21.4862 | 144.0437 | Now climbing large talus ridge with pillows heading towards summit. | | | |
| 05:58:52 Apr/10/04 | 1583 | 322 | 21.4864 | 144.0436 | Orange sediment with some white areas thought to be active. | | | R792-014 |
| 05:59:05 Apr/10/04 | 1583 | 314 | 21.4864 | 144.0437 | Shimmering water with Fe-oxidizing bacterial mats. Lots seen down in the cracks. | | | |
| 06:00:10 Apr/10/04 | 1578 | 323 | 21.4865 | 144.0436 | Orange sediment/mat in cracks of sheet-like material that may be cemented volcaniclastic sand. | | | R792-015 |
| 06:01:34 Apr/10/04 | 1580 | 322 | 21.4864 | 144.0436 | Attempting to sample Fe-oxide crust that is present in sheets. Going to use suction sampler to grab crust. | | | |
| 06:04:10 Apr/10/04 | 1581 | 335 | 21.4865 | 144.0435 | Area where crust sample was taken. | | | R792-016 |
| 06:07:42 Apr/10/04 | 1580 | 334 | 21.4864 | 144.0434 | Using the suction drop technique to pick up a piece of cemented sand. | | Hein et al. | R792-017 |
| 06:08:23 Apr/10/04 | 1581 | 338 | 21.4864 | 144.0434 | Geology sample (and possibly bacterial mat). Fe-oxide crust and orange sediment/mat. May be cemented volcaniclastic sand present in lava sheets. Port biobox. Z=1580.5. [NW Eifuku - Ascent up SE flank of Summit]. | R792-Geo-0003 | SROF geo team (Embley) | |
| 06:08:26 Apr/10/04 | 1581 | 339 | 21.4865 | 144.0435 | View of layered volcaniclastic sand deposits. | | | R792-018 |
| 06:12:03 Apr/10/04 | 1574 | 336 | 21.4865 | 144.0434 | Following ridge upslope covered with more biogeo-crust. | | | |
| 06:15:39 Apr/10/04 | 1544 | 320 | 21.4869 | 144.0431 | Coming up on large mat area. | | | |
| 06:16:20 Apr/10/04 | 1544 | 302 | 21.4870 | 144.0431 | Approaching summit with extensive orange sediment. | | | R792-019 |
| 06:16:47 Apr/10/04 | 1542 | 317 | 21.4871 | 144.0430 | Stopping near summit to pick-up rock. | | | |
| 06:21:28 Apr/10/04 | 1540 | 352 | 21.4872 | 144.0429 | Small mounds of orange/white deposit on summit. | | | R792-020 |
| 06:22:52 Apr/10/04 | 1540 | 349 | 21.4872 | 144.0429 | Close up of deposit on summit. | | | R792-021 |
| 06:23:51 Apr/10/04 | 1540 | 348 | 21.4872 | 144.0428 | Stopping to look at mats near summit. | | | |
| 06:28:20 Apr/10/04 | 1537 | 231 | 21.4872 | 144.0427 | Starting to see mussels and shrimp at the summit site. Going to try for another rock sample. | | | |
| 06:29:18 Apr/10/04 | 1537 | 222 | 21.4873 | 144.0427 | Location of rock sample taken at summit. | | Stern et al. | R792-022 |
| 06:29:29 Apr/10/04 | 1537 | 222 | 21.4873 | 144.0427 | Yellow-orange stained rock small rock. Put in boot. Z=1537. [NW Eifuku - Summit]. | R792-RK-0004 | SROF geo team (Stern) | |
| 06:30:02 Apr/10/04 | 1537 | 226 | 21.4872 | 144.0427 | Rock sample picked up at summit and put in the boot. | | | R792-023 |
| 06:34:44 Apr/10/04 | 1537 | 63 | 21.4873 | 144.0427 | Vent area with mussels and shrimp and galatheid crabs near summit. | | | R792-024 |
| 06:38:54 Apr/10/04 | 1539 | 120 | 21.4872 | 144.0428 | Climbed to the summit. There are with mounds of orange deposit here. | | | |
| 06:42:23 Apr/10/04 | 1539 | 107 | 21.4872 | 144.0428 | Push core sample at summit. | | | R792-025 |
| 06:42:30 Apr/10/04 | 1539 | 111 | 21.4872 | 144.0428 | Push core in mound of yellow/orange deposit. Z=1538. Site dubbed "Orange Rind". [NW Eifuku - Summit]. | R792-Core-0005 | SROF geo team (Hein) | |
| 06:42:58 Apr/10/04 | 1539 | 109 | 21.4872 | 144.0429 | Intact push core. | | De Ronde/Hein | R792-026 |
| 06:47:34 Apr/10/04 | 1538 | 103 | 21.4873 | 144.0428 | Summit hydrothermal sediment mounds. | | | R792-027 |
| 06:48:24 Apr/10/04 | 1539 | 31 | 21.4873 | 144.0428 | Looked around for mat and flow but none evident. Moving off to Champagne. | | | |
| 06:57:43 Apr/10/04 | 1533 | 283 | 21.4876 | 144.0424 | Spire with hydrothermal alteration. | | | R792-028 |
| 07:05:14 Apr/10/04 | 1579 | 338 | 21.4876 | 144.0419 | Nearing Champagne area. White coloring on rocks in many places. | | | |
| 07:06:53 Apr/10/04 | 1591 | 94 | 21.4876 | 144.0419 | Crabs and mussels near Champagne site. | | | R792-029 |
| 07:07:47 Apr/10/04 | 1598 | 63 | 21.4877 | 144.0417 | Located white smoker site. This is the Champagne site! | | | |
| 07:07:56 Apr/10/04 | 1600 | 67 | 21.4877 | 144.0417 | Smoking vents at Champagne Vents. | | | R792-030 |
| 07:08:34 Apr/10/04 | 1602 | 82 | 21.4877 | 144.0417 | Venting at Champagne site. | | | R792-031 |
| 07:16:45 Apr/10/04 | 1606 | 37 | 21.4876 | 144.0418 | DEPLOYED shrimp/crab trap at the Champagne area. | | | |
| 07:17:37 Apr/10/04 | 1606 | 44 | 21.4877 | 144.0418 | Rock (~8cm in length) from area near Champagne vent. Placed in boot. Z=1606. [NW Eifuku - Champagne]. | R792-RK-0006 | SROF geo team (Stern) | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 07:18:08 Apr/10/04 | 1606 | 50 | 21.4877 | 144.0417 | Rock sample (about 8cm) being deposited into boot. | | | R792-032 |
| 07:23:49 Apr/10/04 | 1592 | 161 | 21.4879 | 144.0418 | Mussel covered outcrop as we climb toward "More Mussels". | | | R792-033 |
| 07:25:25 Apr/10/04 | 1588 | 99 | 21.4878 | 144.0419 | Moving to mussel mound (paradise) area to do video transect. | | | |
| 07:30:11 Apr/10/04 | 1607 | 2 | 21.4880 | 144.0414 | At mussel beach and we plan to move off to where there are no mussels and study the transition. | | | R792-034 |
| 07:33:19 Apr/10/04 | 1621 | 9 | 21.4881 | 144.0414 | White staining at base of rocks and in the sediment. Possible hydrothermal activity. | | | R792-035 |
| 07:36:09 Apr/10/04 | 1624 | 88 | 21.4882 | 144.0413 | Long shot of galatheid crab and we are moving in for a close up. | | | R792-036 |
| 07:36:56 Apr/10/04 | 1624 | 89 | 21.4881 | 144.0414 | Three shrimp and two galatheids near area of white staining in sediment. | | | R792-037 |
| 07:40:32 Apr/10/04 | 1624 | 110 | 21.4881 | 144.0413 | Examined putative worm tube. | | | |
| 07:41:04 Apr/10/04 | 1622 | 110 | 21.4881 | 144.0413 | Started stbd McLane pump at 0741. Beginning of mussel transect upslope. Stopped the pump at "Fowling" at 0823. Pumped 200 liters. [NW Eifuku - Mussel Mound]. | R792-MP-S-0007 | Juniper | |
| 07:41:20 Apr/10/04 | 1622 | 113 | 21.4881 | 144.0414 | Beginning of transition from shrimp to mussels. There are some juvenile mussels on the rocks. | | | R792-038 |
| 07:43:14 Apr/10/04 | 1613 | 97 | 21.4881 | 144.0415 | More juvenile mussels. | | | R792-039 |
| 07:44:16 Apr/10/04 | 1611 | 101 | 21.4881 | 144.0414 | Increasing mussel density. | | | R792-040 |
| 07:45:43 Apr/10/04 | 1608 | 98 | 21.4881 | 144.0415 | Mussels and crabs on rocks. | | | R792-041 |
| 07:48:18 Apr/10/04 | 1602 | 130 | 21.4881 | 144.0416 | Part of the mussel transect. | | | R792-042 |
| 07:49:53 Apr/10/04 | 1600 | 139 | 21.4880 | 144.0417 | Continuing upslope on the mussel transect. Mostly large mussels but also some small ones. Smoke appearing. Some signs of diffuse flow. | | | |
| 07:50:08 Apr/10/04 | 1601 | 138 | 21.4880 | 144.0417 | Mussels covering small rocks. | | | R792-043 |
| 07:51:13 Apr/10/04 | 1597 | 136 | 21.4879 | 144.0417 | Mussels seem to be stacking on top of one another rather than covering the rock surfaces completely. Extremely abundant galatheids. | | | |
| 07:52:23 Apr/10/04 | 1596 | 137 | 21.4879 | 144.0417 | Very high density of mussels as well as galatheid. | | | R792-044 |
| 07:52:58 Apr/10/04 | 1596 | 138 | 21.4879 | 144.0418 | McLane pump is at 57 liters. | | | |
| 07:54:25 Apr/10/04 | 1594 | 147 | 21.4879 | 144.0417 | Just gone over the top and looking at the ridge, which is completely covered in mussels. Stacks of mussels several individuals deep. And many galatheids. The smoke appears to be to the right of the vehicle. | | | |
| 07:54:29 Apr/10/04 | 1594 | 146 | 21.4879 | 144.0417 | Continuing across crab hill. Appears to be an even distribution of galatheid. | | | R792-045 |
| 07:56:10 Apr/10/04 | 1589 | 144 | 21.4878 | 144.0418 | Moving into an area with visible plume from downslope. It is getting thicker and it is becoming more difficult to photograph the substrate. 75 liters in the Mc Lane pump. | | | |
| 07:56:20 Apr/10/04 | 1588 | 148 | 21.4878 | 144.0418 | Approaching visible plume area but there is no visible difference in crab and mussel population. | | | R792-046 |
| 07:57:37 Apr/10/04 | 1585 | 146 | 21.4877 | 144.0419 | We moved to a lower altitude because of poor visibility. Mussels are thinning a bit. Small pieces of talus that are not colonized. Some sedimented substrate. | | | |
| 07:58:03 Apr/10/04 | 1585 | 146 | 21.4878 | 144.0419 | The mussels are slightly thinner in this area as are the crabs. Shrimp seem to be feeding on the surface of the rocks and microbial mat. | | | R792-047 |
| 07:59:20 Apr/10/04 | 1584 | 145 | 21.4878 | 144.0419 | The shrimp are more abundant in this patch. The plume is wafting back and forth across the mussels. | | | |
| 08:00:37 Apr/10/04 | 1579 | 149 | 21.4877 | 144.0419 | Abundance of shrimp even greater. They are on the mussels and on the substrate. Thick very filamentous mat on the mussels. Shrimp density is as high here as at Cliff House. | | | |
| 08:01:11 Apr/10/04 | 1575 | 146 | 21.4877 | 144.0419 | Increase in density of shrimp along microbial mat. | | | R792-048 |
| 08:01:38 Apr/10/04 | 1574 | 144 | 21.4878 | 144.0419 | Slightly shimmering water and microbial mat covered breccia. | | | R792-049 |
| 08:02:19 Apr/10/04 | 1572 | 145 | 21.4877 | 144.0419 | Going over an area of intense diffuse flow. Change in habitat happened 5m below where we are stopped. Checking gauges. Will return to waypoint "Fouling". | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 08:04:07 Apr/10/04 | 1571 | 146 | 21.4877 | 144.0420 | Solitary mussel sitting in this diffuse flow along with some shrimp at Fouling. | | | R792-050 |
| 08:05:04 Apr/10/04 | 1569 | 145 | 21.4877 | 144.0419 | Moving up the ridge and coming up to the vertical face. Some white staining which is quite intense. | | | |
| 08:05:32 Apr/10/04 | 1567 | 145 | 21.4877 | 144.0420 | Staining is thinning out and we are seeing more smaller mussels. Galatheids and shrimp are still present. | | | |
| 08:05:46 Apr/10/04 | 1566 | 143 | 21.4876 | 144.0420 | Small mussels dominate the topography at this point. | | | R792-051 |
| 08:06:04 Apr/10/04 | 1565 | 145 | 21.4877 | 144.0420 | Getting into an area of mixed adults and juvenile mussels. The fowling on the mussels appears to be a bit thicker than before. | | | |
| 08:07:45 Apr/10/04 | 1560 | 90 | 21.4877 | 144.0420 | Considerable thinning of mussels (<10% cover on the substrate). Many galatheids. The mussels appear to be perked up on the top of rocks. | | | |
| 08:08:38 Apr/10/04 | 1556 | 93 | 21.4877 | 144.0421 | Snails and mussels as well as shrimp and galatheid crabs. | | | R792-052 |
| 08:09:16 Apr/10/04 | 1554 | 94 | 21.4877 | 144.0421 | 133 L on the McLean pump. We are still seeing mussels (<10% cover). | | | |
| 08:09:28 Apr/10/04 | 1554 | 79 | 21.4877 | 144.0422 | Less than 10% coverage of mussels on this substratum. | | | R792-053 |
| 08:10:27 Apr/10/04 | 1552 | 79 | 21.4876 | 144.0421 | Clean substrate and mostly shrimp and galatheids. Tufts of mat on the substrate. | | | |
| 08:12:23 Apr/10/04 | 1550 | 79 | 21.4877 | 144.0422 | We are beginning to see bacterial mats on the cracks between rocks. Some staining on sedimented substratum. | | | |
| 08:13:01 Apr/10/04 | 1548 | 81 | 21.4876 | 144.0422 | The mussels no longer are present; down to shrimp and galatheid towards summit. | | | R792-054 |
| 08:13:20 Apr/10/04 | 1548 | 79 | 21.4877 | 144.0422 | No more mussels are found. There are shrimp; galatheids; and a few scale worms. Some material mat. | | | |
| 08:15:00 Apr/10/04 | 1544 | 133 | 21.4877 | 144.0423 | We are coming to the top of the pinnacle. Denser shrimp populations. Most rock seems to have tumbled from above. The topography is quite spectacular. | | | |
| 08:16:03 Apr/10/04 | 1540 | 151 | 21.4876 | 144.0422 | Galatheid crabs and microbial matte on this intact outcrop. | | | R792-055 |
| 08:16:21 Apr/10/04 | 1539 | 148 | 21.4875 | 144.0422 | Mostly galatheid crabs on this outcrop. No mussels and no shrimp. | | | |
| 08:16:48 Apr/10/04 | 1537 | 142 | 21.4876 | 144.0422 | The lone mussel very near the summit. | | | R792-056 |
| 08:17:00 Apr/10/04 | 1537 | 144 | 21.4876 | 144.0422 | We are starting to see the occasional mussel. McLane pump is at 175 liters. | | | |
| 08:18:44 Apr/10/04 | 1536 | 136 | 21.4876 | 144.0423 | We are backing back down the slope to collect mussels. | | | |
| 08:22:16 Apr/10/04 | 1568 | 134 | 21.4878 | 144.0420 | Moving back down to The Fouling to have a closer investigation. | | | R792-057 |
| 08:29:42 Apr/10/04 | 1573 | 115 | 21.4877 | 144.0418 | We are still looking for Fouling. We are passing an outcrop with white staining and some shimmering. | | | |
| 08:30:56 Apr/10/04 | 1575 | 102 | 21.4877 | 144.0419 | Searching for fouled mussel location. | | | R792-058 |
| 08:32:39 Apr/10/04 | 1575 | 126 | 21.4877 | 144.0419 | We have located a spot where there are mussels with filaments. | | | |
| 08:33:05 Apr/10/04 | 1576 | 131 | 21.4877 | 144.0419 | Back to Fouling area with large shrimp density. | | | R792-059 |
| 08:33:54 Apr/10/04 | 1577 | 131 | 21.4877 | 144.0420 | Close up of shrimp and fouled mussels. | | | R792-060 |
| 08:35:05 Apr/10/04 | 1576 | 132 | 21.4877 | 144.0419 | Collecting a fairly large number of mussels (~26) at an area near Fouling with filaments. Port biobox. Eh is -115. Z=1576. [NW Eifuku - Fouling]. | R792-Bio-0008 | Tunnicliffe | |
| 08:37:12 Apr/10/04 | 1576 | 130 | 21.4878 | 144.0419 | We are collecting several (20-25) mussels near Fouling. | | | |
| 08:40:11 Apr/10/04 | 1576 | 133 | 21.4876 | 144.0419 | Galatheid and shrimp amongst the mussels. | | | R792-061 |
| 08:43:10 Apr/10/04 | 1576 | 132 | 21.4877 | 144.0419 | Preparing to sample shrimp and mussels. | | | R792-062 |
| 08:44:40 Apr/10/04 | 1576 | 133 | 21.4877 | 144.0420 | Suctioning shrimp from Fouling. | | | R792-063 |
| 08:44:49 Apr/10/04 | 1576 | 130 | 21.4877 | 144.0419 | We are just beginning to collect samples using the suction sampler to get them off the rock and into the biobox. We are using Jar 8 for any potential back wash. | | | |
| 08:49:02 Apr/10/04 | 1576 | 131 | 21.4877 | 144.0419 | Difficulty slurp sampling the mussels. | | | R792-064 |
| 08:49:58 Apr/10/04 | 1576 | 133 | 21.4877 | 144.0419 | Sweeping mussels into biobox with ROPOS arm. | | | R792-065 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 08:51:21 Apr/10/04 | 1576 | 130 | 21.4877 | 144.0419 | About 26 mussels swept into biobox. | | | R792-066 |
| 08:54:31 Apr/10/04 | 1577 | 132 | 21.4877 | 144.0419 | We are finished with mussel sampling and we are going to continue downslope to collect other fauna. | | | |
| 08:59:32 Apr/10/04 | 1588 | 119 | 21.4878 | 144.0418 | We found a location to sample. More characteristic of mussel assemblage. | | | |
| 08:59:34 Apr/10/04 | 1588 | 119 | 21.4878 | 144.0418 | Finished collecting mussels at Fouling and moving on to a new area for suctioning. | | | R792-067 |
| 09:05:04 Apr/10/04 | 1594 | 75 | 21.4878 | 144.0418 | Taking digital photos of polychaete. | | | R792-068 |
| 09:07:19 Apr/10/04 | 1594 | 75 | 21.4879 | 144.0417 | We are doing behavioral observations and video imagery of scale worms and shrimp on mussels. | | | |
| 09:09:06 Apr/10/04 | 1594 | 76 | 21.4878 | 144.0418 | Scale-worm in center area of frame. | | | R792-069 |
| 09:09:22 Apr/10/04 | 1594 | 74 | 21.4878 | 144.0418 | Collecting fauna from a "typical" mussel assemblage into jar 1. ~10m downslope from Fouling. 8 scale worms; several shrimp; 27 galatheids. Z=1594. [NW Eifuku - Fouling]. | R792-SS-J1-0009 | Juniper | |
| 09:11:52 Apr/10/04 | 1594 | 76 | 21.4878 | 144.0418 | Suctioning shrimp and galatheid and attempting to obtain a scale-worm. | | | R792-070 |
| 09:17:32 Apr/10/04 | 1594 | 75 | 21.4878 | 144.0418 | Sampled many galatheids and shrimp plus 6 or 7 scale-worms. | | | R792-071 |
| 09:17:59 Apr/10/04 | 1594 | 76 | 21.4878 | 144.0418 | Galatheid hanging out of suction tube. | | | R792-072 |
| 09:24:11 Apr/10/04 | 1594 | 79 | 21.4878 | 144.0418 | Located new victims to sample. | | | R792-073 |
| 09:25:02 Apr/10/04 | 1594 | 68 | 21.4879 | 144.0418 | Still sampling galatheids and other fauna. | | | |
| 09:26:01 Apr/10/04 | 1594 | 68 | 21.4879 | 144.0418 | Galatheid with eggs escaped the suction. | | | R792-074 |
| 09:34:50 Apr/10/04 | 1594 | 64 | 21.4878 | 144.0418 | Still sampling galatheids and shrimp. | | | R792-075 |
| 09:40:01 Apr/10/04 | 1594 | 67 | 21.4878 | 144.0418 | Not sure if this is a hairy shrimp or just a shrimp with microbial mat attached. | | | R792-076 |
| 09:42:18 Apr/10/04 | 1594 | 79 | 21.4878 | 144.0418 | Finished collecting fauna from typical "mussel" assemblage. | | | |
| 09:43:38 Apr/10/04 | 1594 | 82 | 21.4878 | 144.0418 | The collection of shrimp and scale-worms as well as galatheid. | | | R792-077 |
| 09:44:43 Apr/10/04 | 1594 | 80 | 21.4878 | 144.0418 | Suction into jar 3 - 200 micron mesh. Sampling particulates at "typical" mussel assemblage 10m downslope from Fouling. 20% suction. Suctioning at 2-3 different spots. Z=1594. [NW Eifuku - Fouling]. | R792-SS-J3-0010 | Juniper | |
| 09:48:05 Apr/10/04 | 1594 | 82 | 21.4878 | 144.0418 | Sampling particulates at "typical" mussel assemblage 10m downslope from Fouling. | | | |
| 09:53:48 Apr/10/04 | 1594 | 75 | 21.4878 | 144.0418 | Still sampling particulates. | | | |
| 09:56:32 Apr/10/04 | 1594 | 75 | 21.4878 | 144.0418 | Not quite to sample quota. | | | R792-078 |
| 10:01:36 Apr/10/04 | 1594 | 69 | 21.4879 | 144.0418 | Repositioning vehicle to an untouched site for finishing up the suction sampling. | | | R792-079 |
| 10:01:52 Apr/10/04 | 1594 | 69 | 21.4879 | 144.0418 | Repositioning the vehicle to continue the same suction sample. | | | |
| 10:07:55 Apr/10/04 | 1591 | 122 | 21.4878 | 144.0418 | Finished suction sampling and are going to now move onto Champagne. First we're going to try to go to the original Champagne site from R791 (Champagne-2). Range=43m; at a bearing 243 degrees. | | | |
| 10:09:26 Apr/10/04 | 1591 | 122 | 21.4878 | 144.0418 | Preparing to leave for Champagne site from dive 791. | | | R792-080 |
| 10:14:21 Apr/10/04 | 1605 | 80 | 21.4877 | 144.0415 | We are at the correct depth and seeing more floc in the water. | | | |
| 10:16:02 Apr/10/04 | 1605 | 75 | 21.4875 | 144.0417 | Approaching Champagne site. Water is becoming steadily cloudier. | | | R792-081 |
| 10:16:09 Apr/10/04 | 1605 | 74 | 21.4875 | 144.0417 | The smoke is getting thicker. | | | |
| 10:20:27 Apr/10/04 | 1609 | 67 | 21.4873 | 144.0419 | Still looking for Champagne-2 but do not seem to be able to locate it yet. | | | |
| 10:20:32 Apr/10/04 | 1609 | 47 | 21.4873 | 144.0419 | Coming upon white and yellow stained outcrop with some mussels at depth of 1606. | | | R792-082 |
| 10:22:14 Apr/10/04 | 1607 | 18 | 21.4873 | 144.0419 | Nav says we are 40-50m away from Chmapgane-2; bearing at ~307. | | | |
| 10:22:22 Apr/10/04 | 1606 | 26 | 21.4874 | 144.0418 | Not as near to Champagne 2 as we had thought. Perhaps these rocks are evidence of another venting site. | | | R792-083 |
| 10:22:52 Apr/10/04 | 1607 | 41 | 21.4874 | 144.0418 | Moving into more milky water and floc. Mussels and galatheid crabs. Some white staining. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 10:23:29 Apr/10/04 | 1607 | 40 | 21.4876 | 144.0418 | We are at Champagne 2. And we will try to get a better fix. | | | |
| 10:23:51 Apr/10/04 | 1607 | 42 | 21.4876 | 144.0418 | We have arrived at Champagne 2. Stopping to adjust navigation. | | | R792-084 |
| 10:26:06 Apr/10/04 | 1607 | 58 | 21.4876 | 144.0418 | The Champagne 2 smokers and CO2 bubbles. | | | R792-085 |
| 10:26:36 Apr/10/04 | 1607 | 59 | 21.4876 | 144.0418 | Boundary of Champagne 2. | | | R792-086 |
| 10:28:36 Apr/10/04 | 1606 | 59 | 21.4876 | 144.0418 | At least 5 white chimneys at Champagne 2 and abundant CO2 bubbles. | | | R792-087 |
| 10:29:54 Apr/10/04 | 1606 | 57 | 21.4877 | 144.0417 | Middle chimney appears to be a triple smoker. | | | R792-088 |
| 10:31:31 Apr/10/04 | 1606 | 7 | 21.4877 | 144.0417 | We are sitting down to take pictures of rocks with egg cases of limpets. We cannot really find much right now so we are going to collect samples. | | | |
| 10:33:54 Apr/10/04 | 1606 | 31 | 21.4877 | 144.0418 | The three outer white chimneys and degassing of CO2 at Champagne 2. | | | R792-089 |
| 10:38:40 Apr/10/04 | 1607 | 62 | 21.4877 | 144.0418 | Looking around for a good sample. | | | |
| 10:38:59 Apr/10/04 | 1607 | 74 | 21.4877 | 144.0417 | Diffuse degassing and smoking at the base of the hill that the chimneys are on. | | | R792-090 |
| 10:41:35 Apr/10/04 | 1607 | 45 | 21.4877 | 144.0418 | Change of plan - we'll start with suction sampling the mats. | | | |
| 10:43:27 Apr/10/04 | 1605 | 44 | 21.4876 | 144.0418 | Positioning to suction filamentous mats near the base of the chimneys. | | | |
| 10:43:31 Apr/10/04 | 1605 | 42 | 21.4876 | 144.0418 | Shrimp trap just outside of the chimney clouds. | | | R792-091 |
| 10:44:59 Apr/10/04 | 1606 | 86 | 21.4876 | 144.0419 | Large CO2 bubbles between ROPOS and chimneys. | | | R792-092 |
| 10:46:47 Apr/10/04 | 1607 | 43 | 21.4877 | 144.0418 | Attempting to sample wall of the chimney. | | | R792-093 |
| 10:46:55 Apr/10/04 | 1607 | 41 | 21.4877 | 144.0418 | Suction sampling for mat from chimney surface into jar 5. Start1=1047 Stop1=1049. Start2=1051 Stop2=1054. Start3=1100 Stop3=1104. Temp=4C with occasional spikes to 25C. Z=1606.7. [NW Eifuku - Champagne]. | R792-SS-J5-0011 | Moyer | |
| 10:49:04 Apr/10/04 | 1607 | 43 | 21.4876 | 144.0418 | Attempting to suction sample the coating of the chimney. | | | R792-094 |
| 10:54:22 Apr/10/04 | 1607 | 43 | 21.4877 | 144.0418 | Sampling white microbial mat from chimney surface. | | | R792-095 |
| 10:59:25 Apr/10/04 | 1608 | 61 | 21.4877 | 144.0418 | Checking out the site for another place to sample the bacterial mat. | | | |
| 11:02:52 Apr/10/04 | 1608 | 33 | 21.4877 | 144.0417 | Continue to sample into Jar#5. | | | |
| 11:04:27 Apr/10/04 | 1608 | 29 | 21.4876 | 144.0418 | We won't be doing a second suction sample at this time. We're going to try to get a soft chimney sample instead. | | | |
| 11:05:10 Apr/10/04 | 1608 | 29 | 21.4876 | 144.0418 | Collection of microbial mat. | | | R792-096 |
| 11:07:36 Apr/10/04 | 1608 | 30 | 21.4877 | 144.0417 | We're going to try to use the suction sampler to pick up pieces of a small chimney off to the right of the chimney we just suction sampled at (jar=5). | | | |
| 11:09:00 Apr/10/04 | 1605 | 48 | 21.4877 | 144.0418 | There are lots of shrimp in the area. | | | |
| 11:10:03 Apr/10/04 | 1604 | 6 | 21.4876 | 144.0418 | Shrimp trap in sight! | | | |
| 11:10:26 Apr/10/04 | 1606 | 358 | 21.4876 | 144.0418 | We're checking out a small white smoker chimney. A bigger chimney would be better. | | | |
| 11:11:09 Apr/10/04 | 1607 | 28 | 21.4876 | 144.0419 | Approaching destroyed chimney to search for the piece of the wall that was dropped while attempting to sample. | | | R792-097 |
| 11:13:25 Apr/10/04 | 1607 | 21 | 21.4876 | 144.0418 | Clumps of CO2 bubbles as they ascend. | | | R792-098 |
| 11:16:11 Apr/10/04 | 1607 | 20 | 21.4876 | 144.0417 | We're going to look amongst the big chimneys for a good sample. | | | |
| 11:18:02 Apr/10/04 | 1607 | 45 | 21.4876 | 144.0417 | Looking for 4-5 big chimneys that are together. We sampled one on the last dive. Found them! | | | |
| 11:19:44 Apr/10/04 | 1607 | 40 | 21.4876 | 144.0418 | Two of the largest chimneys at Champagne 2; note the multiple sources of de-gassing. | | | R792-099 |
| 11:20:26 Apr/10/04 | 1607 | 37 | 21.4876 | 144.0419 | The smoke keeps blocking our view out. | | | |
| 11:22:49 Apr/10/04 | 1607 | 82 | 21.4877 | 144.0417 | Still waiting for the smoke to clear in order to see the chimneys we want to sample. | | | |
| 11:28:14 Apr/10/04 | 1607 | 83 | 21.4877 | 144.0418 | White mist view. | | | R792-100 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 11:28:41 Apr/10/04 | 1607 | 83 | 21.4877 | 144.0418 | Our view is still just white mist. | | | |
| 11:34:24 Apr/10/04 | 1608 | 68 | 21.4876 | 144.0418 | Smoke has cleared just enough for us to try to sample one of the chimneys. It's difficult because when ROPOS touches down it stirs up smoke and bubbles. | | | |
| 11:35:15 Apr/10/04 | 1607 | 62 | 21.4877 | 144.0417 | The chimneys we are trying to sample are about 50cm tall and about 10 cm in diameter. We're attempting to sample and get a whole piece. | | | |
| 11:35:49 Apr/10/04 | 1608 | 65 | 21.4878 | 144.0417 | Suctioning surface of chimney. | | | R792-101 |
| 11:36:11 Apr/10/04 | 1608 | 64 | 21.4876 | 144.0418 | The chimneys appear to have a dark interior - sulfides? The temperature is around 100C. They are pretty fragile. | | | |
| 11:40:15 Apr/10/04 | 1607 | 73 | 21.4877 | 144.0418 | We are repositioning the sub so that we can collect the chimney. | | | |
| 11:42:47 Apr/10/04 | 1606 | 47 | 21.4876 | 144.0418 | There are about 3 or 4 chimneys that are smoking. The rest of the smoke is coming through the talus. | | | |
| 11:43:17 Apr/10/04 | 1607 | 51 | 21.4877 | 144.0418 | Three or four chimneys towards the rear of the vent field. Most of the venting is not de-gassing through chimneys but as diffuse release. | | | R792-102 |
| 11:45:01 Apr/10/04 | 1608 | 76 | 21.4877 | 144.0417 | Attempting to lift a piece of collapsed extinct chimney. | | | R792-103 |
| 11:46:54 Apr/10/04 | 1608 | 74 | 21.4877 | 144.0417 | Trying to use the suction tool to lift the piece of chimney wall. | | | R792-104 |
| 11:47:39 Apr/10/04 | 1608 | 73 | 21.4876 | 144.0419 | A piece of material from the chimney area. Very fragile and porous. Funny little ridges on top - probably mostly silica. Port biobox. Z=1608. T~100C. [NW Eifuku - Champagne-2]. | R792-RK-0012 | SROF geo team (De Ronde) | |
| 11:47:48 Apr/10/04 | 1608 | 74 | 21.4876 | 144.0419 | Piece of chimney crust suctioned up. Cornell thinks that it is mostly silica. It was placed in the port bio-box. | | | R792-105 |
| 11:52:11 Apr/10/04 | 1608 | 62 | 21.4876 | 144.0418 | We are trying to grab another piece of altered rock. | | | |
| 11:54:30 Apr/10/04 | 1608 | 58 | 21.4877 | 144.0417 | That idea failed. | | | |
| 11:55:25 Apr/10/04 | 1608 | 56 | 21.4877 | 144.0418 | Still attempting to collect a rock sample. | | | R792-106 |
| 12:05:26 Apr/10/04 | 1608 | 64 | 21.4877 | 144.0417 | Looking for a new site to sample a rock. The cloud made it very difficult at the last site. | | | R792-107 |
| 12:07:52 Apr/10/04 | 1608 | 46 | 21.4876 | 144.0418 | Still looking for a nice spot for rock sampling. It is a long process. | | | R792-108 |
| 12:09:45 Apr/10/04 | 1608 | 58 | 21.4877 | 144.0418 | Sample about 10 cm in length. Most likely a piece of vesiculated fresh lava. | | | R792-109 |
| 12:09:56 Apr/10/04 | 1608 | 64 | 21.4877 | 144.0418 | Collected rock another sample. Relative fresh piece of vesiculated lava. ~10 cm in diameter. In port biobox. Z=1608. [NW Eifuku - Champagne-2]. | R792-RK-0013 | SROF geo team (De Ronde) | |
| 12:12:39 Apr/10/04 | 1610 | 20 | 21.4877 | 144.0417 | We will try to suction around these small chimneys. | | | |
| 12:15:03 Apr/10/04 | 1610 | 59 | 21.4877 | 144.0417 | Sulphur rich precipitate from area suction small chimneys. The sediment underneath this piece is falling away. Looks like a solid chunk of elemental sulphur. In port biobox. Z=1610. [NW Eifuku - Champagne]. | R792-RK-0014 | SROF geo team (De Ronde) | |
| 12:17:00 Apr/10/04 | 1610 | 60 | 21.4877 | 144.0418 | Sample was taken from this area. | | | R792-110 |
| 12:18:22 Apr/10/04 | 1609 | 55 | 21.4877 | 144.0417 | There is a large crust of sulphur rich material. Going back to the vents to suction sample the material from the bottom of chimneys. | | | |
| 12:20:12 Apr/10/04 | 1607 | 98 | 21.4876 | 144.0418 | Returned to Champagne vents; planning on suctioning surficial material. | | | R792-111 |
| 12:21:21 Apr/10/04 | 1608 | 74 | 21.4876 | 144.0418 | Suction sample into jar 2. Collecting particulates and bacterial mat near the base of a chimney. Pebble-sized particles collected. Z=1698. [NW Eifuku - Champagne]. | R792-SS-J2-0015 | SROF geo team (De Ronde) | |
| 12:23:20 Apr/10/04 | 1608 | 68 | 21.4876 | 144.0418 | Suction sampling pebble sized material. | | | R792-112 |
| 12:25:55 Apr/10/04 | 1608 | 68 | 21.4877 | 144.0417 | This is the collected material. | | | R792-113 |
| 12:27:10 Apr/10/04 | 1608 | 68 | 21.4877 | 144.0417 | We are now going to sample bacterial mat. | | | |
| 12:27:23 Apr/10/04 | 1609 | 68 | 21.4876 | 144.0418 | Suction fluffy white (a hint of yellow) thick microbial mat into jar 6. The area has excessive amount of gas. Start:1236 Stop:12:40. T=6-7C. Z=1608. (Downslope from the chimneys and ~0.5 m to the right). [NW Eifuku - Champagne]. | R792-SS-J6-0016 | Moyer | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 12:32:29 Apr/10/04 | 1606 | 351 | 21.4877 | 144.0417 | Checking gauges. | | | |
| 12:33:45 Apr/10/04 | 1606 | 76 | 21.4877 | 144.0417 | Looking around for a good spot to collect a microbial sample. It looks like we found one. | | | |
| 12:34:00 Apr/10/04 | 1606 | 95 | 21.4877 | 144.0418 | Searching for a location for mat sampling. | | | R792-114 |
| 12:34:11 Apr/10/04 | 1607 | 108 | 21.4877 | 144.0418 | Good location for sampling fluffy mat. | | | R792-115 |
| 12:36:08 Apr/10/04 | 1607 | 104 | 21.4877 | 144.0418 | Starting to suction sample. | | | R792-116 |
| 12:38:23 Apr/10/04 | 1607 | 106 | 21.4875 | 144.0419 | Some of the bubbles appear to be milky in color rather than the typical translucent bubbles we have observed before. | | | R792-117 |
| 12:40:08 Apr/10/04 | 1607 | 110 | 21.4875 | 144.0419 | Stopping the pump after collecting this material. | | | R792-118 |
| 12:40:17 Apr/10/04 | 1607 | 107 | 21.4875 | 144.0419 | Suction fluffy white/yellow microbial mat into jar 7. The area has excessive amount of gas. Start 1241 Stop 12:46. T=6-7. Z=1608. (Same location as previous sample - downslope from the chimneys ~0.5m). [NW Eifuku - Champagne]. | R792-SS-J7-0017 | Moyer | |
| 12:46:40 Apr/10/04 | 1607 | 112 | 21.4877 | 144.0417 | This is the second mat collection. | | | R792-119 |
| 12:47:52 Apr/10/04 | 1607 | 111 | 21.4876 | 144.0419 | Suction sample for meiofauna into jar 4. Z=1607. T=6-7C. Z=1607. (Downslope from the chimneys and ~0.5 m to the right) Same location as J6 and J7. [NW Eifuku - Champagne]. | R792-SS-J4-0018 | Juniper | |
| 12:52:01 Apr/10/04 | 1608 | 109 | 21.4877 | 144.0418 | This is the third site for mat collection. | | | R792-120 |
| 12:58:21 Apr/10/04 | 1608 | 86 | 21.4877 | 144.0417 | Success with mat suctioning. | | | R792-121 |
| 13:00:16 Apr/10/04 | 1608 | 87 | 21.4877 | 144.0417 | We are done suction sampling at Champagne. | | | |
| 13:00:48 Apr/10/04 | 1608 | 86 | 21.4877 | 144.0418 | Flushing mat into bottle 8. This is not a sample. | | | R792-122 |
| 13:06:56 Apr/10/04 | 1606 | 83 | 21.4878 | 144.0417 | Searching for a rock with limpets. The limpets appear just on the edge of the white staining. | | | R792-123 |
| 13:07:51 Apr/10/04 | 1605 | 52 | 21.4878 | 144.0417 | Limpets on rocks. Limpets appear just on the edge of the white staining. The small rock (~ 5cm) has a smooth surface and larger rock (~10 cm) has a rough surface. In the boot. Z=1605. [NW Eifuku - Champagne]. | R792-Bio/geo-0019 | Metaxas | |
| 13:09:38 Apr/10/04 | 1606 | 32 | 21.4877 | 144.0418 | Sampling rock with limpets. | | | R792-124 |
| 13:10:39 Apr/10/04 | 1606 | 53 | 21.4877 | 144.0418 | This limpet rock sample is in the boot. | | | R792-125 |
| 13:11:53 Apr/10/04 | 1606 | 68 | 21.4877 | 144.0417 | Sampling 2nd rock (same sample number ) for limpets. | | | R792-126 |
| 13:12:42 Apr/10/04 | 1606 | 63 | 21.4877 | 144.0418 | This limpet rock sample is in the boot at well. These two rocks are the same sample (the purpose of the collection was to sample limpets). | | | R792-127 |
| 13:13:03 Apr/10/04 | 1606 | 63 | 21.4877 | 144.0418 | It is now bubble time! | | | |
| 13:17:28 Apr/10/04 | 1608 | 67 | 21.4877 | 144.0418 | Preparing for bubble sampling! | | | R792-128 |
| 13:18:05 Apr/10/04 | 1608 | 67 | 21.4877 | 144.0418 | We are setting up to collect bubbles. | | | |
| 13:20:01 Apr/10/04 | 1608 | 67 | 21.4877 | 144.0417 | The core tube has been released from the bumper. | | | |
| 13:21:50 Apr/10/04 | 1608 | 67 | 21.4876 | 144.0417 | The push corer has been sealed at the top with rtv. Two pieces of tubing attached to it for gas sampling. | | | |
| 13:22:02 Apr/10/04 | 1608 | 67 | 21.4876 | 144.0418 | Push-core modified for bubble/gas sampling. | | | R792-129 |
| 13:22:41 Apr/10/04 | 1608 | 65 | 21.4876 | 144.0418 | The corer is placed over a bubbling orifice but not squished into the sediment. | | | |
| 13:28:59 Apr/10/04 | 1609 | 42 | 21.4877 | 144.0418 | Repositioning to collect bubbles. | | | |
| 13:31:29 Apr/10/04 | 1609 | 42 | 21.4876 | 144.0418 | We seem to have found a spot that is collecting bubbles. | | | |
| 13:32:44 Apr/10/04 | 1609 | 43 | 21.4876 | 144.0418 | Attempting the difficult task of collecting bubbles. | | | R792-130 |
| 13:33:45 Apr/10/04 | 1609 | 45 | 21.4877 | 144.0417 | It does not look like we are collecting many bubbles in the corer. | | | |
| 13:35:25 Apr/10/04 | 1609 | 62 | 21.4876 | 144.0418 | Collecting gas bubbles. | | | R792-131 |
| 13:35:48 Apr/10/04 | 1609 | 62 | 21.4876 | 144.0418 | It appears that the bubbles are being collected. | | | R792-132 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 13:35:57 Apr/10/04 | 1609 | 63 | 21.4877 | 144.0417 | We are now seeing bubbles starting to collect at the top of the bubble corer. | | | |
| 13:36:55 Apr/10/04 | 1609 | 62 | 21.4877 | 144.0417 | Bubbles gathering in the top of the collecting apparatus. | | | R792-133 |
| 13:39:04 Apr/10/04 | 1609 | 63 | 21.4876 | 144.0418 | The bubbles collect but they do not coalesce. | | | |
| 13:39:40 Apr/10/04 | 1609 | 63 | 21.4876 | 144.0418 | Liquid CO2 with a coating of clathrate forming when liquid CO2 comes in contact with seawater. | | | |
| 13:42:00 Apr/10/04 | 1609 | 63 | 21.4877 | 144.0418 | When the corer is half full we will fire the gas tight bottle. | | | |
| 13:44:29 Apr/10/04 | 1609 | 62 | 21.4877 | 144.0418 | The CO2 seawater interface is just above the nuts in this frame. | | | R792-134 |
| 13:50:36 Apr/10/04 | 1609 | 64 | 21.4877 | 144.0418 | Still collecting bubbles. | | | |
| 13:50:41 Apr/10/04 | 1609 | 62 | 21.4877 | 144.0418 | Collected about half the tube worth of bubbles. | | | R792-135 |
| 13:51:46 Apr/10/04 | 1609 | 64 | 21.4876 | 144.0418 | Gas Tight Bottle-1 (HIL GTB 12) attached to Bubble corer. Fired 0152. Bottle is left open. Very slow leak at the top of the corer. Can see the bubbles actually deforming as they leak. Similar to those seen coming out of tubes at JADE site of Okinawa Trough. [NW Eifuku - Champagne]. | R792-GTB-1-0020 | Lupton | |
| 13:52:42 Apr/10/04 | 1609 | 63 | 21.4876 | 144.0418 | Some of the bubbles have found a way to escape. Sneaky buggers. | | | R792-136 |
| 13:54:00 Apr/10/04 | 1609 | 64 | 21.4877 | 144.0417 | The bubbles rise like plumes with tails as they escape the collection tube. | | | R792-137 |
| 13:56:45 Apr/10/04 | 1609 | 63 | 21.4877 | 144.0418 | Putting the sampler back into the holster. See is still leaking so may have to go and sample once again after the survey if leaked completely. | | | |
| 14:02:16 Apr/10/04 | 1606 | 33 | 21.4876 | 144.0418 | Going to look in the shrimp trap and see if anything inside and if not will leave and pick up during next dive. | | | |
| 14:04:51 Apr/10/04 | 1606 | 31 | 21.4877 | 144.0417 | Checking status of the shrimp trap at Champagne. | | | R792-138 |
| 14:06:21 Apr/10/04 | 1606 | 49 | 21.4877 | 144.0417 | Only saw one shrimp so decided to re-deploy closer to a group of mussels nearby. | | | |
| 14:06:55 Apr/10/04 | 1606 | 53 | 21.4876 | 144.0418 | Shrimp trap back in place. | | | R792-139 |
| 14:13:21 Apr/10/04 | 1590 | 265 | 21.4876 | 144.0414 | Starting port McLane pump to sample the particles in the water. | | | |
| 14:14:01 Apr/10/04 | 1598 | 266 | 21.4876 | 144.0413 | Started sampling port McLane pump at 1413. Stop 1457 - at 770m. 207.4L sampled. [NW Eifuku - Champagne area]. | R792-MP-P-0021 | Juniper | |
| 14:16:17 Apr/10/04 | 1607 | 268 | 21.4876 | 144.0412 | Net open 14:16. Closed 1423 due to technical difficulties. Tow 30 meters above the bottom. Speed=0.5 knots. [NW Eifuku - Champagne area]. | R792-net-P-0022 | Metaxas | |
| 14:18:03 Apr/10/04 | 1616 | 269 | 21.4877 | 144.0409 | Open Starboard Plankton net. Start=1418. Stop 1423 due to technical problems. Tow 30 meters above the bottom. Speed=0.5 knots. [NW Eifuku - Champagne area]. | R792-net-S-0023 | Metaxas | |
| 14:23:16 Apr/10/04 | 1653 | 244 | 21.4880 | 144.0401 | Started Imagenex survey then aborted due to hydraulic leak. | | | |
| 14:26:50 Apr/10/04 | 1604 | 94 | 21.4882 | 144.0402 | ROPOS is heading to the surface. Dive aborted. | | | |
| 14:57:28 Apr/10/04 | 777 | 255 | 21.4880 | 144.0401 | Stop McLean pump at 770 m. 207.4 L sampled. | | | |
| 14:59:33 Apr/10/04 | 725 | 273 | 21.4879 | 144.0401 | Bubbles keep escaping out of the modified sediment core sampler. Unfortunately bubbles are escaping from leak at top of cylinder. Bubbles getting smaller in diameter. | | | |
| 15:10:40 Apr/10/04 | 422 | 229 | 21.4881 | 144.0395 | Liquid CO2 is escaping on ascent. | | | |
| 15:12:04 Apr/10/04 | 386 | 228 | 21.4881 | 144.0395 | See CO2 liquid starting to coalesce at 360 m. | | | |
| 15:13:43 Apr/10/04 | 343 | 216 | 21.4881 | 144.0395 | See change at 340m. Turning into gas phase. | | | |
| 15:14:23 Apr/10/04 | 325 | 212 | 21.4881 | 144.0395 | Single mass of clathrate appears to have formed at 310 m. | | | |
| 15:15:10 Apr/10/04 | 305 | 196 | 21.4881 | 144.0395 | Gas collector with CO2 hydrate at the top. | | | R792-140 |
| 15:15:39 Apr/10/04 | 293 | 194 | 21.4881 | 144.0395 | Looks like clathrate melting. Triggered bottle and showed CO2 gas pushing out the seawater at the bottom of the flask. | | | |
| 15:16:04 Apr/10/04 | 282 | 195 | 21.4881 | 144.0395 | Gas collector with CO2 hydrate at the top and the water/gas interface visible. | | | R792-141 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R792 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 15:17:10 Apr/10/04 | 251 | 201 | 21.4880 | 144.0395 | See the clathrate melting quite clearly now. | | | |
| 15:17:22 Apr/10/04 | 245 | 209 | 21.4881 | 144.0395 | CO2 hydrate now with water all around. Bubbles are still escaping from the top. | | | R792-142 |
| 15:18:37 Apr/10/04 | 209 | 212 | 21.4880 | 144.0395 | Clathrate continues to melt. | | | |
| 15:20:45 Apr/10/04 | 159 | 212 | 21.4881 | 144.0395 | Final bit of clathrate melted. | | | |
| 15:53:29 Apr/10/04 | 2 | 294 | 21.4793 | 144.0336 | Late Entry: 1547 at surface. 1550 ROPOS is on deck. | | | |

# 8.12 R793 Dive Log: NW Eifuku

| **R793: Northwest Eifuku** |
|---|
| wet time (UTC): 4/11 0253 - 4/12 0132. JD 102 - 103. 21.26 hrs. |
| bottom time (UTC): 4/11 0418 - 4/11 2252. 18.57 hrs. [37 samples]<br>**[Imagenex survey: 4/11 1655 – 2027. ~30 m off bottom]** |
| Missing 2 hours of navigation at the start of the dive. The nav system was set to the wrong frequency. Nav was restored at 0617. No navigation for first 3 samples (somewhere between Yellow Top and Bacterial Balls). |
| **R793 DSC information:** There were 155 original DSCs taken and 134 final ones were kept starting with R793_DSC_041104_043425_01769.jpg and ending with R793_DSC_041104_215841_01922.jpg |
| HFS, suction and geological sampling dive on NW Eifuku. Missing 2 hours of navigation at the start of the dive. Nav was restored at 0617. Samples: **Yellow Top**: 3 suctions (yellow mat). **Fouling area**: 2 HFS, 1 suction (juvenile mussels). **Yellow Cone**: 2 HFS, 2 suctions (mini chimney and bacterial mat). **Champagne**: 3 HFS, 1 gastight, 2 rocks, 1 shrimp trap, 1 suction (crab). **Sulfur Dendrite**: 5 HFS, 1 gas tight. **Cliff House**: 6 HFS, 2 gas tights, 1 rock. **Sulfur Spicules**: 1 HFS, 1 bio/geo (spicule and snails). **Summit and NW Venting area**: Imagenex survey, 2 plankton nets during survey. Collected liquid CO2 bubbles at Champagne and watched the phase change as the sub ascended. Observed HFS near surface. Bubbles were venting from the HFS sampler. |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 02:52:24 Apr/11/04 | 1 | 350 | 21.4793 | 144.0336 | ROPOS on the deck. | | | |
| 02:53:02 Apr/11/04 | 1 | 348 | 21.4793 | 144.0336 | ROPOS in the water. | | | |
| 04:18:30 Apr/11/04 | 1685 | 163 | 21.4797 | 144.0435 | We are now on the bottom at 1636 meters at a lava outcrop. | | | R793-001 |
| 04:20:04 Apr/11/04 | 1689 | 165 | 21.4797 | 144.0435 | Yellow mat on slopes along with outcrops. | | | |
| 04:21:27 Apr/11/04 | 1684 | 188 | 21.4797 | 144.0435 | Rat tail fish sighted near Yellow top. | | | R793-002 |
| 04:22:51 Apr/11/04 | 1679 | 154 | 21.4797 | 144.0435 | We have orange colored bacterial mat with some white bacteria. We are still below yellow top. | | | R793-003 |
| 04:23:45 Apr/11/04 | 1676 | 145 | 21.4797 | 144.0435 | Getting flocky in the water column. Yellow/orange mats are getting more extensive. eH=97. | | | |
| 04:24:47 Apr/11/04 | 1670 | 190 | 21.4797 | 144.0435 | Here is an example of white patch of mat at lower left of center in picture. | | | R793-004 |
| 04:26:44 Apr/11/04 | 1665 | 182 | 21.4797 | 144.0435 | Now out of the mat zone. | | | |
| 04:27:56 Apr/11/04 | 1671 | 217 | 21.4797 | 144.0435 | We have more signs of hydrothermal venting with yellow and white bacterial mat at Yellow Top. | | | R793-005 |
| 04:29:38 Apr/11/04 | 1676 | 106 | 21.4797 | 144.0435 | White mat is in the right upper quadrant of this picture. We are on a slope and at the depth of the suction sample. Now we're moving north. | | | R793-006 |
| 04:32:04 Apr/11/04 | 1672 | 77 | 21.4797 | 144.0435 | There was been an increase of yellow mat and now floc over the last minute. | | | R793-007 |
| 04:33:52 Apr/11/04 | 1670 | 43 | 21.4797 | 144.0435 | This is the top of a local ridge. | | | R793-008 |
| 04:34:53 Apr/11/04 | 1671 | 159 | 21.4797 | 144.0435 | This is the next ridge over. These come right out of the slope and are causing us to divert. | | | R793-009 |
| 04:35:52 Apr/11/04 | 1673 | 223 | 21.4797 | 144.0435 | We are now into abundant bacterial mat about 50% on a nearly vertical face. | | | R793-010 |
| 04:37:15 Apr/11/04 | 1672 | 137 | 21.4797 | 144.0435 | We have found a very serious milky cloud that might come from a hydrothermal source downslope. | | | R793-011 |
| 04:38:24 Apr/11/04 | 1675 | 111 | 21.4797 | 144.0435 | We are trying to determine if this is prop wash or hydrothermal venting. | | | R793-012 |
| 04:39:43 Apr/11/04 | 1675 | 169 | 21.4797 | 144.0435 | We have bacterial balls in the left center here. This and the previous frame was stirred up by our movements and not hydrothermal. | | | R793-013 |
| 04:40:24 Apr/11/04 | 1664 | 169 | 21.4797 | 144.0435 | Yellow out blizzard. Tether management time. | | | |
| 04:57:28 Apr/11/04 | 1689 | 121 | 21.4880 | 144.0375 | Back to the bottom. Checking nav to see if can get working again. | | | |
| 04:57:34 Apr/11/04 | 1688 | 78 | 21.4880 | 144.0375 | We are back on the bottom after tether management. We don't have nav on ROPOS and may abort the dive. | | | R793-014 |
| 05:03:46 Apr/11/04 | 1689 | 105 | 21.4760 | 144.0437 | Heading to bottom again to see if we can get suction samples. | | | |
| 05:04:40 Apr/11/04 | 1697 | 187 | 21.4760 | 144.0437 | We have a small amount of yellow floc here. Increasing to the next frame. | | | R793-015 |
| 05:05:25 Apr/11/04 | 1691 | 200 | 21.4760 | 144.0437 | I just missed the thicker mat. We are moving to a talus slope. | | | R793-016 |
| 05:06:54 Apr/11/04 | 1680 | 116 | 21.4760 | 144.0437 | We are climbing this ridge to get to Yellow Top. | | | R793-017 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 05:07:54 Apr/11/04 | 1676 | 108 | 21.4882 | 144.0397 | Heavy mat but it is heavier still on the other side of this slope. | | | R793-018 |
| 05:08:58 Apr/11/04 | 1676 | 168 | 21.4882 | 144.0397 | Found think yellow/orange mats. Must be near previous Yellow Top site. | | | |
| 05:09:04 Apr/11/04 | 1677 | 164 | 21.4882 | 144.0397 | This is the "other side" referred to in the last frame. | | | R793-019 |
| 05:10:18 Apr/11/04 | 1679 | 199 | 21.4882 | 144.0397 | Rat-tail at Yellow Top. | | | R793-020 |
| 05:10:48 Apr/11/04 | 1679 | 209 | 21.4882 | 144.0397 | We have stirred up some of the mat and are about to move up slope. | | | R793-021 |
| 05:11:51 Apr/11/04 | 1678 | 187 | 21.4882 | 144.0397 | We are upslope from where the rat-tail was. We are going to look for thicker mat elsewhere. | | | R793-022 |
| 05:13:48 Apr/11/04 | 1672 | 89 | 21.4948 | 144.0409 | We are at the ridge crest and we have been stirring up mat. | | | R793-023 |
| 05:15:30 Apr/11/04 | 1677 | 34 | 21.4948 | 144.0409 | We have very thick mat here and we are coming in to land. | | | R793-024 |
| 05:15:41 Apr/11/04 | 1677 | 57 | 21.4948 | 144.0409 | Found our sample site. Getting ready to suction sample. | | | |
| 05:16:03 Apr/11/04 | 1677 | 68 | 21.4948 | 144.0409 | This is a closer up view of the landing site for suction sample. | | | R793-025 |
| 05:17:22 Apr/11/04 | 1679 | 65 | 21.4738 | 144.0439 | We are about to take Suction sample 6. | | | R793-026 |
| 05:17:36 Apr/11/04 | 1678 | 64 | 21.4738 | 144.0439 | Suction sampling yellow mat into jar 6. Eh=90. Z=1678. [NW Eifuku - Yellow Top]. | R793-SS-J6-0001 | Moyer | |
| 05:18:18 Apr/11/04 | 1678 | 56 | 21.4738 | 144.0439 | We are doing a slow pull on the bacterial mat. | | | R793-027 |
| 05:20:07 Apr/11/04 | 1678 | 52 | 21.4738 | 144.0439 | We are continuing the suction sample and are taking digital pictures to look for meiofauna. | | | R793-028 |
| 05:24:49 Apr/11/04 | 1678 | 51 | 21.4738 | 144.0439 | This is a view of floc stirred up during repositioning. | | | R793-029 |
| 05:25:35 Apr/11/04 | 1679 | 48 | 21.4738 | 144.0439 | This jar is full! We are moving to jar 7 immediately. | | | R793-030 |
| 05:26:06 Apr/11/04 | 1678 | 48 | 21.4738 | 144.0439 | Suction sample yellow mat into jar 7. Z=1678. [NW Eifuku - Yellow Top]. | R793-SS-J7-0002 | Moyer | |
| 05:26:20 Apr/11/04 | 1678 | 40 | 21.4738 | 144.0439 | We are rapidly filling jar 7. | | | R793-031 |
| 05:27:24 Apr/11/04 | 1678 | 39 | 21.4738 | 144.0439 | Mat is quaking as the arm moves. We are still on jar 7. | | | R793-032 |
| 05:28:28 Apr/11/04 | 1678 | 37 | 21.4738 | 144.0439 | This is a close up of suction sampling for ss7. | | | R793-033 |
| 05:29:39 Apr/11/04 | 1678 | 38 | 21.4738 | 144.0439 | Estimating this mat is 3cm thick. We are starting to expose the rocky substrate. | | | R793-034 |
| 05:31:05 Apr/11/04 | 1678 | 36 | 21.4738 | 144.0439 | We are rapidly filling jar 7. | | | R793-035 |
| 05:31:46 Apr/11/04 | 1678 | 36 | 21.4738 | 144.0439 | This is the end of jar 7. Now moving to jar 3. | | | R793-036 |
| 05:32:41 Apr/11/04 | 1678 | 39 | 21.4738 | 144.0439 | Suction sample yellow mat into jar 3 (200-micron mesh. The mat was ~3cm thick here. Z=1678. [NW Eifuku - Yellow Top]. | R793-SS-J3-0003 | Juniper | |
| 05:33:08 Apr/11/04 | 1679 | 62 | 21.4738 | 144.0439 | Bacterial floc everywhere in this view. Suction sample 3 has 200-micron mesh. | | | R793-037 |
| 05:34:23 Apr/11/04 | 1679 | 84 | 21.4738 | 144.0439 | We could see the first part of this sample going up the hose. | | | R793-038 |
| 05:37:17 Apr/11/04 | 1679 | 85 | 21.4738 | 144.0439 | Here we can see the hose full of bacterial mat. | | | R793-039 |
| 05:39:50 Apr/11/04 | 1679 | 87 | 21.4738 | 144.0439 | Here is SS#3. It is stopped. | | | R793-040 |
| 05:41:08 Apr/11/04 | 1679 | 85 | 21.4738 | 144.0439 | We are emptying the hose into #5 and flushing the hose. Not a sample. Just saving time. | | | R793-041 |
| 05:43:17 Apr/11/04 | 1673 | 359 | 21.4738 | 144.0439 | Heading to Champagne to use pacman (chimney collection) and collect the shrimp trap. | | | |
| 06:11:34 Apr/11/04 | 1527 | 189 | 21.4738 | 144.0439 | Heading back down to mussel field area. | | | |
| 06:15:01 Apr/11/04 | 1570 | 183 | 21.4871 | 144.0413 | Now back to bottom heading towards Champagne. | | | |
| 06:15:06 Apr/11/04 | 1570 | 181 | 21.4871 | 144.0399 | Our new landing site here is near mussel mound. There is white staining on the face of this slope. | | | R793-042 |
| 06:17:00 Apr/11/04 | 1582 | 136 | 21.4879 | 144.0416 | We have more white staining as move downslope and some of these look like sulfur blocks. | | | R793-043 |
| 06:18:28 Apr/11/04 | 1589 | 210 | 21.4879 | 144.0415 | Mussel bed and galatheid crabs are almost totally covering this outcrop. | | | R793-044 |
| 06:20:19 Apr/11/04 | 1603 | 203 | 21.4880 | 144.0414 | We have sediment between mussel beds. Also have navigation back now. There was a different nav channel set on the sub. | | | R793-045 |
| 06:21:32 Apr/11/04 | 1603 | 222 | 21.4879 | 144.0412 | Nav is now back. Back to original plan. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 06:23:08 Apr/11/04 | 1602 | 118 | 21.4880 | 144.0416 | White mat seen on our way to the Fouling site. | | | R793-046 |
| 06:24:41 Apr/11/04 | 1586 | 155 | 21.4879 | 144.0415 | These appear to be sulfur blocks. | | | R793-047 |
| 06:25:43 Apr/11/04 | 1585 | 129 | 21.4879 | 144.0417 | There are just a few mussels here and more galatheids on a ski slope. | | | R793-048 |
| 06:27:53 Apr/11/04 | 1573 | 97 | 21.4879 | 144.0418 | We have a lot of white staining on slope face. We are just 2 meters below the depth of Fouling but not at it yet. | | | R793-049 |
| 06:29:26 Apr/11/04 | 1562 | 225 | 21.4878 | 144.0418 | This is a high ridge with no mussels and at least a dozen galatheids. | | | R793-050 |
| 06:32:13 Apr/11/04 | 1569 | 119 | 21.4877 | 144.0417 | This is in the area of Cliff House. Not where we want to be but a good place to check the navigation. | | | R793-051 |
| 06:34:22 Apr/11/04 | 1574 | 121 | 21.4876 | 144.0418 | Located Cliff House. Moving on to Fouling. | | | |
| 06:35:52 Apr/11/04 | 1566 | 150 | 21.4877 | 144.0416 | Mussels on top of this pinnacle - quite close to the Fouling site. On the knife-edge of a ridge. | | | R793-052 |
| 06:38:01 Apr/11/04 | 1564 | 154 | 21.4878 | 144.0416 | Mussels and white staining but this is too shallow to be Fouling. | | | R793-053 |
| 06:44:47 Apr/11/04 | 1574 | 181 | 21.4878 | 144.0418 | Mussels are more prevalent here than anywhere to the left or right. | | | R793-054 |
| 06:46:50 Apr/11/04 | 1579 | 145 | 21.4877 | 144.0415 | The mussels here are dusted with sediment. | | | R793-055 |
| 06:47:33 Apr/11/04 | 1575 | 136 | 21.4877 | 144.0417 | We are near Fouling. Lots of mussels. Ready for sampling. | | | |
| 06:47:49 Apr/11/04 | 1575 | 142 | 21.4877 | 144.0417 | We are now at a past sampling site near Fouling. | | | R793-056 |
| 06:51:44 Apr/11/04 | 1576 | 159 | 21.4877 | 144.0417 | The shrimp here are quite active amongst the mussels and it appears that a lot of filaments from the mussels have been left behind. | | | R793-057 |
| 06:53:11 Apr/11/04 | 1576 | 157 | 21.4877 | 144.0416 | Here is another view of shrimp and mussels and we are going to use the wand to check temperatures. | | | R793-058 |
| 06:58:25 Apr/11/04 | 1576 | 157 | 21.4877 | 144.0417 | We have a 0.3 degree temp anomaly here. | | | |
| 06:59:02 Apr/11/04 | 1576 | 157 | 21.4877 | 144.0416 | There was a 0.2 temperature anomaly here. | | | R793-059 |
| 06:59:56 Apr/11/04 | 1576 | 157 | 21.4877 | 144.0417 | The probe is right under mussels at 2.3 to 2.4 degrees. | | | R793-060 |
| 07:04:33 Apr/11/04 | 1576 | 159 | 21.4877 | 144.0417 | Archive tape snafu. Unsure for how long but we think it was only for a few minutes. | | | |
| 07:05:14 Apr/11/04 | 1576 | 159 | 21.4877 | 144.0416 | We are still at background temperatures. | | | R793-061 |
| 07:08:08 Apr/11/04 | 1576 | 159 | 21.4877 | 144.0417 | At the sampling site to take HFS bag-8. Mussels were removed from this area on the last dive. | | | R793-062 |
| 07:08:11 Apr/11/04 | 1576 | 160 | 21.4877 | 144.0417 | HFS unfiltered bag #8. Start 7:08 Stop 7:13. Tmax=2.5 Tavg=2.4 Tbackground=2.0 (stdev=0.1) Vol=211ml. Eh=140. Z=160. Lots of shrimp and mussels in area. [NW Eifuku - Fouling]. | R793-HFS-8-0004 | Butterfield | |
| 07:09:19 Apr/11/04 | 1576 | 161 | 21.4878 | 144.0417 | This is the sampler taking bag 8 with a shrimp over the sampler. | | | R793-063 |
| 07:10:08 Apr/11/04 | 1576 | 161 | 21.4877 | 144.0417 | Poor mussel - on the way to the sampling site. | | | R793-064 |
| 07:11:07 Apr/11/04 | 1576 | 161 | 21.4877 | 144.0416 | This is another frame grab at the sample site for bag 8. | | | R793-065 |
| 07:12:11 Apr/11/04 | 1576 | 158 | 21.4878 | 144.0416 | Many byssal threads in this view and the mussels spin these to move around. | | | R793-066 |
| 07:13:43 Apr/11/04 | 1577 | 161 | 21.4877 | 144.0417 | Maximum temperature here was 2.5 degrees. Ambient is 2.0. We are about to move. | | | R793-067 |
| 07:16:04 Apr/11/04 | 1575 | 161 | 21.4877 | 144.0416 | We are looking for more shimmering water. Quite a few shrimp in this view. | | | R793-068 |
| 07:17:01 Apr/11/04 | 1575 | 179 | 21.4877 | 144.0416 | The goal here is to find shimmering near or below mussel bed. | | | R793-069 |
| 07:19:22 Apr/11/04 | 1578 | 223 | 21.4878 | 144.0416 | There appears to be a light white coating (mat?) on some of the mussel shells. | | | R793-070 |
| 07:23:37 Apr/11/04 | 1588 | 164 | 21.4878 | 144.0415 | Searching for signs of shimmering water among mussel beds. | | | R793-071 |
| 07:25:46 Apr/11/04 | 1589 | 221 | 21.4879 | 144.0416 | Looking for temperature anomalies among mussel clumps. | | | R793-072 |
| 07:26:07 Apr/11/04 | 1589 | 222 | 21.4878 | 144.0415 | Another temperature measurement. Still 1.9 degrees C. Not sampling here. Decision to move upslope to seek more obvious diffuse venting through substratum. Heading upslope. | | | |
| 07:29:41 Apr/11/04 | 1580 | 202 | 21.4878 | 144.0416 | We are climbing up the ridge and we are seeing white staining amongst the mussels. | | | R793-073 |
| 07:30:45 Apr/11/04 | 1573 | 150 | 21.4877 | 144.0417 | We are seeing a lot of shimmering water in this area and it was noted that there were no mussels here. | | | R793-074 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 07:31:46 Apr/11/04 | 1574 | 220 | 21.4877 | 144.0417 | At shimmering flow area just above Fouling site. Mussels here are not in flow. | | | |
| 07:32:25 Apr/11/04 | 1574 | 214 | 21.4877 | 144.0416 | We are below the shimmering at Cliff House looking for lower temperature venting. | | | R793-075 |
| 07:33:42 Apr/11/04 | 1574 | 197 | 21.4877 | 144.0416 | Some clear shimmering from the area of the white rock in the lower right quadrant of this picture. | | | R793-076 |
| 07:35:35 Apr/11/04 | 1572 | 179 | 21.4877 | 144.0417 | Only intense diffuse flow here and mussels not present in intense flow. Discussion of repositioning to Yellow Cone site. | | | |
| 07:36:00 Apr/11/04 | 1572 | 177 | 21.4878 | 144.0416 | One of the indicators we are using for temperature is the presence or lack of mussels. | | | R793-077 |
| 07:36:54 Apr/11/04 | 1572 | 142 | 21.4878 | 144.0417 | We are getting flow from this cave on the right. | | | R793-078 |
| 07:37:00 Apr/11/04 | 1572 | 154 | 21.4878 | 144.0417 | Now at Cliff House. Shimmering from cliff base. Mound of mussels adjacent to intense flow. Decision made to probe source and mussels for temperature. Will also collect juvenile mussels at this location. | | | |
| 07:37:43 Apr/11/04 | 1573 | 118 | 21.4878 | 144.0417 | This is down below the cave. We have gastropods and juvenile mussels. | | | R793-079 |
| 07:38:58 Apr/11/04 | 1573 | 133 | 21.4878 | 144.0417 | We are taking a temperature measurement of this cave. If the temperature is low enough - we will sample. | | | R793-080 |
| 07:39:37 Apr/11/04 | 1573 | 126 | 21.4877 | 144.0417 | Inserting temperature probe in cave-like opening. Less than 1C temp anomaly. | | | |
| 07:39:58 Apr/11/04 | 1573 | 129 | 21.4877 | 144.0416 | We are reaching into the cave and only getting 2.8 degrees. | | | R793-081 |
| 07:41:14 Apr/11/04 | 1573 | 135 | 21.4878 | 144.0417 | Repositioning vehicle for better access to vent. | | | |
| 07:42:48 Apr/11/04 | 1574 | 152 | 21.4878 | 144.0417 | Top temperature here is 14 degrees. | | | R793-082 |
| 07:42:50 Apr/11/04 | 1573 | 154 | 21.4878 | 144.0417 | Temperature up to 26C. | | | |
| 07:43:29 Apr/11/04 | 1573 | 154 | 21.4876 | 144.0418 | Temperature steady at 39-40C. Locking arm for sampling. | | | |
| 07:43:34 Apr/11/04 | 1573 | 154 | 21.4876 | 144.0418 | This site is on the other side of the ridge from Champagne with the afore mentioned cave to the left. | | | R793-083 |
| 07:44:54 Apr/11/04 | 1573 | 155 | 21.4877 | 144.0417 | Our maximum temperature so far has been 40 degrees. | | | R793-084 |
| 07:45:26 Apr/11/04 | 1574 | 154 | 21.4876 | 144.0417 | Re-adjusting sample intake to be in more intense flow. | | | |
| 07:45:45 Apr/11/04 | 1574 | 151 | 21.4877 | 144.0417 | We are doing a little excavating to improve flow and steadiness of temperature measurements. | | | R793-085 |
| 07:47:20 Apr/11/04 | 1574 | 149 | 21.4877 | 144.0417 | We are getting 15-20 degrees from the excavated crack. | | | R793-086 |
| 07:48:44 Apr/11/04 | 1574 | 149 | 21.4878 | 144.0417 | After lowering the probe deeper we got back to higher temperatures nearing 40C. There is a shrimp right in the lens. | | | R793-087 |
| 07:48:59 Apr/11/04 | 1574 | 150 | 21.4877 | 144.0418 | Locking arm to start sampling. Temperature not steady - fluctuates from 20-30C. | | | |
| 07:50:13 Apr/11/04 | 1574 | 150 | 21.4878 | 144.0417 | We just started bag 9 an unfiltered bag. | | | R793-088 |
| 07:51:44 Apr/11/04 | 1573 | 148 | 21.4878 | 144.0418 | Seems to be a better spot for water sampling. Shimmering water coming from the crack in the middle of the frame. | | | R793-089 |
| 07:54:51 Apr/11/04 | 1574 | 150 | 21.4878 | 144.0417 | HFS unfiltered Bag-9. Start=0750 Stop=0752. Tmax=19.9 Tavg=17.9(sd=3) T2=5. Vol=410ml. Z=1574. (3 m upslope from Fouling). [NW Eifuku - Fouling Heights]. | R793-HFS-9-0005 | Butterfield | |
| 07:57:36 Apr/11/04 | 1574 | 164 | 21.4877 | 144.0417 | Suctioning mussels for juveniles. It is hard to get to the juveniles from certain angles because of the Pacman. | | | |
| 08:00:03 Apr/11/04 | 1573 | 164 | 21.4877 | 144.0419 | Suction sample of juvenile mussels into jar 2. Also sweeping the rock for settlers. Repositioning the sub during sampling. Sampled 2-3 different locations. Z=1573. Eh=-126. [NW Eifuku - Fouling]. | R793-SS-J2-0006 | Tunnicliffe | |
| 08:00:11 Apr/11/04 | 1573 | 168 | 21.4877 | 144.0419 | Suction sampling juvenile mussels into jar #2. | | | R793-090 |
| 08:01:04 Apr/11/04 | 1573 | 172 | 21.4877 | 144.0419 | Also suction sampling material off of rock surface. | | | R793-091 |
| 08:07:04 Apr/11/04 | 1575 | 140 | 21.4877 | 144.0416 | Still sampling juvenile mussels at Upper Fouling. | | | R793-092 |
| 08:13:06 Apr/11/04 | 1575 | 113 | 21.4877 | 144.0417 | Still sampling small mussels. | | | |
| 08:19:26 Apr/11/04 | 1574 | 133 | 21.4877 | 144.0417 | Still looking for juvenile mussels to grab. | | | R793-093 |
| 08:26:51 Apr/11/04 | 1573 | 134 | 21.4878 | 144.0417 | Giving the baby mussels a new home. | | | R793-094 |
| 08:29:25 Apr/11/04 | 1573 | 71 | 21.4878 | 144.0416 | We are going to move to Yellow Cone to do some fluid sampling. | | | |
| 08:32:00 Apr/11/04 | 1584 | 63 | 21.4882 | 144.0417 | Transiting to Yellow Cone. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 08:34:14 Apr/11/04 | 1588 | 188 | 21.4883 | 144.0420 | Searching for Yellow Cone to do fluid sampling. | | | R793-095 |
| 08:34:32 Apr/11/04 | 1589 | 215 | 21.4883 | 144.0419 | We are looking for Yellow Cone, which is a mound of orangey sediment with two small chimneys. | | | |
| 08:36:15 Apr/11/04 | 1588 | 234 | 21.4883 | 144.0419 | We have located the site. | | | |
| 08:38:02 Apr/11/04 | 1587 | 234 | 21.4882 | 144.0419 | Taking some images and frame grabs of the little chimneys. | | | |
| 08:39:06 Apr/11/04 | 1587 | 229 | 21.4882 | 144.0420 | Small chimneys at Yellow Cone. | | | R793-096 |
| 08:39:13 Apr/11/04 | 1587 | 229 | 21.4882 | 144.0420 | We are gong to start with fluid sampling; take some temperature measurements and then do suction. Eh is -49. We selected on small orifice to take measures. | | | |
| 08:42:59 Apr/11/04 | 1587 | 230 | 21.4882 | 144.0420 | Temperature probe at one of the small chimneys of Yellow Cone. | | | R793-097 |
| 08:44:12 Apr/11/04 | 1587 | 229 | 21.4882 | 144.0419 | Temperature at 7.4 so far. Checking the exhaust; it looks very dark. Back down to ambient. | | | |
| 08:46:15 Apr/11/04 | 1587 | 229 | 21.4883 | 144.0420 | Exhaust from temperature probe. | | | R793-098 |
| 08:46:58 Apr/11/04 | 1587 | 229 | 21.4883 | 144.0419 | HFS intake is clogging up with sediments. Turned the pump off briefly. | | | |
| 08:50:41 Apr/11/04 | 1587 | 230 | 21.4883 | 144.0420 | We are trying to decide how to collect the little chimneys for Hein (and share the samples with Moyer). | | | |
| 08:52:24 Apr/11/04 | 1587 | 230 | 21.4883 | 144.0420 | We knocked over the tallest of the chimneys and it fell over intact. We will attempt water sampling at the hole left behind. We are trying another orifice. | | | |
| 08:52:29 Apr/11/04 | 1587 | 230 | 21.4882 | 144.0420 | We knocked this chimney over and hope to pick it up somehow. | | | R793-099 |
| 08:54:10 Apr/11/04 | 1587 | 229 | 21.4883 | 144.0420 | T=6.5 We are locking the arm. | | | |
| 08:57:37 Apr/11/04 | 1587 | 229 | 21.4882 | 144.0420 | HFS filtered bag-11. Start=0857 Stop=0901. Tmax=6.3 Tavg=4.2(sd=1) T2=2.5. Vol=592ml. Z=1587. The probe is moving around but has remained in the orifice. Clear fluid out of the exhaust. [NW Eifuku - Yellow Cone]. | R793-HFS-11-0007 | Butterfield | |
| 08:57:56 Apr/11/04 | 1588 | 229 | 21.4883 | 144.0421 | Sampling to bag with filter #11. | | | R793-100 |
| 09:01:35 Apr/11/04 | 1587 | 231 | 21.4883 | 144.0421 | Sample to bag 11. | | | R793-101 |
| 09:02:35 Apr/11/04 | 1587 | 231 | 21.4883 | 144.0420 | Temperature is rising again and so we can do a filter HFS sample in addition to the Bag. | | | |
| 09:03:37 Apr/11/04 | 1587 | 229 | 21.4883 | 144.0420 | The hole may have become too big and the temperature is down to 2.7 C. Trying a different opening. Temperature=7.2. | | | |
| 09:07:42 Apr/11/04 | 1587 | 229 | 21.4882 | 144.0420 | HFS unfiltered bag-19. Start=0908 Stop=0911 Start2=0912 Stop2=0913. Tmax=11.4 Tavg=8.1(sd=1) T2=4.2. Vol=702ml. Z=1587. Moving a bit but the HFS probe stayed in the hole. Temperature is creeping up. [NW Eifuku - Yellow Cone]. | R793-HFS-19-0008 | Butterfield | |
| 09:07:46 Apr/11/04 | 1587 | 229 | 21.4882 | 144.0421 | Finishing up the fluid sampling at Yellow Cone. | | | R793-102 |
| 09:08:39 Apr/11/04 | 1587 | 230 | 21.4883 | 144.0421 | Temperature is now 8 degrees. | | | |
| 09:14:23 Apr/11/04 | 1587 | 230 | 21.4882 | 144.0421 | We are refinished water sampling. Taking the probe out carefully to minimize disturbance of the sediments. | | | |
| 09:16:15 Apr/11/04 | 1588 | 229 | 21.4883 | 144.0421 | We bumped the bubble corer and it fell in front of us. We will try picking it up after we stow the HFS probe. | | | |
| 09:20:29 Apr/11/04 | 1588 | 229 | 21.4882 | 144.0420 | Trying to decide which chimney to attempt to sample. | | | R793-103 |
| 09:21:43 Apr/11/04 | 1587 | 230 | 21.4882 | 144.0420 | We are picking up the bubble corer. It is lying on a rather precipitous location. | | | |
| 09:23:06 Apr/11/04 | 1589 | 123 | 21.4883 | 144.0421 | The corer is grabbed successfully. Plan to carry the corer to Champagne and stow it afterwards. Next we will try to collect a little chimney as intact as possible. | | | |
| 09:29:08 Apr/11/04 | 1587 | 170 | 21.4883 | 144.0420 | Inspecting the cone for an appropriate location for chimney sampling. | | | R793-104 |
| 09:31:21 Apr/11/04 | 1587 | 132 | 21.4882 | 144.0420 | Suctioning a mini chimney in Jar 4. Attempting to collect the most stick-like one, which appears more coherent. Got a piece of it - mostly from the base. Z=1587. [NW Eifuku - Yellow Cone]. | R793-SS-J4-0009 | SROF geo team (Hein) | |
| 09:35:09 Apr/11/04 | 1587 | 130 | 21.4883 | 144.0419 | Trying to suction pieces of fallen chimney. It did not work. | | | R793-105 |
| 09:40:17 Apr/11/04 | 1587 | 120 | 21.4883 | 144.0420 | We are still collecting coherent pieces of mini chimney. | | | |
| 09:40:29 Apr/11/04 | 1587 | 121 | 21.4883 | 144.0421 | Suctioned this small piece of chimney. | | | R793-106 |
| 09:45:40 Apr/11/04 | 1587 | 121 | 21.4883 | 144.0420 | Taking a look at jar 4. The material is quite powdery. Some small intact pieces. | | | |
| 09:46:59 Apr/11/04 | 1587 | 120 | 21.4882 | 144.0420 | Mostly powder but Jim managed to find a few solid pieces. | | | R793-107 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 09:47:39 Apr/11/04 | 1587 | 119 | 21.4882 | 144.0421 | Suction sample of bacterial mat and sediment into jar-1. Start1=0956 Stop1=1000 Start2=1003 Stop2=1004. Z=1587. [NW Eifuku - Yellow Cone]. | R793-SS-J1-0010 | Moyer | |
| 09:54:47 Apr/11/04 | 1587 | 272 | 21.4882 | 144.0421 | We are still looking for a place to suction sample. | | | |
| 09:57:38 Apr/11/04 | 1587 | 300 | 21.4882 | 144.0421 | Craig had some success sampling the microbial mat from the chimney area. You go Craig. | | | R793-108 |
| 10:01:49 Apr/11/04 | 1587 | 300 | 21.4883 | 144.0421 | Craig managed a nice amount of mat and sediment. | | | R793-109 |
| 10:05:59 Apr/11/04 | 1587 | 301 | 21.4883 | 144.0420 | This is the last picture of sediment collected by Craig. | | | R793-110 |
| 10:06:13 Apr/11/04 | 1587 | 301 | 21.4883 | 144.0421 | Finished with suction sampling. | | | |
| 10:07:43 Apr/11/04 | 1587 | 298 | 21.4882 | 144.0422 | We're headed to Champagne to take some hot fluid samples. | | | |
| 10:09:07 Apr/11/04 | 1584 | 204 | 21.4882 | 144.0420 | Transit to Champagne. | | | R793-111 |
| 10:16:33 Apr/11/04 | 1617 | 123 | 21.4877 | 144.0415 | We've come upon a white mound with chimneys on it. Have we seen it before? Lots of shrimp around. | | | |
| 10:16:55 Apr/11/04 | 1621 | 130 | 21.4876 | 144.0414 | Pausing in transit to inspect white outcrop. | | | R793-112 |
| 10:18:15 Apr/11/04 | 1620 | 68 | 21.4876 | 144.0415 | Large population of shrimp on large white outcrop. Bob E. thinks this is at Champagne 2. | | | R793-113 |
| 10:19:12 Apr/11/04 | 1621 | 82 | 21.4877 | 144.0416 | Navigation suggests that we are at Champagne 2. Appears to be hydrothermal but we haven't seen shimmering water yet. | | | |
| 10:22:05 Apr/11/04 | 1622 | 104 | 21.4877 | 144.0414 | We're poking the side. The wall is crumbling. Looks like a solid block of hydrothermal mineral - not volcanic. | | | |
| 10:22:17 Apr/11/04 | 1622 | 101 | 21.4878 | 144.0416 | Some people thought that this was a coating. It crumbled. I was wrong. | | | R793-114 |
| 10:23:59 Apr/11/04 | 1616 | 66 | 21.4878 | 144.0415 | We've come upon another mound of sulfur and shrimp. We think is it Ice Cream. | | | |
| 10:25:42 Apr/11/04 | 1615 | 72 | 21.4878 | 144.0415 | Shrimp on Ice Cream before we tried to break through. It turned out to be rock solid. | | | R793-115 |
| 10:25:46 Apr/11/04 | 1615 | 72 | 21.4878 | 144.0414 | We're poking the mound we think is Ice Cream to see if it is hydrothermal. A bubble came out. The material isn't soft. | | | |
| 10:27:28 Apr/11/04 | 1615 | 72 | 21.4878 | 144.0416 | We're moving on to Champagne now. | | | |
| 10:29:21 Apr/11/04 | 1608 | 73 | 21.4876 | 144.0417 | Bingo - saith Craig. | | | R793-116 |
| 10:29:22 Apr/11/04 | 1608 | 72 | 21.4876 | 144.0417 | Venting! We're arrived at Champagne. | | | |
| 10:30:52 Apr/11/04 | 1606 | 74 | 21.4877 | 144.0417 | We'll sample a few of the vents. | | | |
| 10:31:16 Apr/11/04 | 1607 | 68 | 21.4877 | 144.0416 | Putting the corer down by the shrimp trap and are getting ready to sample. | | | |
| 10:32:52 Apr/11/04 | 1605 | 71 | 21.4877 | 144.0416 | Huge Bubbles! | | | |
| 10:33:17 Apr/11/04 | 1605 | 76 | 21.4877 | 144.0417 | Full shrimp trap. It shall now be known as Crab Trap. | | | R793-117 |
| 10:33:20 Apr/11/04 | 1605 | 74 | 21.4877 | 144.0417 | Looks like there are a few crabs in the shrimp trap. | | | |
| 10:35:37 Apr/11/04 | 1606 | 75 | 21.4877 | 144.0417 | Looking for a good sampling site. | | | |
| 10:41:11 Apr/11/04 | 1607 | 81 | 21.4876 | 144.0417 | Temperature measurement of bubbles coming out of a hole. | | | |
| 10:41:56 Apr/11/04 | 1608 | 82 | 21.4877 | 144.0418 | Smaller bubbles are constantly streaming from a hole near a rock. Occasionally we'll see a few big bubbles. Some bubbles look like they are coming out of a tube. Perhaps a hydrate tube. | | | |
| 10:42:06 Apr/11/04 | 1608 | 83 | 21.4876 | 144.0418 | Taking the temperature where large bubbles are evacuating the sea floor. | | | R793-118 |
| 10:45:44 Apr/11/04 | 1607 | 73 | 21.4877 | 144.0418 | The cage is getting thrown back and forth. | | | |
| 10:46:13 Apr/11/04 | 1607 | 72 | 21.4877 | 144.0417 | Near the bubbles the temperature was 3.3 - 3.4C. | | | |
| 10:46:59 Apr/11/04 | 1607 | 73 | 21.4876 | 144.0417 | The current appears to be going uphill. | | | |
| 10:47:47 Apr/11/04 | 1607 | 71 | 21.4877 | 144.0417 | We can only put the probe in the cracks of the rocks. We need to find more sediment type substrate. | | | |
| 10:47:53 Apr/11/04 | 1607 | 73 | 21.4877 | 144.0417 | Some of these large bubbles have a milky/foggy interior. | | | R793-119 |
| 10:49:19 Apr/11/04 | 1607 | 73 | 21.4876 | 144.0417 | The sampler hose is kinked. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 10:49:51 Apr/11/04 | 1607 | 72 | 21.4876 | 144.0418 | The temperature here where the bubbles are coming out is 3.3C. So not very different from ambient. We'll try to measure where bubbles are coming out if we can find a place in the sediment not cracks among the rocks. | | | |
| 10:50:09 Apr/11/04 | 1607 | 73 | 21.4876 | 144.0417 | 3.3 degrees at this bubble site. | | | R793-120 |
| 10:51:44 Apr/11/04 | 1607 | 71 | 21.4877 | 144.0417 | Repositioning the sub to HFS. | | | |
| 10:52:00 Apr/11/04 | 1607 | 69 | 21.4877 | 144.0417 | Temperature probe tubing is rather kinked. This is not ideal. | | | R793-121 |
| 10:54:18 Apr/11/04 | 1607 | 30 | 21.4877 | 144.0417 | Think we've spotted a good rock with a lot of stuff coming out and it is on the end so ROPOS can easily access it. | | | |
| 10:58:03 Apr/11/04 | 1605 | 348 | 21.4876 | 144.0417 | Another smoke out. Moving towards the rock on the west side. | | | |
| 11:01:14 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0417 | Limpets and shrimp. These are the same as the samples that hatched today. | | | R793-122 |
| 11:02:16 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0417 | Limpet egg cases on rock in left frame. | | | R793-123 |
| 11:03:07 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0417 | We're measuring the temperature near the rock with limpets. So far the high temp is 62C. | | | |
| 11:03:52 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0418 | Temperature probe in action at Champagne. | | | R793-124 |
| 11:05:33 Apr/11/04 | 1607 | 63 | 21.4876 | 144.0416 | Trying a hole near by the rock with limpets. High temp so far is 77C. Good enough to take samples. | | | |
| 11:07:09 Apr/11/04 | 1607 | 63 | 21.4876 | 144.0417 | HFS piston-4. Start1=1107 Stop1=1107 Start=1108 Stop2=1116. Tmax=76.6 Tavg=71.9(sd=1.7) T2=18. Vol=~600ml. Z=16067. Limpets; crab and shrimp near probe. [NW Eifuku - Champagne]. | R793-HFS-4-0011 | Butterfield | |
| 11:08:30 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0417 | Crab and shrimp near the probe. | | | R793-125 |
| 11:10:17 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0417 | This frame grab of the crab is in better focus than the last. | | | R793-126 |
| 11:11:44 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0417 | Limpets and egg cases shown with scale. For density estimations. | | | R793-127 |
| 11:17:26 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0416 | GTB-1 (HIL GTB 5). Fired=1118. T=68C. After triggered T2 went up. Z=1607. [NW Eifuku - Yellow Cone]. | R793-GTB-1-0012 | Lupton | |
| 11:19:55 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0418 | HFS piston-5. Start=1120 Stop=1132. Tmax=74.2 Tavg=64.5(sd=4.3) T2=28. Vol=~600ml. Z=1607. [NW Eifuku - Yellow Cone]. | R793-HFS-5-0013 | Butterfield | |
| 11:25:37 Apr/11/04 | 1607 | 63 | 21.4878 | 144.0417 | Limpets for density analysis. | | | R793-128 |
| 11:26:57 Apr/11/04 | 1607 | 63 | 21.4876 | 144.0417 | T is still 17 C with slight fluctuations. | | | |
| 11:28:31 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0418 | Taking frame grabs for limpet abundance estimation. | | | |
| 11:28:52 Apr/11/04 | 1607 | 62 | 21.4878 | 144.0416 | Limpets for density analysis. | | | R793-129 |
| 11:29:43 Apr/11/04 | 1607 | 64 | 21.4876 | 144.0416 | Limpets; density analysis. | | | R793-130 |
| 11:29:51 Apr/11/04 | 1607 | 63 | 21.4876 | 144.0416 | Limpets; density analysis. | | | R793-131 |
| 11:29:59 Apr/11/04 | 1607 | 64 | 21.4876 | 144.0417 | Limpets; density analysis. | | | R793-132 |
| 11:30:04 Apr/11/04 | 1607 | 62 | 21.4876 | 144.0417 | Limpets; density analysis. | | | R793-133 |
| 11:30:13 Apr/11/04 | 1607 | 64 | 21.4876 | 144.0416 | Limpets; density analysis. | | | R793-134 |
| 11:30:54 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0417 | Limpets; density analysis. | | | R793-135 |
| 11:31:04 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0417 | Limpets; density analysis. | | | R793-136 |
| 11:31:12 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0417 | Limpets; density analysis. | | | R793-137 |
| 11:31:17 Apr/11/04 | 1607 | 62 | 21.4877 | 144.0418 | Limpets; density analysis. | | | R793-138 |
| 11:31:31 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0417 | Limpets; density analysis. | | | R793-139 |
| 11:31:49 Apr/11/04 | 1607 | 64 | 21.4876 | 144.0417 | Limpets; density analysis. | | | R793-140 |
| 11:31:58 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0416 | Limpets; density analysis. | | | R793-141 |
| 11:32:14 Apr/11/04 | 1607 | 63 | 21.4876 | 144.0417 | Limpets; density analysis. | | | R793-142 |
| 11:32:48 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0417 | Chasing unidentified crab. Decided not to try suctioning it. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 11:33:03 Apr/11/04 | 1607 | 64 | 21.4876 | 144.0417 | HFS chemistry filter-1. Start=1133 Stop=1139. Tmax=67.8 Tavg=63.4(sd=1.8) T2=25. Vol=619ml. Z=1607. Eh=-114.79. [NW Eifuku - Champagne]. | R793-HFS-1-0014 | Butterfield | |
| 11:41:52 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0416 | Looking around for another spot where bubbles come out. T=4. another spot with bubbles coming out and T=2.8C; T=6C in the sediment; then up to T=18C. | | | |
| 11:43:01 Apr/11/04 | 1607 | 63 | 21.4876 | 144.0418 | The temperature probe was placed rather deep into the sediment. | | | R793-143 |
| 11:47:03 Apr/11/04 | 1607 | 63 | 21.4878 | 144.0417 | Lupton thought this crab was dead. But he was dead wrong. | | | R793-144 |
| 11:48:53 Apr/11/04 | 1607 | 63 | 21.4878 | 144.0417 | Moving downslope to find a white stained low temperature diffuse vent for sampling. | | | |
| 11:52:02 Apr/11/04 | 1613 | 40 | 21.4877 | 144.0415 | We have found the spot. We do not see any bubbles here. There is some diffuse flow. | | | |
| 11:52:24 Apr/11/04 | 1614 | 46 | 21.4877 | 144.0415 | Lupton spotted some shimmering water coming from this white patch. | | | R793-145 |
| 11:53:54 Apr/11/04 | 1615 | 63 | 21.4877 | 144.0416 | We are settling down to sample. | | | |
| 11:54:24 Apr/11/04 | 1615 | 61 | 21.4877 | 144.0416 | Plenty of flow coming from the white chimneys on the left. | | | R793-146 |
| 11:54:58 Apr/11/04 | 1615 | 59 | 21.4878 | 144.0416 | Temperature got up to 35. Eh is -81. There is floc so this would be a good place for a DNA sample. The arm is being bad. Wants to hit the sub. | | | |
| 11:57:34 Apr/11/04 | 1615 | 74 | 21.4877 | 144.0416 | Taking temperature readings from this horizontal chimney orifice. | | | R793-147 |
| 12:03:17 Apr/11/04 | 1615 | 114 | 21.4877 | 144.0416 | We got pulled and are trying to settle down again. | | | |
| 12:04:16 Apr/11/04 | 1615 | 63 | 21.4878 | 144.0415 | Searching for a good place for sampling fluid. | | | R793-148 |
| 12:07:57 Apr/11/04 | 1615 | 71 | 21.4877 | 144.0416 | We looking for the right spot. In one spot T=27-28C; at another spot T=52C; at yet another T=10C. | | | |
| 12:09:16 Apr/11/04 | 1616 | 70 | 21.4877 | 144.0415 | Temperature readings from the diffuse flow. | | | R793-149 |
| 12:15:24 Apr/11/04 | 1616 | 80 | 21.4877 | 144.0416 | Thick sulfur crust with shimmering water rising from the crack. | | | R793-150 |
| 12:16:33 Apr/11/04 | 1615 | 55 | 21.4877 | 144.0415 | We got a better handle on the probe and we are in position again. T=53C. We locked the arm. | | | |
| 12:17:24 Apr/11/04 | 1615 | 50 | 21.4876 | 144.0416 | Filter #3 and temperature reading of 53 degrees. | | | R793-151 |
| 12:17:42 Apr/11/04 | 1615 | 49 | 21.4877 | 144.0415 | HFS Sterivex filter-3. Start=1217 Stop=1231. Tmax=55.3 Tavg=41.4(sd=10). T2=30 Vol=1201ml. Z=1615. Temperature dropped quite a bit and then increased again while sampling. [NW Eifuku - Sulfur Dendrite]. | R793-HFS-3-0015 | Butterfield | |
| 12:21:05 Apr/11/04 | 1615 | 53 | 21.4877 | 144.0416 | GTB-2 (HIL GTB 11). Fired=1221. T1=48 T2=30. Z=1615. [NW Eifuku - Sulfur Dendrite]. | R793-GTB-2-0016 | Lupton | |
| 12:26:46 Apr/11/04 | 1615 | 53 | 21.4878 | 144.0415 | Still taking temperature readings. | | | R793-152 |
| 12:32:17 Apr/11/04 | 1615 | 56 | 21.4877 | 144.0416 | HFS FISH filter-2. Start=1232 Stop=1234. Tmax=54.4 Tavg=53(sd=0.76) T2=34. Vol=301ml. Z=1615. [NW Eifuku - Sulfur Dendrite]. | R793-HFS-2-0017 | Butterfield | |
| 12:34:00 Apr/11/04 | 1615 | 61 | 21.4877 | 144.0416 | The rock is cracking. | | | |
| 12:35:14 Apr/11/04 | 1616 | 65 | 21.4877 | 144.0414 | Checking gauges. | | | |
| 12:36:19 Apr/11/04 | 1615 | 66 | 21.4877 | 144.0415 | This location is now known as Sulfur Dendrite. | | | R793-153 |
| 12:37:00 Apr/11/04 | 1615 | 66 | 21.4878 | 144.0416 | HFS filtered bag-18. Start=1237 Stop=1238. Tmax=54.7 Tavg=54.1(sd=0.2) T2=34. Vol=174ml. Z=1615. [NW Eifuku - Sulfur Dendrite]. | R793-HFS-18-0018 | Butterfield | |
| 12:39:27 Apr/11/04 | 1615 | 67 | 21.4877 | 144.0416 | HFS piston-24. Start=1240 Stop=1251. Tmax=55.7 Tavg=54.7(sd=0.4) T2=32. Vol=~600ml. Z=1615. Clear effluent from the exhaust for most of the time. [NW Eifuku - Sulfur Dendrite]. | R793-HFS-24-0019 | Butterfield | |
| 12:46:38 Apr/11/04 | 1615 | 66 | 21.4878 | 144.0415 | A sulfur crusted slope with several examples of probable sulfur orifices. It looks like the sulfur is molten and has melted down the slope. The entire face is venting fluids ~50C. | | | |
| 12:47:40 Apr/11/04 | 1615 | 66 | 21.4877 | 144.0415 | Cornel has described this in such an eloquent manner. Read the log to see his description. | | | R793-154 |
| 12:49:29 Apr/11/04 | 1615 | 65 | 21.4878 | 144.0415 | A close up of the 'sulfur flow'. | | | R793-155 |
| 12:50:56 Apr/11/04 | 1615 | 65 | 21.4878 | 144.0415 | Occasional floc coming out of the orifice; perhaps subsurface biological activity? | | | |
| 12:52:28 Apr/11/04 | 1615 | 63 | 21.4877 | 144.0416 | While sampling we got pushed forward and we have to reposition. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 12:52:35 Apr/11/04 | 1615 | 64 | 21.4877 | 144.0416 | HFS RNA filter-12. Start=1253 Stop=1255. Start2=0100 Stop2=0108. Tmax=55.4 Tavg=44.5(sd=2.3) T2=31. Vol=1268ml. Z=1615. We were pushed forward during the sampling and got out of the vent. [NW Eifuku - Sulfur Dendrite]. | R793-HFS-12-0020 | Butterfield | |
| 13:00:10 Apr/11/04 | 1616 | 64 | 21.4877 | 144.0415 | We are trying to reposition. | | | |
| 13:05:29 Apr/11/04 | 1616 | 64 | 21.4877 | 144.0414 | Still fluid sampling. | | | R793-156 |
| 13:09:10 Apr/11/04 | 1616 | 63 | 21.4877 | 144.0414 | We are done fluid sampling and we are going on to find an altered rock. | | | |
| 13:10:30 Apr/11/04 | 1615 | 60 | 21.4877 | 144.0415 | We are going back to Champagne to get the rock after stowing the HFS wand. | | | |
| 13:12:00 Apr/11/04 | 1613 | 69 | 21.4876 | 144.0415 | Holstering probe for fluid sampler. Proceeding upslope to Champagne site to collect rock sample. | | | |
| 13:12:41 Apr/11/04 | 1608 | 65 | 21.4877 | 144.0415 | In transit to Champagne to search for hydrothermally altered rock sample. | | | R793-157 |
| 13:14:23 Apr/11/04 | 1606 | 70 | 21.4877 | 144.0415 | Approaching lower reaches of Champagne white smoker field. | | | |
| 13:14:53 Apr/11/04 | 1607 | 70 | 21.4877 | 144.0416 | Arriving at Champagne for altered rock sampling. | | | R793-158 |
| 13:17:01 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0415 | Attempting to pull bottom off of this rock. | | | R793-159 |
| 13:19:24 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0416 | Sampling at the same place as the HFS at Champagne. The rock is very bleached on the outside and it breaks off. It is not fresh rock inside. | | | |
| 13:19:49 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0415 | When basaltic material gets altered it becomes bluish grayish. | | | |
| 13:20:40 Apr/11/04 | 1607 | 66 | 21.4877 | 144.0415 | Thought about this one but decided it was too fresh. | | | R793-160 |
| 13:24:03 Apr/11/04 | 1607 | 66 | 21.4877 | 144.0416 | Believed to be fairly altered; it was collected and placed in the purse. | | | R793-161 |
| 13:25:49 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0416 | We are looking around picking up rocks and checking them out to find the right one. | | | |
| 13:26:22 Apr/11/04 | 1607 | 64 | 21.4877 | 144.0415 | Rock sample near HFS site - ~10+ cm. Fairly angular with sufficient covering of sulfur. Some degree of alteration. At lower (western margin) slope of Champagne. In purse. Z=1607. [NW Eifuku - Champagne]. | R793-RK-0021 | SROF geo team (De Ronde) | |
| 13:31:14 Apr/11/04 | 1603 | 40 | 21.4877 | 144.0416 | Placing the hopefully altered rock into the purse. | | | R793-162 |
| 13:32:22 Apr/11/04 | 1597 | 40 | 21.4877 | 144.0416 | Looking further for more altered rocks. | | | |
| 13:34:04 Apr/11/04 | 1599 | 97 | 21.4877 | 144.0415 | We are repositioning at Champagne to obtain a second rock. We will stay around the margin to stay clear of the smoke. | | | |
| 13:36:41 Apr/11/04 | 1607 | 65 | 21.4877 | 144.0415 | A blanket of a few cm of sulfur over the active hydrothermal zone. | | | R793-163 |
| 13:36:48 Apr/11/04 | 1607 | 63 | 21.4877 | 144.0415 | Striking for second rock. Has to be fast. | | | |
| 13:37:15 Apr/11/04 | 1607 | 46 | 21.4877 | 144.0415 | Rock sample ~12 cm across. More circular; relatively fresh; mostly surficial alteration. In purse. Z=1607. [NW Eifuku - Champagne]. | R793-RK-0022 | SROF geo team (De Ronde) | |
| 13:37:23 Apr/11/04 | 1607 | 33 | 21.4877 | 144.0415 | Probably rather fresh but it was collected anyway. | | | R793-164 |
| 13:40:34 Apr/11/04 | 1608 | 26 | 21.4877 | 144.0415 | Second rock sample going into the purse. | | | R793-165 |
| 13:42:04 Apr/11/04 | 1608 | 24 | 21.4876 | 144.0416 | We are finished at Champagne for now and will move up to Cliff House. | | | |
| 13:45:52 Apr/11/04 | 1579 | 81 | 21.4877 | 144.0416 | Rising through the clouds to Cliff House. | | | R793-166 |
| 13:48:13 Apr/11/04 | 1573 | 91 | 21.4878 | 144.0417 | We are at Cliff House. We will take some water samples. Scattered mussels (mostly small) on the face. | | | |
| 13:50:22 Apr/11/04 | 1572 | 125 | 21.4878 | 144.0416 | Mussels and venting at Cliff House. | | | R793-167 |
| 13:52:35 Apr/11/04 | 1574 | 153 | 21.4877 | 144.0417 | We are getting in position to sample fluids. It is a very large crack; the contact between two lava flows. A few bubbles coming out. | | | |
| 13:53:05 Apr/11/04 | 1574 | 150 | 21.4878 | 144.0417 | HFS piston-23. Start=14:05 Stop=1417. Tmax=69.7 Tavg=69.0(sd=0.26) T2=48. Vol=~600ml Z=1574. [NW Eifuku - Cliff House]. | R793-HFS-23-0023 | Butterfield | |
| 13:58:55 Apr/11/04 | 1574 | 182 | 21.4877 | 144.0418 | We are seeing strong flows at the spot we may sample. T up to 69.9C. We have found the spot. | | | |
| 14:04:40 Apr/11/04 | 1574 | 183 | 21.4877 | 144.0418 | Fluid sampling site at Cliff House. | | | R793-168 |
| 14:11:15 Apr/11/04 | 1574 | 185 | 21.4877 | 144.0418 | Firing GTB-3 (HIL GTB 7). Fired at 1414. Temperature at firing was 69C. T2=48. Z=1574. [NW Eifuku - Cliff House]. | R793-GTB-3-0024 | Lupton | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 14:19:24 Apr/11/04 | 1574 | 183 | 21.4877 | 144.0418 | HFS filtered piston-20. Start=1420 Stop=1428. Tmax=69.4 Tavg=68.8(sd=0.2) T2=48. Vol=800ml. Z=1574. Outflow from the sampler is coming out clear. Piston filled completely to the end of the bottle. [NW Eifuku - Cliff House]. | R793-HFS-20-0025 | Butterfield | |
| 14:21:01 Apr/11/04 | 1574 | 185 | 21.4878 | 144.0417 | Firing GTB-4 (HIL GTB 2). Fired at 1421. Something is wrong. It was already triggered when we fired it. There is an unknown sample in GTB-4. [NW Eifuku - Cliff House]. | R793-GTB-4-0026 | Lupton | |
| 14:29:35 Apr/11/04 | 1574 | 185 | 21.4878 | 144.0417 | HFS chemistry filter-15. Start=1429 Stop=1434. Tmax=69.5 Tavg=69.0(sd=0.2) T2=48. Vol=650ml. Z=1574. [NW Eifuku - Cliff House]. | R793-HFS-15-0027 | Butterfield | |
| 14:34:44 Apr/11/04 | 1574 | 185 | 21.4878 | 144.0416 | HFS RNA filter-10. Start=1435 Stop=1444. Tmax=69.4 Tavg=68.9(sd=0.2) T2=48. Vol=1143ml. Z=1574. [NW Eifuku - Cliff House]. | R793-HFS-10-0028 | Butterfield | |
| 14:45:49 Apr/11/04 | 1574 | 184 | 21.4878 | 144.0418 | HFS FISH filter-7. Start=1446 Stop=1448. Tmax=69.4 Tavg=69.0(sd=0.2) T2=48. Vol=310ml. Z=1574. [NW Eifuku - Cliff House]. | R793-HFS-7-0029 | Butterfield | |
| 14:48:47 Apr/11/04 | 1574 | 185 | 21.4877 | 144.0417 | HFS Sterivex DNA filter-13. Start=1449 Stop=1503. Tmax=69.6 Tavg=69.0(sd=0.2) T2=48. Vol=1753ml. Z=1574.[NW Eifuku - Cliff House]. | R793-HFS-13-0030 | Butterfield | |
| 15:04:33 Apr/11/04 | 1574 | 185 | 21.4877 | 144.0417 | Done fluid sampling at Cliff House. Going to get a rock sample here now. | | | |
| 15:07:07 Apr/11/04 | 1574 | 185 | 21.4877 | 144.0417 | Fluid sampler intake is back in the holster. | | | |
| 15:08:28 Apr/11/04 | 1574 | 185 | 21.4877 | 144.0418 | Grabbing a rock sample looking for altered material. | | de Ronde | R793-169 |
| 15:09:15 Apr/11/04 | 1574 | 183 | 21.4878 | 144.0417 | Tried to pick up a piece right where we were fluid sampling but the material is too soft. Looking around for a nice hydrothermally altered piece. | | | |
| 15:13:26 Apr/11/04 | 1574 | 183 | 21.4877 | 144.0417 | We have a sample that is probably a piece of massive sulfur. | | | |
| 15:13:30 Apr/11/04 | 1574 | 185 | 21.4877 | 144.0417 | Small piece of rock - which is most likely all sulfur. | | de Ronde | R793-170 |
| 15:14:06 Apr/11/04 | 1574 | 185 | 21.4879 | 144.0417 | There is a contact area below. | | | |
| 15:14:20 Apr/11/04 | 1574 | 183 | 21.4879 | 144.0417 | Rock - about 3-4cm across and likely massive sulfur. Into purse. Maybe not sulfur but a piece of hydrothermally altered rock with some sulfur coating it. Taken immediately (0.5meter) upslope from fluid sampling site. [NW Eifuku - Cliff House]. | R793-RK-0031 | SROF geo team (De Ronde) | |
| 15:15:11 Apr/11/04 | 1574 | 182 | 21.4878 | 144.0417 | Pacman opening purse. | | | R793-171 |
| 15:19:02 Apr/11/04 | 1574 | 183 | 21.4877 | 144.0417 | Done sampling at this site. Going to record some highlights of this site as we pull away. | | | |
| 15:21:25 Apr/11/04 | 1574 | 167 | 21.4878 | 144.0417 | There is a crack a bit to the left of where we just fluid sampled that is spewing quite a bit of flocculent material. | | | |
| 15:26:15 Apr/11/04 | 1573 | 104 | 21.4877 | 144.0417 | Looking up close at some dark specs on a venting sulf ur deposit. Trying to determine if they are animals. | | | |
| 15:26:35 Apr/11/04 | 1573 | 99 | 21.4877 | 144.0417 | Checking out the sulfur deposit in the bottom of the screen. Trying to figure out what the black dots are on the surface. | | | R793-172 |
| 15:27:32 Apr/11/04 | 1573 | 84 | 21.4877 | 144.0418 | Snail and limpets? And little bitty chimneys. | | | R793-173 |
| 15:28:02 Apr/11/04 | 1573 | 84 | 21.4878 | 144.0417 | This looks like a sulfur patch that is covered with snails and has a couple limpets and scale worms. It appears to have little sulfur chimneys on top. | | | |
| 15:28:42 Apr/11/04 | 1573 | 85 | 21.4878 | 144.0417 | Sulfur structure with tiny nozzles on the top. | | | R793-174 |
| 15:30:18 Apr/11/04 | 1573 | 85 | 21.4878 | 144.0417 | Dancing shrimp among the sulfur chimneys. | | | R793-175 |
| 15:31:18 Apr/11/04 | 1573 | 86 | 21.4878 | 144.0417 | Odd coloring but the lasers are there for scale. | | | R793-176 |
| 15:31:56 Apr/11/04 | 1573 | 84 | 21.4878 | 144.0418 | We are going to try to grab some of this sulfur chimney mound with the pacman and put it in the purse. | | | |
| 15:32:38 Apr/11/04 | 1573 | 84 | 21.4878 | 144.0415 | Another picture of the sulfur forest. | | | R793-177 |
| 15:37:32 Apr/11/04 | 1573 | 128 | 21.4877 | 144.0418 | Bottom of the sulfur structure. | | | R793-178 |
| 15:38:18 Apr/11/04 | 1573 | 129 | 21.4877 | 144.0417 | We have repositioned around this sulfur mound with the small chimneys that appear to be where molten sulfur has bubbled up. It is covered in snails. Slope around is covered in bacterial mat. Chimneys look really fragile. | | | |
| 15:38:31 Apr/11/04 | 1573 | 128 | 21.4877 | 144.0417 | Sulfur finger with shimmering water all around. | | | R793-179 |
| 15:41:00 Apr/11/04 | 1573 | 107 | 21.4877 | 144.0417 | Moving down slope a bit so we don't damage the spicules when we reach out with the pac-man. | | | |
| 15:41:41 Apr/11/04 | 1573 | 110 | 21.4878 | 144.0416 | Can see a little bit of shimmer coming out of one of the spicules. Fluid actually seems to be sinking rather than rising. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 15:43:11 Apr/11/04 | 1573 | 111 | 21.4877 | 144.0416 | Current may actually be coming towards us so fluid is probably not sinking but it still looks unusual. | | | |
| 15:44:26 Apr/11/04 | 1573 | 110 | 21.4877 | 144.0417 | We may try to take a sample of this fluid since it looks like it is mixing quite differently from the typical warm fluids. | | | |
| 15:45:47 Apr/11/04 | 1573 | 113 | 21.4877 | 144.0417 | Looks like the flow is coming out more laminar than the typical turbulent flow. | | | |
| 15:47:39 Apr/11/04 | 1573 | 110 | 21.4877 | 144.0416 | Taking out the fluid sampler intake to measure the temperature. | | | |
| 15:51:15 Apr/11/04 | 1573 | 108 | 21.4877 | 144.0417 | Little chimneys are really tiny and we are having difficulty positioning the intake in the low flow. No temperature anomaly so far. | | | |
| 15:55:29 Apr/11/04 | 1573 | 110 | 21.4877 | 144.0416 | Still trying to position the fluid sampler intake. Still no temperature anomaly. | | | |
| 15:55:32 Apr/11/04 | 1573 | 109 | 21.4877 | 144.0416 | Striving to sample the sulfur saplings. | | | R793-180 |
| 15:57:27 Apr/11/04 | 1573 | 110 | 21.4877 | 144.0417 | Small temperature anomaly. Getting 3.2 degrees. Ambient is about 1.9 degrees. | | | |
| 15:57:35 Apr/11/04 | 1573 | 112 | 21.4877 | 144.0417 | The actual sampling position. | | | R793-181 |
| 15:58:57 Apr/11/04 | 1573 | 111 | 21.4877 | 144.0417 | HFS filtered bag-16. Start=1559 Stop=1602. Tmax=3.7 Tavg=3.3 T2=4.6??. Vol=500ml. Z=1573. Tbackground=2.0. There may be something wrong with the intake. T2 should not be higher than T1. [NW Eifuku - Sulfur Spicules]. | R793-HFS-16-0032 | Butterfield | |
| 16:05:40 Apr/11/04 | 1572 | 124 | 21.4877 | 144.0416 | Had to lift up because we were sitting on the HFS hose. | | | |
| 16:06:31 Apr/11/04 | 1570 | 100 | 21.4877 | 144.0416 | Stowing fluid sampler intake. | | | |
| 16:09:42 Apr/11/04 | 1573 | 116 | 21.4877 | 144.0417 | Back down and ready to take a pac-man of the snail covered sulfur spicules. | | | |
| 16:10:53 Apr/11/04 | 1573 | 115 | 21.4877 | 144.0416 | Pac-man sample of sulfur spicule material covered in snails. Into the purse. Z=1573. [NW Eifuku - Sulfur Spicules]. | R793-Bio/Geo-0033 | Tunnicliffe/De Ronde | |
| 16:17:22 Apr/11/04 | 1567 | 122 | 21.4877 | 144.0416 | Going back to the cage to check the tether then it's off to Imagenex!! Whoo hoo! | | | |
| 16:20:25 Apr/11/04 | 1525 | 336 | 21.4878 | 144.0417 | Doing tether management. Tether is wrapped around the cage cable and twisted. | | | |
| 16:22:31 Apr/11/04 | 1530 | 280 | 21.4878 | 144.0416 | Kinked tether. | | | R793-182 |
| 16:27:53 Apr/11/04 | 1526 | 105 | 21.4878 | 144.0416 | Still unwrapping the tether. | | | |
| 16:37:39 Apr/11/04 | 1530 | 208 | 21.4881 | 144.0416 | Had a problem with a twisted tether so spent some time untangling it. Now off to start the Imagenex survey. | | | |
| 16:54:52 Apr/11/04 | 1632 | 195 | 21.4884 | 144.0400 | Still transiting to the start of the first Imagenex line. | | | |
| 16:56:07 Apr/11/04 | 1634 | 168 | 21.4885 | 144.0403 | Imagenex is not getting data. May have lost telemetry. | | | |
| 16:58:58 Apr/11/04 | 1636 | 198 | 21.4880 | 144.0399 | Imagenex working again. | | | |
| 16:59:15 Apr/11/04 | 1636 | 213 | 21.4880 | 144.0401 | Plankton tow during Imagenex survey. Moving at 0.5 knot and 30 meters off the bottom. Open at 1659. Closed at 2027. Depth range 1538m-1710m. Depth range 1538m-1710m. [NW Eifuku]. | R793-net-P-0034 | Metaxas | |
| 16:59:54 Apr/11/04 | 1641 | 144 | 21.4880 | 144.0400 | Starting Imagenex line 1 heading to the SE. | | | |
| 17:02:22 Apr/11/04 | 1642 | 143 | 21.4879 | 144.0398 | Plankton tow during Imagenex survey. Moving at 0.5 knot and 30 meters off the bottom. Open at 1659. Closed at 2027. Depth range 1538m-1710m. (Summit and NW venting area). [NW Eifuku - Sulfur Spicules]. | R793-net-S-0035 | Metaxas | |
| 17:40:40 Apr/11/04 | 1632 | 64 | 21.4854 | 144.0421 | End of line 1. Turning north. | | | |
| 17:42:31 Apr/11/04 | 1608 | 325 | 21.4857 | 144.0425 | Start of line 2 heading NW. | | | |
| 18:02:33 Apr/11/04 | 1618 | 325 | 21.4882 | 144.0404 | End of line 2. Turning north. | | | |
| 18:05:52 Apr/11/04 | 1613 | 136 | 21.4885 | 144.0405 | Starting line 3 heading SE. | | | |
| 18:38:57 Apr/11/04 | 1582 | 139 | 21.4861 | 144.0427 | End of line 3. Turning north. | | | |
| 18:43:30 Apr/11/04 | 1568 | 320 | 21.4863 | 144.0430 | Start of line 4 heading NW. | | | |
| 19:08:23 Apr/11/04 | 1615 | 323 | 21.4889 | 144.0409 | End of line 4. Turning north. | | | |
| 19:11:42 Apr/11/04 | 1645 | 111 | 21.4891 | 144.0412 | Starting line 5 heading SE. | | | |
| 19:34:59 Apr/11/04 | 1571 | 134 | 21.4867 | 144.0435 | End of line 5. Heading north. | | | |
| 19:38:58 Apr/11/04 | 1604 | 338 | 21.4871 | 144.0438 | Start of line 6 heading to the NW. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 20:03:53 Apr/11/04 | 1680 | 321 | 21.4894 | 144.0417 | End of line 6. Heading north. | | | |
| 20:06:59 Apr/11/04 | 1710 | 141 | 21.4897 | 144.0420 | Starting line 7 heading to the SW. | | | |
| 20:27:17 Apr/11/04 | 1614 | 142 | 21.4872 | 144.0442 | End of line 7 and done with Imagenex survey. | | | |
| 20:30:16 Apr/11/04 | 1598 | 307 | 21.4871 | 144.0442 | Heading to Champagne to get the shrimp trap and a chimney sample. | | | |
| 20:33:42 Apr/11/04 | 1577 | 279 | 21.4872 | 144.0435 | Transiting back to Champagne Chimney site. | | | |
| 20:48:59 Apr/11/04 | 1553 | 47 | 21.4875 | 144.0418 | Turing archive video on. | | | |
| 20:50:39 Apr/11/04 | 1577 | 69 | 21.4874 | 144.0417 | Back on bottom nearly at Champagne site. We will recover the shrimp trap first. | | | |
| 20:57:10 Apr/11/04 | 1617 | 13 | 21.4875 | 144.0414 | We are back at Champagne vents and see the shrimp trap. | | | |
| 20:57:14 Apr/11/04 | 1603 | 13 | 21.4875 | 144.0414 | Shrimp Trap off in the distance. | | | R793-183 |
| 20:58:48 Apr/11/04 | 1605 | 45 | 21.4876 | 144.0413 | Shrimp Trap and Core Tube ready for recovery. | | | R793-184 |
| 20:59:58 Apr/11/04 | 1606 | 58 | 21.4876 | 144.0413 | Shrimp trap recovered. Lots of animals in it. Into the purse. [NW Eifuku - Champagne]. | R793-bio-0036 | Tunnicliffe | |
| 21:01:00 Apr/11/04 | 1606 | 63 | 21.4877 | 144.0415 | Full house in the Shrimp Trap. | | | R793-185 |
| 21:04:21 Apr/11/04 | 1606 | 64 | 21.4876 | 144.0414 | Shrimp Trap into the purse. | | | R793-186 |
| 21:16:11 Apr/11/04 | 1612 | 64 | 21.4876 | 144.0412 | Picking up core tube to use later; but will try to suction crabs first. | | | |
| 21:19:18 Apr/11/04 | 1604 | 122 | 21.4877 | 144.0414 | Back on bottom (after closing purse) to retrieve the push-corer for the bubble samples. | | | R793-187 |
| 21:23:19 Apr/11/04 | 1605 | 70 | 21.4876 | 144.0413 | The push corer has been retrieved. | | | R793-188 |
| 21:34:22 Apr/11/04 | 1607 | 69 | 21.4877 | 144.0413 | NW corner of Champagne vent site to collect different type of crab with bigger claws then the one previously collected. | | | |
| 21:44:02 Apr/11/04 | 1606 | 49 | 21.4876 | 144.0412 | The crab that Verena would like to sample. | | | R793-189 |
| 21:44:13 Apr/11/04 | 1606 | 47 | 21.4877 | 144.0413 | The crabs have been found. Several frame grabs were taken. | | | |
| 21:44:38 Apr/11/04 | 1606 | 48 | 21.4877 | 144.0413 | Shrimp and a crab in the background. | | | R793-190 |
| 21:46:26 Apr/11/04 | 1606 | 57 | 21.4877 | 144.0414 | The elusive crab is under the rock. | | | R793-191 |
| 21:47:36 Apr/11/04 | 1606 | 58 | 21.4877 | 144.0414 | Scale worm to the left. Crab in the center of the frame. | | | R793-192 |
| 21:49:42 Apr/11/04 | 1606 | 58 | 21.4877 | 144.0413 | Just about to suction a crab into the flush-jar. | | | R793-193 |
| 21:49:53 Apr/11/04 | 1606 | 58 | 21.4877 | 144.0413 | Suctioned one large-clawed crab into jar 8. Z=1606. [NW Eifuku - Champagne]. | R793-SS-J8-0037 | Tunnicliffe | |
| 21:53:16 Apr/11/04 | 1606 | 59 | 21.4877 | 144.0413 | Looking for a site to collect bubbles and just found one. Highlights are on. | | | |
| 21:54:11 Apr/11/04 | 1606 | 69 | 21.4878 | 144.0413 | Preparing to sample bubbles. | | | R793-194 |
| 21:56:25 Apr/11/04 | 1606 | 79 | 21.4875 | 144.0412 | Highlights turned off. | | | |
| 22:04:19 Apr/11/04 | 1607 | 78 | 21.4877 | 144.0413 | Purse management. | | | R793-195 |
| 22:04:37 Apr/11/04 | 1607 | 78 | 21.4876 | 144.0413 | Attempting to secure the purse and preparing for bubble sampling. | | | |
| 22:06:19 Apr/11/04 | 1607 | 76 | 21.4876 | 144.0413 | We will describe and video the collection and evolution of the bubbles with change in pressure; but a sample will not be returned to the ship. | | | |
| 22:07:43 Apr/11/04 | 1607 | 74 | 21.4877 | 144.0413 | Highlights turned on. Liquid carbon dioxide in the water. Stream of bubbles entering the tube and accumulating at the top. | | | |
| 22:11:00 Apr/11/04 | 1607 | 83 | 21.4876 | 144.0413 | Bubbles continuing to enter the tube and several centimeters have accumulated at the top. Bubbles form an inverted tower rather than filling the entire core space. | | | |
| 22:12:24 Apr/11/04 | 1607 | 85 | 21.4877 | 144.0413 | Collecting bubbles. Bubbles visible in upper end of tube. | | | R793-196 |
| 22:14:06 Apr/11/04 | 1607 | 85 | 21.4877 | 144.0414 | Now have 5+ centimeter bubble tower in the tube. Now smoke has moved into the sample site and it is difficult to see. The tower collapsed when the tube was moved to a vertical position. | | | |
| 22:15:32 Apr/11/04 | 1607 | 83 | 21.4877 | 144.0414 | Collection of bubbles near top of tube. | | | R793-197 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
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| 22:17:10 Apr/11/04 | 1607 | 83 | 21.4878 | 144.0414 | Highlights turned off. Continue to collect bubbles. Now only 2-3 cm of bubbles evenly distributed at top of tube. | | | |
| 22:24:38 Apr/11/04 | 1607 | 85 | 21.4877 | 144.0413 | Continuing to collect bubbles by gently disturbing the seafloor to allow bubbles to escape. Stopped collecting bubbles. Will now collect a chimney with pacman. | | | |
| 22:28:12 Apr/11/04 | 1608 | 80 | 21.4876 | 144.0412 | Looking for a chimney to grab with Pac-Man. | | | R793-198 |
| 22:28:52 Apr/11/04 | 1607 | 55 | 21.4876 | 144.0414 | Chimneys in view and will try to collect one about 30-40 cm high. Lots of smoke and will need to wait until it clears. | | | |
| 22:31:17 Apr/11/04 | 1606 | 308 | 21.4876 | 144.0413 | Time code on highlight tape decks was about 5 min. slow and just updated the clocks. | | | |
| 22:32:15 Apr/11/04 | 1607 | 32 | 21.4876 | 144.0414 | Lots of venting coming out of the talus in front of and at the base of the chimneys. Bubbles and smoke are abundant. | | | |
| 22:33:28 Apr/11/04 | 1607 | 47 | 21.4876 | 144.0414 | Possible chimney to sample with the Pacman. | | de Ronde | R793-199 |
| 22:34:09 Apr/11/04 | 1607 | 36 | 21.4876 | 144.0413 | Highlights turned on. Chimney to be sampled is in sight and got frame grab and digital photos. Much of the chimney looks to be sulfur. | | | |
| 22:35:03 Apr/11/04 | 1607 | 31 | 21.4876 | 144.0412 | Close up view of chimney to be sampled. | | de Ronde | R793-200 |
| 22:35:10 Apr/11/04 | 1607 | 29 | 21.4876 | 144.0412 | Chimney seems to be largely made up of sulphur. | | de Ronde | R793-201 |
| 22:37:07 Apr/11/04 | 1606 | 41 | 21.4876 | 144.0413 | Lots of smoke and waiting for it to clear as we position ROPOS to sample with pacman. The smoke is smoky-gray with occasional yellow tinge. | | | |
| 22:37:43 Apr/11/04 | 1607 | 40 | 21.4876 | 144.0413 | About to sample the chimney with the Pac-man. | | de Ronde | R793-202 |
| 22:40:35 Apr/11/04 | 1607 | 47 | 21.4876 | 144.0413 | The chimney vent is several centimeters in diameter and appears to have a thin black stain on the inside surface. Highlights off. | | | |
| 22:44:02 Apr/11/04 | 1607 | 47 | 21.4877 | 144.0414 | The site will not clear enough to sample; so we will wait until it does. | | | |
| 22:47:33 Apr/11/04 | 1607 | 46 | 21.4876 | 144.0413 | Smoke cleared just briefly and went in with a pacman chomp. Appears to have chomped the top off as much more vigorous smoke is venting now. The top is gone from the chimney. | | | |
| 22:49:14 Apr/11/04 | 1607 | 46 | 21.4876 | 144.0412 | Top of the chimney is gone. Hopefully it has been sampled correctly. Collected top of a chimney using Pacman sampler. CHIMNEY WAS NOT THERE WHEN WE GOT TO SURFACE! NO SAMPLE. | | | R793-203 |
| 22:50:54 Apr/11/04 | 1606 | 38 | 21.4876 | 144.0413 | Highlights are turned off. | | | |
| 22:51:52 Apr/11/04 | 1600 | 68 | 21.4875 | 144.0413 | Off bottom and watching bubbles in the tube. | | | |
| 22:52:14 Apr/11/04 | 1598 | 81 | 21.4877 | 144.0414 | Bubbles inside of core tube. They seem to be converting to the clathrate. | | | R793-204 |
| 22:52:44 Apr/11/04 | 1594 | 5 | 21.4877 | 144.0414 | Bubbles in tube are not as distinct and may be converting to clathrate. | | | |
| 22:56:25 Apr/11/04 | 1536 | 261 | 21.4876 | 144.0410 | Cage in sight and coming up. Bubbles have formed clathrate. | | | |
| 23:17:37 Apr/11/04 | 940 | 42 | 21.4874 | 144.0407 | Z=961. We're watching the liquid CO2 - awaiting phase transition. | | | R793-205 |
| 23:22:00 Apr/11/04 | 822 | 31 | 21.4874 | 144.0408 | Back lighting of carbon dioxide in tube at 807 m water depth. | | | R793-206 |
| 23:23:26 Apr/11/04 | 786 | 78 | 21.4876 | 144.0407 | Highlights turned on at 775 m water depth. | | | |
| 23:28:21 Apr/11/04 | 663 | 140 | 21.4877 | 144.0407 | Bubbles of liquid CO2 present. Can't tell if we're seeing clathrate or the plastic being attacked by the liquid CO2. Little splotches on plastic lower down are where bubbles of liquid CO2 reacted with the plastic. | | | |
| 23:28:41 Apr/11/04 | 655 | 141 | 21.4877 | 144.0408 | Liquid CO2 is at 655 meters. | | | R793-207 |
| 23:31:01 Apr/11/04 | 598 | 151 | 21.4876 | 144.0407 | Seeing little flecks of white material falling off the clump and down the tube. | | | |
| 23:32:07 Apr/11/04 | 572 | 130 | 21.4875 | 144.0408 | Flecks of white material are falling off the clump. Z=570. | | | |
| 23:32:44 Apr/11/04 | 557 | 119 | 21.4875 | 144.0407 | Some flecks of white material are falling off the glob and sinking. | | | R793-208 |
| 23:32:52 Apr/11/04 | 554 | 118 | 21.4875 | 144.0407 | Something is starting to happen. More of the white flecks are falling off the clump. | | | |
| 23:33:35 Apr/11/04 | 538 | 108 | 21.4875 | 144.0408 | Now we're seeing some gas bubbles. Gas bubbles are starting to appear. A squat lobster just fell off the arm. | | | |
| 23:33:37 Apr/11/04 | 537 | 106 | 21.4875 | 144.0408 | Some gas bubble movement occurred at 536 meters. | | | R793-209 |
| 23:34:46 Apr/11/04 | 508 | 92 | 21.4874 | 144.0408 | We can see an interface line appearing at the top of the chamber. Z=496. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R793 Comments: NW Eifuku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 23:36:56 Apr/11/04 | 451 | 156 | 21.4876 | 144.0409 | A phase line is visible | | | R793-210 |
| 23:37:50 Apr/11/04 | 427 | 168 | 21.4876 | 144.0409 | Clathrate or liquid CO2 turning into gaseous CO2. | | | |
| 23:38:41 Apr/11/04 | 407 | 167 | 21.4876 | 144.0409 | There appears to be 2 lines between phases. | | | R793-211 |
| 23:38:43 Apr/11/04 | 406 | 169 | 21.4876 | 144.0409 | 2 lines of phase. Gaseous CO2; liquid CO2; Seawater at bottom. | | | |
| 23:40:02 Apr/11/04 | 377 | 154 | 21.4876 | 144.0409 | The lower phase line is descending. | | | R793-212 |
| 23:40:40 Apr/11/04 | 361 | 153 | 21.4876 | 144.0409 | 3 phase lines were observed. | | | R793-213 |
| 23:40:54 Apr/11/04 | 355 | 153 | 21.4876 | 144.0409 | Gas on top; cloudy liquid layer; seawater on the bottom. | | | |
| 23:41:14 Apr/11/04 | 347 | 152 | 21.4875 | 144.0409 | Lots of gas coming out of the horizontal tube. The gas layer is moving down the tube. Middle layer is getting cloudier. The bubbles are coming out of the top (CO2 gas). | | | |
| 23:41:18 Apr/11/04 | 345 | 154 | 21.4876 | 144.0409 | Bubbles are coming out of the top of the core device. | | | R793-214 |
| 23:42:33 Apr/11/04 | 317 | 160 | 21.4876 | 144.0409 | Liquid CO2 shouldn't be stable at this depth. Conversion to gaseous CO2 is almost complete now. Z=311. The thin layer is almost gone. | | | |
| 23:42:36 Apr/11/04 | 316 | 161 | 21.4876 | 144.0409 | Conversion to gaseous CO2 is almost complete. | | | R793-215 |
| 23:43:35 Apr/11/04 | 310 | 182 | 21.4876 | 144.0410 | The wall of the core liner has been attacked by liquid CO2. | | | R793-216 |
| 23:43:49 Apr/11/04 | 310 | 182 | 21.4876 | 144.0410 | Gas bubbles still leaking out of the top of the push core. There's also H2S; He; methane coming out. Looks like liquid CO2 layer gone now. Now just gas sitting on top of seawater at 290m. | | | |
| 23:44:21 Apr/11/04 | 297 | 182 | 21.4876 | 144.0410 | The liquid CO2 layer appears to be completely gone. | | | R793-217 |
| 23:45:59 Apr/11/04 | 262 | 201 | 21.4876 | 144.0410 | The gas level is losing ground to the leaks in the lid. | | | R793-218 |
| 23:47:14 Apr/11/04 | 230 | 206 | 21.4876 | 144.0411 | Clear interface between the water and gas bubbles now. Bubbles still escaping the top of the cylinder. | | | |
| 23:47:40 Apr/11/04 | 220 | 216 | 21.4876 | 144.0411 | Seawater is winning the race. | | | R793-219 |
| 23:49:23 Apr/11/04 | 182 | 223 | 21.4876 | 144.0410 | Nearly all the headspace is depleted. | | | R793-220 |
| 23:49:52 Apr/11/04 | 170 | 218 | 21.4876 | 144.0411 | Bubbles are gone now. That's it at 170m. | | | |
| 23:50:15 Apr/11/04 | 161 | 215 | 21.4877 | 144.0411 | The bubble flow from the lid has stopped. | | | R793-221 |
| 23:53:24 Apr/11/04 | 106 | 210 | 21.4875 | 144.0411 | We're looking at GTB-4 right now. It looks fine. | | | |
| 00:01:42 Apr/12/04 | 57 | 111 | 21.4874 | 144.0411 | ROPOS is safe and sound in the cage. Heading to the surface. | | | |
| 00:04:49 Apr/12/04 | 36 | 68 | 21.4874 | 144.0410 | HFS sampler: Bubbles are leaking out of the sampler. They should be continuing to bubble out. | | | |
| 00:05:01 Apr/12/04 | 36 | 79 | 21.4874 | 144.0410 | HFS releasing bubbles near surface. | | | R793-222 |
| 00:05:06 Apr/12/04 | 35 | 81 | 21.4874 | 144.0410 | HFS releasing bubbles near the surface. | | | R793-223 |
| 00:06:52 Apr/12/04 | 3 | 359 | 21.4874 | 144.0410 | ROPOS at surface. Still blasting out bubbles on HFS. | | | |
| 00:09:59 Apr/12/04 | 3 | 30 | 21.4874 | 144.0410 | ROPOS on deck at 0009. | | | |

# 8.13 R794 Dive Log: Kasuga-2

| **R794: Kasuga-2** |
|---|
| wet time (UTC): 4/12 1042 - 4/13 0132. JD 103 - 104. 14.83 hrs. |
| bottom time (UTC): 4/12 1136 - 4/13 0038. 13.03 hrs. [16 samples] |
| **R794 DSC information:** There were 202 original DSCs taken and 182 final ones were kept starting with R794_DSC_041204_141300_01923.jpg and ending with R794_DSC_041304_002051_02124.jpg |
| Exploratory dive to Kasuga-2. Lots of searching for hydrothermal activity. Found a bit of diffuse flow. Cage took a tumble on the edge of the volcano. **Caldera area**: 2 rocks. **Near summit**: 1 suction (sediment and crust). **Barnacle Boulders**: 2 suctions (fauna and sediments). **Mat Ridge**: 3 suctions (tubeworms, sponges, bacterial mat). **Cracked**: 1 bio/geo (barnacles on rock), 5 HFS, 2 gas tights. Incredible abundance of flatfish (not sampled). |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 10:41:54 Apr/12/04 | 1 | 3 | 21.4874 | 144.0410 | ROPOS in water. | | | |
| 11:23:11 Apr/12/04 | 625 | 245 | 21.6064 | 143.6462 | Large fish on the way down. | | | R794-001 |
| 11:36:31 Apr/12/04 | 681 | 273 | 21.6066 | 143.6462 | We are on the bottom. | | | |
| 11:36:39 Apr/12/04 | 682 | 275 | 21.6066 | 143.6462 | On bottom; well developed ripple marks and yellowish sediment in troughs. | | | R794-002 |
| 11:37:15 Apr/12/04 | 681 | 273 | 21.6066 | 143.6461 | Seeing some yellow material. Big chunks of material in the troughs. Not much visible life. | | | |
| 11:39:47 Apr/12/04 | 679 | 276 | 21.6066 | 143.6460 | Ripples are formed around these chunks of material. One rock has a bit of white staining. The rocks are quite angular. | | | |
| 11:40:03 Apr/12/04 | 679 | 275 | 21.6066 | 143.6461 | Could be an eel. | | | R794-003 |
| 11:40:40 Apr/12/04 | 678 | 275 | 21.6066 | 143.6460 | A red fish on bottom. | | | R794-004 |
| 11:41:14 Apr/12/04 | 677 | 291 | 21.6066 | 143.6459 | We are seeing a couple of redfish. We are starting to move. Scattered brittle stars and fish on sandy bottom. Little balls of yellow material collecting in the ripples. | | | |
| 11:42:15 Apr/12/04 | 678 | 293 | 21.6066 | 143.6459 | And yet another fish. | | | R794-005 |
| 11:43:51 Apr/12/04 | 677 | 290 | 21.6066 | 143.6459 | Brittle stars in the sediment. | | | R794-006 |
| 11:45:35 Apr/12/04 | 677 | 294 | 21.6066 | 143.6458 | Zooming in to take a good look at the rock. A lot of the yellow balls. | | | |
| 11:45:42 Apr/12/04 | 676 | 293 | 21.6066 | 143.6459 | Large boulders coated with yellow sediment. These must be out of place. | | | R794-007 |
| 11:46:46 Apr/12/04 | 675 | 290 | 21.6067 | 143.6458 | Mostly volcaniclastic sand around these boulders. | | | R794-008 |
| 11:47:09 Apr/12/04 | 675 | 290 | 21.6067 | 143.6458 | Obviously a high a current area with large scouring around the rocks and pronounced ripples on the sediment. | | | |
| 11:49:30 Apr/12/04 | 668 | 289 | 21.6068 | 143.6456 | Seeing some white specs on the bottom but we are not sure what they are. Taking a closer look. We think they may be floc. | | | |
| 11:51:33 Apr/12/04 | 663 | 288 | 21.6068 | 143.6454 | The ripples are no longer confused (interference ripples). The slope is getting a bit steeper. | | | |
| 11:52:47 Apr/12/04 | 660 | 289 | 21.6068 | 143.6452 | No evidence of pronounced bioturbation. | | | |
| 11:53:18 Apr/12/04 | 658 | 287 | 21.6069 | 143.6452 | Still seeing yellow-coated rocks with a spatter of white staining. | | | |
| 11:55:33 Apr/12/04 | 648 | 347 | 21.6070 | 143.6449 | We are seeing slightly finer sediment over a uniform area. | | | |
| 11:56:59 Apr/12/04 | 645 | 323 | 21.6071 | 143.6448 | Seeing a bit more white staining and an outcrop with some white material and yellow staining. Broken off boulders? Some white deposit around these rocks. | | | |
| 11:57:47 Apr/12/04 | 644 | 329 | 21.6072 | 143.6448 | We've come across our first outcrop. | | | R794-009 |
| 11:59:56 Apr/12/04 | 640 | 323 | 21.6072 | 143.6447 | It is difficult to tell what type of rock this is. It appears to have some kind of banding rather than pillows. | | | R794-010 |
| 12:02:05 Apr/12/04 | 642 | 321 | 21.6071 | 143.6445 | We are starting to see a lot more lava. | | | |
| 12:03:15 Apr/12/04 | 634 | 324 | 21.6072 | 143.6445 | We are looking for a small piece of rock to collect for identification. | | | |
| 12:06:31 Apr/12/04 | 633 | 327 | 21.6073 | 143.6445 | The ship went ahead of us and the cage is near bottom and ahead of us. We need to manage tether and everything else. The cage is lying on the bottom. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
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| 12:08:53 Apr/12/04 | 626 | 324 | 21.6073 | 143.6444 | Little scare here; cage bumped an outcrop and seemed to be stuck. | | | R794-011 |
| 12:11:18 Apr/12/04 | 611 | 285 | 21.6073 | 143.6444 | The cage seemed to have been lying on its side on the bottom. It is back up at 20 meters above bottom. All seems to have been restored. We are waiting to see whether all functions are OK. | | | |
| 12:15:56 Apr/12/04 | 590 | 140 | 21.6072 | 143.6445 | We are checking the cage to make sure all functions are operating. | | | |
| 12:17:04 Apr/12/04 | 588 | 195 | 21.6072 | 143.6445 | Cage shot for checking possible damage. | | | R794-012 |
| 12:25:09 Apr/12/04 | 584 | 3 | 21.6075 | 143.6446 | We will carry on with the dive. | | | |
| 12:25:44 Apr/12/04 | 584 | 6 | 21.6075 | 143.6446 | Checking gauges. | | | |
| 12:32:05 Apr/12/04 | 625 | 52 | 21.6071 | 143.6445 | We are heading back down to the bottom. Back in business. | | | |
| 12:33:31 Apr/12/04 | 634 | 58 | 21.6072 | 143.6444 | We are going to sit down and try to take a look. Some white staining. Material that seems like glass. We will try collecting a piece. | | | |
| 12:34:11 Apr/12/04 | 635 | 32 | 21.6071 | 143.6444 | Making an attempt to sample a rock while the blue fish roots us on. | | | R794-013 |
| 12:39:14 Apr/12/04 | 635 | 43 | 21.6071 | 143.6444 | It appears that the 7-function is spazzing out a bit. Trying to collect a rock. | | | |
| 12:41:22 Apr/12/04 | 634 | 116 | 21.6071 | 143.6444 | Repositioning and trying again. | | | |
| 12:42:30 Apr/12/04 | 634 | 313 | 21.6071 | 143.6444 | A very interesting group of lavas. High potassium lavas unusual for the Marianas. | | | |
| 12:44:24 Apr/12/04 | 636 | 307 | 21.6071 | 143.6444 | Rugose structure on these lavas. They do not look particularly young. Eh=151. | | | |
| 12:44:35 Apr/12/04 | 636 | 295 | 21.6072 | 143.6444 | Continuing the search for a good place for rock sampling. | | | R794-014 |
| 12:46:59 Apr/12/04 | 636 | 293 | 21.6071 | 143.6444 | Location of rock samples. | | | R794-015 |
| 12:47:45 Apr/12/04 | 635 | 332 | 21.6071 | 143.6445 | Two samples picked up. Light color rounded outer margins and dark interior. | | | R794-016 |
| 13:09:56 Apr/12/04 | 633 | 319 | 21.6071 | 143.6446 | The lining of the purse has come detached and sticking out of the purse. We are trying to stuff it back in to collect samples. | | | |
| 13:10:39 Apr/12/04 | 633 | 319 | 21.6071 | 143.6446 | We had collected two rocks for Stern but purse difficulties made us drop them. | | | |
| 13:12:37 Apr/12/04 | 633 | 320 | 21.6070 | 143.6446 | Purse has been fixed and we are now going to collect another rock. | | | |
| 13:14:16 Apr/12/04 | 632 | 319 | 21.6071 | 143.6447 | Trying to go back to the bottom. | | | |
| 13:15:59 Apr/12/04 | 631 | 316 | 21.6070 | 143.6447 | We can see the bottom. We are going to try to intersect the outcrop. | | | |
| 13:17:49 Apr/12/04 | 638 | 321 | 21.6071 | 143.6446 | Found some large pillows and a type of canyon. | | | R794-017 |
| 13:18:11 Apr/12/04 | 639 | 323 | 21.6071 | 143.6446 | Very large structures; perhaps pillows. Trying to find a good spot to easily pick up another rock. Going up a steep wall. | | | |
| 13:19:34 Apr/12/04 | 635 | 317 | 21.6072 | 143.6446 | Long linear features; y ellow and a bit of white staining. Eh is 160 and not changing. | | | |
| 13:19:35 Apr/12/04 | 635 | 316 | 21.6072 | 143.6446 | Exploring the flows. | | | R794-018 |
| 13:20:24 Apr/12/04 | 633 | 316 | 21.6072 | 143.6446 | Sedimentary material on top of the outcrop. | | | |
| 13:21:35 Apr/12/04 | 627 | 316 | 21.6073 | 143.6445 | Seeing possibly volcaniclastic sand. The slope is still quite steep. The rocks look old. We are trying to collect another sample. | | | |
| 13:23:50 Apr/12/04 | 625 | 321 | 21.6073 | 143.6444 | Settling down to collect the rock sample. | | | |
| 13:29:35 Apr/12/04 | 625 | 305 | 21.6073 | 143.6443 | Angular rock; ~10 cm long; brown-orange and red on the outside. In the purse. Z=625. [Kasuga-2]. | R794-RK-0001 | SROF geo team (Stern) | |
| 13:33:40 Apr/12/04 | 623 | 281 | 21.6073 | 143.6445 | Sample placed in purse. | | | R794-019 |
| 13:36:25 Apr/12/04 | 629 | 274 | 21.6073 | 143.6445 | Back to the bottom to continue our transect up the slope. | | | |
| 13:36:58 Apr/12/04 | 631 | 304 | 21.6073 | 143.6445 | Pillows and white patches but no signs of active venting. | | | R794-020 |
| 13:37:22 Apr/12/04 | 629 | 300 | 21.6073 | 143.6445 | Some thicker white staining on a rock. Something here? | | | |
| 13:39:25 Apr/12/04 | 629 | 303 | 21.6073 | 143.6444 | Settling down to check it out. Bacterial strands. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 13:39:43 Apr/12/04 | 630 | 304 | 21.6073 | 143.6444 | Bacterial strands and possibly limpets at this low level venting site. | | | R794-021 |
| 13:42:06 Apr/12/04 | 627 | 300 | 21.6074 | 143.6444 | Some recent flows looking slightly darker. Eh is still 161. | | | |
| 13:42:12 Apr/12/04 | 627 | 302 | 21.6074 | 143.6444 | Possibly recent flows and perhaps exposed to some hydrothermal venting. | | | R794-022 |
| 13:43:50 Apr/12/04 | 621 | 303 | 21.6074 | 143.6442 | Broken up rocks and talus. Some faint staining. Continuing upslope. | | | |
| 13:47:35 Apr/12/04 | 610 | 303 | 21.6075 | 143.6440 | Large pillow forms on top of slab-like forms with cracks running through them. | | | |
| 13:49:07 Apr/12/04 | 603 | 304 | 21.6075 | 143.6439 | These lavas look very fractured. Contorted surfaces - slabs. Rugose surfaces with ridges running through them. Streams of talus running downslope. | | | |
| 13:50:04 Apr/12/04 | 602 | 302 | 21.6075 | 143.6438 | Perhaps a more recent flow - blocky. | | | R794-023 |
| 13:50:47 Apr/12/04 | 599 | 303 | 21.6076 | 143.6437 | Smaller pieces of lava and sediment in between the pieces. Nothing looks active. | | | |
| 13:52:07 Apr/12/04 | 595 | 304 | 21.6076 | 143.6436 | Pieces of older rock; sedimented; steep slope. Degrading lavas. Some black sand. | | | |
| 13:53:01 Apr/12/04 | 593 | 305 | 21.6076 | 143.6435 | Large ripple marks caused by current flowing over this ridge. | | | R794-024 |
| 13:55:21 Apr/12/04 | 583 | 311 | 21.6077 | 143.6433 | Sand ripples on the slope running perpendicular to the slope. | | | |
| 13:55:30 Apr/12/04 | 583 | 311 | 21.6077 | 143.6433 | More ripple marks trending down slope. | | | R794-025 |
| 13:58:37 Apr/12/04 | 579 | 313 | 21.6079 | 143.6432 | Continue to see blocky lava covered in places with sediment. Looks like 'old' lava. Here at 580 m thought might see first signs of venting given the plume data (max at 550 m). | | | |
| 13:59:50 Apr/12/04 | 581 | 311 | 21.6079 | 143.6432 | Mmmm. Tasty deep-sea shrimp. | | | R794-026 |
| 14:01:01 Apr/12/04 | 581 | 309 | 21.6079 | 143.6432 | See red shrimp on rock with yellowish bacterial mat in background. | | | |
| 14:03:49 Apr/12/04 | 581 | 310 | 21.6079 | 143.6432 | Close up of lava that appears to have some yellowish staining on it. Has a very irregular surface. Surrounded by sand with a number of ripples on it. | | | |
| 14:05:28 Apr/12/04 | 577 | 314 | 21.6079 | 143.6431 | Lots of sediment on the slope NE-SW trend of sand waves. Lesser outcropping blocky lavas. | | | |
| 14:06:09 Apr/12/04 | 575 | 315 | 21.6080 | 143.6431 | Possibly blocky flow here. Remnants of pillow lavas? | | | |
| 14:07:05 Apr/12/04 | 572 | 314 | 21.6080 | 143.6430 | Lavas commonly have sediment on top of them. The lavas look older than some of the other volcanoes we have seen. | | | |
| 14:08:06 Apr/12/04 | 571 | 318 | 21.6080 | 143.6429 | Reddish fish. | | | R794-027 |
| 14:10:15 Apr/12/04 | 568 | 314 | 21.6082 | 143.6428 | Massive blocky lava outcrop. Looks like a dike here? See cooling joints at right angles to the strike of the dike. Took couple of DSC photos of the dike cutting up through the lavas. | | | |
| 14:10:32 Apr/12/04 | 567 | 310 | 21.6082 | 143.6428 | Large dike (1.5 m wide) with perpendicular columnar joints. | | | R794-028 |
| 14:12:53 Apr/12/04 | 565 | 315 | 21.6083 | 143.6428 | Dike about 1.5 m wide? Is massive and blocky. See some vesicles. Covered by some sediment. | | | |
| 14:15:37 Apr/12/04 | 563 | 338 | 21.6083 | 143.6428 | This dike becomes a distinct ridge as we move upwards (shallower) with the lavas either side fallen away. | | | |
| 14:24:40 Apr/12/04 | 563 | 48 | 21.6083 | 143.6428 | Collected a piece of rock from the dike that is tooth-shaped. Into the purse. Z=562.6 (NW part of the caldera). [Kasuga-2]. | R794-RK-0002 | SROF geo team (Stern) | |
| 14:24:41 Apr/12/04 | 563 | 49 | 21.6083 | 143.6428 | Triangular piece of weathered dike. Rock sample number 2. | | | R794-029 |
| 14:33:24 Apr/12/04 | 558 | 271 | 21.6083 | 143.6428 | Eh is coming down here from 157 now to 141 at 550 m water depth which is the max anomaly seen during the plume mapping. | | | |
| 14:39:19 Apr/12/04 | 564 | 322 | 21.6084 | 143.6427 | Close up look at some biology (not sure what it was?) fixed on the dike. Decided to go back down and come up in different spot to get away from this steep slope and get back to Eh anomaly around Z=550. | | | |
| 14:45:11 Apr/12/04 | 570 | 259 | 21.6085 | 143.6425 | See some evidence for minor venting with small cavities lined by white (bacterial mats) in lava outcrops. | | | |
| 14:45:32 Apr/12/04 | 570 | 255 | 21.6084 | 143.6425 | White mat covered rock face. | | | R794-030 |
| 14:45:49 Apr/12/04 | 570 | 254 | 21.6084 | 143.6424 | White mat covered rock face. No visible shimmering. | | | R794-031 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 14:47:18 Apr/12/04 | 570 | 227 | 21.6084 | 143.6424 | See rippled sediments with occasional outcropping lava with some white bacterial mat coating. | | | |
| 14:48:46 Apr/12/04 | 566 | 222 | 21.6084 | 143.6423 | Moving NW upslope. Mostly sediments with some outcropping lavas. | | | |
| 14:50:31 Apr/12/04 | 565 | 235 | 21.6083 | 143.6421 | Moving NE and see lots of sand with minor outcrop. Some minor bottom fish. | | | |
| 14:51:58 Apr/12/04 | 566 | 21 | 21.6085 | 143.6420 | Eh moving at 565 m. | | | |
| 14:55:41 Apr/12/04 | 566 | 23 | 21.6089 | 143.6420 | Went W then turned NE to go back up the wall. See Eh moving as soon as we get shallower than 565 m. | | | |
| 14:58:39 Apr/12/04 | 556 | 38 | 21.6091 | 143.6421 | See blocky lavas and talus out of the sedimented basin. Some sponges. Eh going down. | | | |
| 15:00:28 Apr/12/04 | 550 | 60 | 21.6090 | 143.6423 | Massive talus here. See lowest Eh at 550 m water depth. | | | |
| 15:02:05 Apr/12/04 | 558 | 71 | 21.6088 | 143.6424 | Massive blocky lava talus. Not much sediment here. | | | |
| 15:02:37 Apr/12/04 | 556 | 75 | 21.6088 | 143.6425 | See another dike outcrop striking out of talus slope. Some sediment here too. | | | |
| 15:04:32 Apr/12/04 | 546 | 55 | 21.6088 | 143.6426 | Have a very steep massive outcrop of lava with some sponges on it and the occasional rat fish. | | | |
| 15:08:58 Apr/12/04 | 549 | 102 | 21.6085 | 143.6427 | Decided to turn around and go back to the SW and explore in that direction. Go back over the dike and across the sedimented basin and look further to the SW. | | | |
| 15:11:41 Apr/12/04 | 576 | 220 | 21.6084 | 143.6426 | Back on the sedimented flat floor at 576 m and will drive across and come back up on the other side. | | | |
| 15:13:22 Apr/12/04 | 573 | 217 | 21.6084 | 143.6425 | Lots of sediment down here with some outcrops of blocky lava. | | | |
| 15:14:54 Apr/12/04 | 561 | 209 | 21.6082 | 143.6424 | See lowest Eh reading thus far of 134 as we move to the SW. | | | |
| 15:16:38 Apr/12/04 | 563 | 115 | 21.6082 | 143.6425 | Moving along top of ridge that bounded the sedimented basin. Eh down to 130. | | | |
| 15:19:01 Apr/12/04 | 562 | 74 | 21.6081 | 143.6427 | Followed this ridge to the east for a while but Eh went up so went back to the west to continue looking then at around 565 m to the SW. | | | |
| 15:22:03 Apr/12/04 | 562 | 287 | 21.6082 | 143.6424 | Sedimented slope with some white staining and occasional small outcrop of lava sticking up. Going west. | | | |
| 15:24:38 Apr/12/04 | 556 | 232 | 21.6080 | 143.6423 | Lots of blocky lavas here with some white staining around although Eh meter went back up. | | | |
| 15:27:37 Apr/12/04 | 558 | 225 | 21.6078 | 143.6424 | See some degree of white staining with very blocky rough looking lavas. | | | |
| 15:31:51 Apr/12/04 | 565 | 24 | 21.6078 | 143.6428 | Found moving SW we moved out of the Eh anomaly so decided to move back to the NE where found lowest Eh anomaly and from there to move NW up towards the summit to see if can find shallower (400 m) plume. | | | |
| 15:35:54 Apr/12/04 | 564 | 312 | 21.6081 | 143.6427 | See blocky lavas outcropping from a sediment slope. Eh goes back down as we moved back to NE and then move to NW. | | | |
| 15:38:56 Apr/12/04 | 573 | 303 | 21.6084 | 143.6425 | Coming down from the rocky outcrop down into the sedimented basin. | | | |
| 15:41:38 Apr/12/04 | 568 | 297 | 21.6085 | 143.6423 | Moving upslope and lots of sediments with some outcropping lava that is really blocky. Lots of sand ripples here. | | | |
| 15:44:56 Apr/12/04 | 569 | 295 | 21.6088 | 143.6420 | Continuing in northwesterly direction. | | | |
| 15:46:31 Apr/12/04 | 567 | 297 | 21.6088 | 143.6418 | Still moving northwesterly over sandy bottom. | | | |
| 15:47:52 Apr/12/04 | 563 | 297 | 21.6089 | 143.6417 | Sporadic rocky outcrop 10-20cm in diameter. | | | |
| 15:53:12 Apr/12/04 | 559 | 315 | 21.6089 | 143.6415 | Moving ship 100m along line to northwest. | | | |
| 15:53:41 Apr/12/04 | 559 | 314 | 21.6089 | 143.6414 | Blue fish. | | | R794-032 |
| 15:55:12 Apr/12/04 | 552 | 271 | 21.6090 | 143.6414 | Still moving over sedimented bottom with occasional outcrop. | | | |
| 15:57:39 Apr/12/04 | 527 | 313 | 21.6091 | 143.6409 | Slope steepening and substratum becoming more coarse. Moving ship another 100m along line toward summit. | | | |
| 16:01:39 Apr/12/04 | 514 | 309 | 21.6093 | 143.6408 | Ship now catching up. ROPOS resumes moving upslope. Over a mixture of fine sediment and coarse lava debris and occasional outcrops. | | | |
| 16:02:02 Apr/12/04 | 512 | 312 | 21.6093 | 143.6407 | Steeper slope with more weathered lava. | | | R794-033 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 16:09:53 Apr/12/04 | 497 | 307 | 21.6094 | 143.6404 | Digital stills of fish while waiting for ship to catch up. | | | |
| 16:11:03 Apr/12/04 | 488 | 303 | 21.6095 | 143.6403 | ROPOS resumes track to the northwest. | | | |
| 16:12:03 Apr/12/04 | 482 | 302 | 21.6095 | 143.6403 | Mixture of dark and weathered yellow lava debris on sediment substratum. | | | |
| 16:15:19 Apr/12/04 | 466 | 304 | 21.6096 | 143.6400 | Crab picture. | | | R794-034 |
| 16:16:49 Apr/12/04 | 466 | 295 | 21.6096 | 143.6400 | Close-up of crab. | | | R794-035 |
| 16:19:21 Apr/12/04 | 464 | 307 | 21.6097 | 143.6399 | Gimme a kiss! | | | R794-036 |
| 16:19:25 Apr/12/04 | 465 | 308 | 21.6097 | 143.6399 | Are you lookin' at me?? | | | R794-037 |
| 16:20:28 Apr/12/04 | 464 | 287 | 21.6097 | 143.6399 | Back on course again after ship catches up. Moving upslope - seeing some larger blocks of talus. | | | |
| 16:22:36 Apr/12/04 | 450 | 303 | 21.6097 | 143.6397 | More weathered debris. Slope steepening. | | | |
| 16:24:12 Apr/12/04 | 439 | 305 | 21.6098 | 143.6395 | Slope now dominated by larger pieces of talus on sediment background. Now a real talus slope. | | | |
| 16:25:47 Apr/12/04 | 430 | 324 | 21.6098 | 143.6393 | Occasional large boulders colonized by hydroids. | | | |
| 16:26:50 Apr/12/04 | 423 | 305 | 21.6099 | 143.6392 | More outcrops with hydroids. Signs of hydrothermal staining. | | | |
| 16:27:39 Apr/12/04 | 414 | 307 | 21.6099 | 143.6391 | Eh dropping to 152. | | | |
| 16:29:18 Apr/12/04 | 403 | 320 | 21.6099 | 143.6389 | Eh dropping more sharply. Down to 144. | | | |
| 16:30:08 Apr/12/04 | 397 | 330 | 21.6099 | 143.6388 | School of fish. Patches of staining. Eh down to 130. | | | |
| 16:33:36 Apr/12/04 | 369 | 313 | 21.6103 | 143.6384 | Eh rising again from low of 114. | | | |
| 16:34:57 Apr/12/04 | 352 | 303 | 21.6104 | 143.6381 | Ship stopped. ROPOS continues to run up hill to stretch out tether in attempt to solve reel-in/reel-out malfunction. | | | |
| 16:38:40 Apr/12/04 | 342 | 295 | 21.6104 | 143.6381 | Tether problem resolved. There was a nasty kink in the tether that was jamming in the sheave. | | | |
| 16:41:39 Apr/12/04 | 360 | 94 | 21.6105 | 143.6383 | Moving back downslope toward 380m level where strongest Eh anomaly was detected - and where previous dives have found venting. Our CTD work indicated hydrothermal a plume in that area. | | | |
| 16:44:32 Apr/12/04 | 384 | 131 | 21.6106 | 143.6385 | Eh down to 112. | | | |
| 16:50:19 Apr/12/04 | 392 | 328 | 21.6100 | 143.6387 | New strategy. A quick review of the McMurtry et al paper indicates a hydrothermal field at a summit at 402m depth - probably the saddle to the east of the summit. Will follow 400m contour to the north. | | | |
| 16:57:56 Apr/12/04 | 401 | 282 | 21.6104 | 143.6389 | Eh down to 107. A new low. | | | |
| 16:59:34 Apr/12/04 | 402 | 358 | 21.6106 | 143.6389 | Patches of white staining and microbial mat. Most abundant so far. Eh down to 104. | | | |
| 16:59:46 Apr/12/04 | 402 | 10 | 21.6106 | 143.6389 | White staining which may be some bacterial mat. The eH is 103. | | | R794-038 |
| 17:01:07 Apr/12/04 | 397 | 288 | 21.6107 | 143.6389 | Running upslope along line of white staining. | | | |
| 17:02:04 Apr/12/04 | 396 | 308 | 21.6107 | 143.6389 | Resuming traverse northward along 400m contour. | | | |
| 17:05:28 Apr/12/04 | 397 | 300 | 21.6109 | 143.6389 | Eh is holding steady around 97. | | | |
| 17:06:47 Apr/12/04 | 400 | 335 | 21.6109 | 143.6389 | Putting a nav target here of 'Eh 98'. | | | |
| 17:08:14 Apr/12/04 | 399 | 320 | 21.6111 | 143.6390 | Oh look more sediment! Eh is down to 96 here though. | | | |
| 17:08:53 Apr/12/04 | 399 | 298 | 21.6111 | 143.6390 | Thin ash crust as we go down the slope of the caldera. | | | |
| 17:10:22 Apr/12/04 | 399 | 321 | 21.6112 | 143.6391 | Bits of white staining on the sediment and between the rocks. | | | |
| 17:11:56 Apr/12/04 | 399 | 279 | 21.6114 | 143.6392 | Crusty fish haven. | | | R794-039 |
| 17:14:35 Apr/12/04 | 400 | 356 | 21.6115 | 143.6392 | More hydrothermal staining showing through the sediment. Continuing along the 400m contour. | | | |
| 17:16:00 Apr/12/04 | 401 | 274 | 21.6117 | 143.6393 | Stopping for a bit to wait for the ship. Looking at the white material on the sediment. | | | |
| 17:16:57 Apr/12/04 | 401 | 263 | 21.6117 | 143.6393 | It appears to be bacterial mat with a non-vent shrimp feeding in the area. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 17:17:00 Apr/12/04 | 401 | 263 | 21.6117 | 143.6393 | White bacterial mat with shrimp feeding nearby (in lower right corner). | | | R794-040 |
| 17:18:06 Apr/12/04 | 401 | 262 | 21.6117 | 143.6394 | This is more likely some sort of alteration rather than mat. | | | |
| 17:18:32 Apr/12/04 | 400 | 304 | 21.6117 | 143.6394 | Continuing along the 400m contour to the north. | | | |
| 17:19:29 Apr/12/04 | 400 | 339 | 21.6118 | 143.6394 | Passing over mostly sediment covered areas with little or no outcrop. | | | |
| 17:21:10 Apr/12/04 | 397 | 355 | 21.6120 | 143.6395 | Eh is gradually creeping back up. We are over 100 again. | | | |
| 17:22:51 Apr/12/04 | 399 | 13 | 21.6122 | 143.6396 | Well-weathered outcrop with a large spider crab on top and some white staining. | | | |
| 17:23:51 Apr/12/04 | 399 | 291 | 21.6122 | 143.6397 | Outcrop with a "different biological action" on it. | | | R794-041 |
| 17:26:07 Apr/12/04 | 398 | 318 | 21.6122 | 143.6398 | Back to a more sandy sediment area with lots of ripples. | | | |
| 17:29:32 Apr/12/04 | 399 | 11 | 21.6123 | 143.6400 | Quite a bit more white staining here with more jumbled outcrop. | | | |
| 17:31:16 Apr/12/04 | 400 | 343 | 21.6123 | 143.6403 | Heavily sedimented area with lots of ripple marks. | | | |
| 17:32:32 Apr/12/04 | 400 | 320 | 21.6124 | 143.6403 | Going up over the saddle. The bottom flattens out here more. | | | |
| 17:33:55 Apr/12/04 | 400 | 158 | 21.6125 | 143.6404 | Fish. | | | R794-042 |
| 17:38:34 Apr/12/04 | 401 | 32 | 21.6127 | 143.6404 | Have now reached the saddle on the NE side of rim in this NW part of the caldera. See widespread white staining on top of the sediments. Thought to be mineral rather than bacterial. | | | |
| 17:43:38 Apr/12/04 | 404 | 2 | 21.6129 | 143.6406 | Monotonous sands with ripples and white staining on the upper part of the ripple. | | | |
| 17:48:25 Apr/12/04 | 405 | 283 | 21.6133 | 143.6409 | Went to the center of the saddle and now moving back westwards to continue the surv ey around the 'summit' of the volcano here at the 400 m contour. | | | |
| 17:50:29 Apr/12/04 | 402 | 281 | 21.6134 | 143.6406 | Sea anemone. | | | R794-043 |
| 17:55:02 Apr/12/04 | 392 | 248 | 21.6134 | 143.6395 | Decided to take a SW heading to go up to the summit of the volcano and view the summit and then go back southwards and see if can find ~400m venting on that side of the volcano summit. | | | |
| 17:55:56 Apr/12/04 | 389 | 229 | 21.6133 | 143.6395 | See mixed bottom of weathered outcrop and rippled white stained sediments. | | | |
| 18:01:13 Apr/12/04 | 370 | 229 | 21.6128 | 143.6389 | See some more yellowish material in the sediments that looks like sulfur. McMurtry et al. (1993) describe nontronite and elemental S from Kasuga 2 and mention probably CO2 and SO2 venting fluids. | | | |
| 18:01:17 Apr/12/04 | 371 | 232 | 21.6128 | 143.6389 | Yellow staining. | | | R794-044 |
| 18:04:21 Apr/12/04 | 359 | 229 | 21.6126 | 143.6386 | Eh moving back down again towards 96 as we move up towards the summit moving westwards. | | | |
| 18:04:59 Apr/12/04 | 356 | 255 | 21.6125 | 143.6385 | See few cm thick crust as we go up slope. White staining still prevalent and crust is yellowish in color. No real rock outcrop. | | | |
| 18:11:10 Apr/12/04 | 347 | 238 | 21.6124 | 143.6382 | Attempted to sample a piece of this yellowish 'crust' we see going up the slope of the vdcano. Is this mostly sulfur? Could this be an ancient equivalent of what we saw at NW Eifuku? | | | |
| 18:12:08 Apr/12/04 | 347 | 239 | 21.6124 | 143.6381 | Poking the yellow substrate. | | | R794-045 |
| 18:14:58 Apr/12/04 | 344 | 239 | 21.6124 | 143.6381 | Robotic arm had problems controlling its grip so could not sample. | | | |
| 18:17:10 Apr/12/04 | 346 | 210 | 21.6124 | 143.6381 | Sampled with suction sampler (into jar 8) some of the yellow colored crust material seen on the slope of the summit. Looks like mostly dark sediment with some of the yellow crust included. Z=345. [Kasuga 2 - Near Summit]. | R794-SS-J8-0003 | SROF geo team (de Ronde) | |
| 18:22:40 Apr/12/04 | 346 | 211 | 21.6124 | 143.6381 | Suction sample scene. | | | R794-046 |
| 18:25:21 Apr/12/04 | 323 | 253 | 21.6121 | 143.6378 | More extensive outcrop here at 320 m. Does not look like lava - more ash type units? | | | |
| 18:28:23 Apr/12/04 | 286 | 92 | 21.6121 | 143.6376 | Strange jellyfish? | | | R794-047 |
| 18:37:42 Apr/12/04 | 319 | 236 | 21.6120 | 143.6376 | Tether management. | | | |
| 18:39:54 Apr/12/04 | 312 | 234 | 21.6119 | 143.6374 | Back on survey and see sandy gravely sediment with weathered outcrop of a Fe-oxide crust. Some animals in sediment. Almost at the summit. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 18:41:28 Apr/12/04 | 295 | 239 | 21.6117 | 143.6371 | Higher density of hydroids as we approach the summit. | | | |
| 18:41:36 Apr/12/04 | 294 | 235 | 21.6117 | 143.6371 | High density of hydroids here. | | | R794-048 |
| 18:42:15 Apr/12/04 | 292 | 241 | 21.6117 | 143.6371 | Summit is at 293 m. See crust with hydroids on it. | | | |
| 18:43:17 Apr/12/04 | 293 | 220 | 21.6116 | 143.6371 | Fish with chin feelers. | | | R794-049 |
| 18:47:27 Apr/12/04 | 295 | 181 | 21.6113 | 143.6371 | The summit! Little hermit crabs are here to greet us. | | | R794-050 |
| 18:47:39 Apr/12/04 | 295 | 178 | 21.6113 | 143.6371 | Going back down in S to SSW direction to south side of the summit. Still see sediment-covered slopes with crust material on top in places. | | | |
| 18:51:48 Apr/12/04 | 299 | 201 | 21.6107 | 143.6370 | See some rock outcrop that has sponges growing on it. Bottom mostly covered by sediment. See what appears to be an octopus. | | | |
| 18:53:32 Apr/12/04 | 302 | 192 | 21.6106 | 143.6370 | An octopus tucked back in a rock crevice. | | | R794-051 |
| 19:03:04 Apr/12/04 | 307 | 280 | 21.6104 | 143.6369 | Collapsed pits here with some sulfide staining. | | | |
| 19:04:50 Apr/12/04 | 303 | 219 | 21.6103 | 143.6367 | Yellow colored 'pit' with some hydroids in the foreground | | | R794-052 |
| 19:05:36 Apr/12/04 | 302 | 205 | 21.6103 | 143.6367 | Abrupt change from sand to slightly yellowish outcrop. | | | |
| 19:06:38 Apr/12/04 | 297 | 252 | 21.6102 | 143.6366 | Much more weathered outcrop here. Some patches of white here and there. | | | |
| 19:07:36 Apr/12/04 | 293 | 233 | 21.6102 | 143.6364 | Large fish. | | | R794-053 |
| 19:08:17 Apr/12/04 | 294 | 235 | 21.6101 | 143.6363 | Very little sediment here. We seem to be on another little peak here. | | | |
| 19:10:04 Apr/12/04 | 287 | 253 | 21.6102 | 143.6362 | Trying to follow around the summit at 200 meters. | | | |
| 19:12:07 Apr/12/04 | 303 | 73 | 21.6100 | 143.6362 | We are dropping down a steep rock face with columnar joining. | | | |
| 19:13:37 Apr/12/04 | 314 | 157 | 21.6100 | 143.6360 | Vertical face of a lava flow. | | | R794-054 |
| 19:16:39 Apr/12/04 | 303 | 108 | 21.6097 | 143.6360 | Heading back up and over this cliff to get better lined up with the cage. | | | |
| 19:17:35 Apr/12/04 | 291 | 62 | 21.6097 | 143.6360 | Fish festival. | | | R794-055 |
| 19:19:55 Apr/12/04 | 295 | 320 | 21.6098 | 143.6362 | Bottom is in sight again. Start climbing down the southern face of the summit to the 400 meter contour then follow it around. | | | |
| 19:24:41 Apr/12/04 | 322 | 68 | 21.6098 | 143.6366 | Oooh! A shark! | | | |
| 19:24:50 Apr/12/04 | 324 | 113 | 21.6098 | 143.6366 | Shark attack! | | | R794-056 |
| 19:28:12 Apr/12/04 | 331 | 4 | 21.6096 | 143.6367 | The Cliffs of Doom and the Sands of Boredom- from the mouth of Kim Juniper. | | | |
| 19:29:10 Apr/12/04 | 334 | 353 | 21.6096 | 143.6367 | Backing down the south face with fine-grained sand on the right and talus on the left. | | | |
| 19:30:36 Apr/12/04 | 340 | 346 | 21.6094 | 143.6367 | Going to start doing switchbacks down the southern face. | | | |
| 19:31:21 Apr/12/04 | 339 | 330 | 21.6094 | 143.6366 | Eh is starting to drop rather quickly. It is down to about 115 now. | | | |
| 19:33:42 Apr/12/04 | 338 | 339 | 21.6094 | 143.6364 | Heading down about 10 meters then we will head east. | | | |
| 19:34:51 Apr/12/04 | 350 | 308 | 21.6093 | 143.6365 | Rocks here are covered with bacterial mat and the Eh is nearing 100. | | | |
| 19:34:55 Apr/12/04 | 350 | 347 | 21.6093 | 143.6365 | Mat covered rocks. | | | R794-057 |
| 19:37:40 Apr/12/04 | 348 | 14 | 21.6092 | 143.6365 | Putting a nav marker here called 'Hairy Mat'. | | | |
| 19:38:18 Apr/12/04 | 349 | 21 | 21.6092 | 143.6366 | We have left the area of mat and the Eh is going back up again. | | | |
| 19:41:57 Apr/12/04 | 352 | 42 | 21.6091 | 143.6367 | Going down to 355 meters then heading west. Eh is still dropping. Down to 86 now. | | | |
| 19:43:21 Apr/12/04 | 357 | 336 | 21.6091 | 143.6366 | White mat covered rocks in the slope here. | | | |
| 19:43:38 Apr/12/04 | 357 | 343 | 21.6091 | 143.6365 | White mat on the rocks. | | | R794-058 |
| 19:44:45 Apr/12/04 | 359 | 31 | 21.6092 | 143.6364 | Mat-covered rocks. | | | R794-059 |
| 19:45:09 Apr/12/04 | 357 | 352 | 21.6092 | 143.6364 | Nav marker called hairy rocks. Lots of bacteria on talus. Then an outcrop nearby. Eh is down to 79 mV. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 19:49:11 Apr/12/04 | 364 | 41 | 21.6090 | 143.6365 | Cobble talus with yellow-brown old bacterial mat and white active bacterial mat on the talus and on black to gray sand that is not rippled. | | | |
| 19:51:58 Apr/12/04 | 367 | 284 | 21.6089 | 143.6364 | A large outcrop of breccia (?) is coated with patchy but thick bacterial mat and thin gray mat. Nav marker called whale rock. | | | |
| 19:54:26 Apr/12/04 | 378 | 15 | 21.6088 | 143.6364 | A white crab with large claws on pebble and cobble talus at base of Whale Rock. The first occurrence of these crabs. Mat covers the slope. | | | |
| 19:55:10 Apr/12/04 | 377 | 335 | 21.6088 | 143.6364 | A crab. | | | R794-060 |
| 19:57:11 Apr/12/04 | 380 | 49 | 21.6088 | 143.6363 | Traversing to the W getting deeper with lots of crabs on talus which gives way to gray sand with mats and dark gray sand without mats. Photo of crabs. Nav marker crab slope. | | | |
| 19:59:11 Apr/12/04 | 384 | 54 | 21.6088 | 143.6363 | Crab close-up. | | | R794-061 |
| 20:01:03 Apr/12/04 | 384 | 55 | 21.6088 | 143.6363 | Flounder. | | | R794-062 |
| 20:01:09 Apr/12/04 | 384 | 54 | 21.6087 | 143.6363 | Many flat fish resting in the sand and one was photographed. Patches of bacteria mat forming tiny chimney-like structure with perhaps a bit of shimmering water. | | | |
| 20:02:40 Apr/12/04 | 384 | 54 | 21.6087 | 143.6364 | Barnacles. | | | R794-063 |
| 20:03:02 Apr/12/04 | 384 | 56 | 21.6087 | 143.6363 | Abundant barnacles on rock talus. Frame grab taken. Also lots of crabs and flat fish; 385 m. Steep slope. | | | |
| 20:03:29 Apr/12/04 | 384 | 55 | 21.6088 | 143.6363 | Barnacle close-up. | | | R794-064 |
| 20:06:18 Apr/12/04 | 385 | 77 | 21.6086 | 143.6362 | Moving ship 50 m parallel to our course. Talus and sand covered with bacterial mat and lots of flat fish. | | | |
| 20:07:26 Apr/12/04 | 393 | 56 | 21.6086 | 143.6363 | Numerous crabs plus a flatfish and barnacle covered rocks. | | | R794-065 |
| 20:08:28 Apr/12/04 | 393 | 55 | 21.6086 | 143.6362 | Three crabs defending a barnacle covered rock. | | | R794-066 |
| 20:08:39 Apr/12/04 | 393 | 55 | 21.6086 | 143.6362 | A white crab just attached a tiny flat fish but missed. The flat fish was sitting on top of a barnacle-covered rock. | | | |
| 20:10:12 Apr/12/04 | 393 | 38 | 21.6086 | 143.6362 | The bacterial mat is getting thicker. See a clear area of shimmering water around a group of rock talus with extensive cover of mat and white crabs. Nav marker called "Barnacle Boulders". | | | |
| 20:13:44 Apr/12/04 | 393 | 37 | 21.6086 | 143.6362 | Dense collection of crabs visible as we continue downslope. | | | R794-067 |
| 20:14:54 Apr/12/04 | 391 | 30 | 21.6086 | 143.6362 | At 390 m the rock talus is covered with barnacles. Some areas of extensive mat and many flat fish. | | | |
| 20:17:18 Apr/12/04 | 398 | 129 | 21.6086 | 143.6360 | Many flatfish and crabs. | | | R794-068 |
| 20:17:36 Apr/12/04 | 397 | 143 | 21.6087 | 143.6360 | The flat fish sit mostly on the darker sand rather than the white bacterial covered sand. Their color is the same as the dark sand. | | | |
| 20:19:41 Apr/12/04 | 397 | 94 | 21.6087 | 143.6361 | In a small bowl with lots of thick mat on cobble talus. Lots of white crabs; flat fish and barnacles. Steep sand and talus slope. | | | |
| 20:22:47 Apr/12/04 | 397 | 52 | 21.6088 | 143.6361 | A veritable pile of crabs on sandy slope. | | | R794-069 |
| 20:23:50 Apr/12/04 | 402 | 93 | 21.6088 | 143.6360 | Less mat and fewer barnacles but lots of white crabs. The talus slope gives way to a sandy slope covered with mat. This gives way to a flat gravel surface at 409 m. | | | |
| 20:25:21 Apr/12/04 | 407 | 220 | 21.6088 | 143.6359 | Four conger eels on sandy slope. Small dark patches on bottom are juvenile flatfish. | | | R794-070 |
| 20:27:45 Apr/12/04 | 409 | 247 | 21.6089 | 143.6358 | Nav marker called Flat Bottom. Now will move back up slope along an adjacent tract. | | | |
| 20:29:33 Apr/12/04 | 408 | 214 | 21.6088 | 143.6358 | Conger eel and crabs as we ascend sandy slope. | | | R794-071 |
| 20:29:42 Apr/12/04 | 407 | 214 | 21.6088 | 143.6358 | Long Conger eel; abundant tiny flat fish; and white crabs. Moving up slope. There may be diffuse flow along much of this slope. | | | |
| 20:30:30 Apr/12/04 | 404 | 216 | 21.6088 | 143.6358 | Dense cover of crabs. More than 20 visible in this view. | | | R794-072 |
| 20:31:31 Apr/12/04 | 406 | 239 | 21.6087 | 143.6357 | Moving SW with mat on sediment and lots of Conger eel. | | | |
| 20:31:37 Apr/12/04 | 406 | 241 | 21.6087 | 143.6356 | Mat visible on sediment. No shimmering. | | | R794-073 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
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| 20:32:28 Apr/12/04 | 407 | 162 | 21.6086 | 143.6356 | Nav marker called SW Eels. | | | |
| 20:34:58 Apr/12/04 | 404 | 184 | 21.6085 | 143.6357 | Moving the ship 50 m along track. Bacterial mat and barnacle covered outcrops and talus on sediment. | | | |
| 20:35:37 Apr/12/04 | 406 | 114 | 21.6085 | 143.6357 | Approaching a series of barnacle covered outcrops. | | | R794-074 |
| 20:38:06 Apr/12/04 | 404 | 113 | 21.6084 | 143.6357 | We are now moving south and looking SE into the slope. Cobble and boulder talus and some outcrops. Lots of floc in the water at about 400 m water depth. | | | |
| 20:39:59 Apr/12/04 | 411 | 116 | 21.6083 | 143.6356 | Small dome shaped sponges on rocky slope. | | | R794-075 |
| 20:40:14 Apr/12/04 | 413 | 97 | 21.6082 | 143.6356 | Cobble talus slope with eels and flat fish and mat with patches of talus and sand slope. | | | |
| 20:41:25 Apr/12/04 | 413 | 213 | 21.6082 | 143.6356 | Turning to look S and see red crab and flat fish. Photos of crab. Cobble talus slope with little mat cover. | | | |
| 20:42:25 Apr/12/04 | 414 | 113 | 21.6082 | 143.6355 | Two red crabs. Different species from the others we've seen on this dive. | | | R794-076 |
| 20:44:12 Apr/12/04 | 409 | 93 | 21.6082 | 143.6356 | Area of white mats with sponges; white crabs; and barnacles on talus. May be diffuse flow around margin of boulder and along slope in general. | | | |
| 20:46:16 Apr/12/04 | 403 | 105 | 21.6082 | 143.6356 | Large outcrop of breccia with patches of yellow mat. Going around outcrop to the north. | | | |
| 20:48:34 Apr/12/04 | 397 | 136 | 21.6082 | 143.6357 | Moving up talus and sand slope with less biota. Boundary of white mat and area of yellow and yellow-gray mat area. Very sharp edge that follows a ridge crest; photos. The yellow slope has Fe oxide crusts. | | | |
| 20:49:15 Apr/12/04 | 392 | 75 | 21.6081 | 143.6358 | Distinct edge between sand/gravel and an area of diffuse venting. | | | R794-077 |
| 20:51:52 Apr/12/04 | 391 | 92 | 21.6081 | 143.6358 | Following ridge with extensive white mat waving in the current on one side and yellow mat on the other. Some mingling of mats at the margin. | | | |
| 20:52:52 Apr/12/04 | 390 | 35 | 21.6080 | 143.6358 | Shaggy mat covering top of slope. | | | R794-078 |
| 20:54:52 Apr/12/04 | 391 | 42 | 21.6082 | 143.6359 | Dense cover of juvenile flatfish on yellow stained gravelly bottom. | | | R794-079 |
| 20:55:24 Apr/12/04 | 391 | 16 | 21.6083 | 143.6359 | Large area of patches of yellow and white mat; then into area of white mat and patches of rippled sand. Abundant white crabs. Pebble fields alternate with sand areas. | | | |
| 20:55:59 Apr/12/04 | 391 | 348 | 21.6084 | 143.6359 | Out of focus shot but gives a good idea of the high density of crabs. | | | R794-080 |
| 20:57:41 Apr/12/04 | 395 | 55 | 21.6085 | 143.6359 | Heading for barnacle boulders. Slope with extensive thick white mat and talus with barnacles on sand. This area of flat fish; barnacles crabs; and mat with few shrimp. | | | |
| 21:00:15 Apr/12/04 | 387 | 94 | 21.6085 | 143.6362 | Sponges in diffuse flow area. | | | R794-081 |
| 21:00:16 Apr/12/04 | 387 | 96 | 21.6085 | 143.6362 | Large boulders and then outcrop of breccia highly fractured with sponges and mats. White crabs are also abundant. This is just S of Barnacle Boulders. Minor shimmering water in places. | | | |
| 21:01:32 Apr/12/04 | 388 | 89 | 21.6084 | 143.6362 | Barnacles feeding south of Barnacle Rocks. | | | R794-082 |
| 21:03:46 Apr/12/04 | 388 | 103 | 21.6085 | 143.6362 | Shimmering water coming out along a fracture with white mat outlining the fracture as well. Fracture is in breccia outcrop. | | | |
| 21:03:56 Apr/12/04 | 388 | 88 | 21.6084 | 143.6362 | Diffuse flow coming through a crack. | | | R794-083 |
| 21:04:02 Apr/12/04 | 388 | 92 | 21.6085 | 143.6362 | Shimmering flow. | | | R794-084 |
| 21:05:09 Apr/12/04 | 389 | 70 | 21.6084 | 143.6362 | Nav marker called Cracked Vent. More extensive diffuse flow venting in breccia outcrop. Most shimmering water exiting along fractures. | | | |
| 21:05:43 Apr/12/04 | 389 | 69 | 21.6084 | 143.6362 | Diffuse flow through a crack south of Barnacle Rocks. | | | R794-085 |
| 21:07:15 Apr/12/04 | 389 | 69 | 21.6084 | 143.6362 | Close-up of crack south of Barnacle Rocks. | | | R794-086 |
| 21:07:25 Apr/12/04 | 389 | 70 | 21.6084 | 143.6362 | More extensive diffuse flow in breccia outcrop. Nav marker Cracked Vent. Most shimmering water exiting along fractures. | | | |
| 21:07:28 Apr/12/04 | 389 | 71 | 21.6084 | 143.6362 | Crab falling through the crack. | | | R794-087 |
| 21:10:43 Apr/12/04 | 388 | 26 | 21.6084 | 143.6362 | Less venting on the other side of Cracked Vent rock outcrop. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 21:10:58 Apr/12/04 | 385 | 25 | 21.6084 | 143.6362 | Sponges at Barnacle Rocks. | | | R794-088 |
| 21:11:30 Apr/12/04 | 379 | 24 | 21.6085 | 143.6362 | Heading west of north and see a steep sandy slope. | | | |
| 21:12:52 Apr/12/04 | 390 | 60 | 21.6086 | 143.6361 | Barnacle Rocks 2. | | | R794-089 |
| 21:12:54 Apr/12/04 | 391 | 73 | 21.6086 | 143.6361 | Barnacle Rocks 1. | | | R794-090 |
| 21:13:23 Apr/12/04 | 391 | 81 | 21.6086 | 143.6361 | Boulder and cobble talus slope with white mat along base of some talus blocks. | | | |
| 21:18:16 Apr/12/04 | 392 | 88 | 21.6086 | 143.6361 | Staying at same place with extensive white crabs and mat around base of rocks. Sand and cobble/boulder slope and lots of barnacles. Crabs are eating mat off rocks. | | | |
| 21:18:18 Apr/12/04 | 392 | 88 | 21.6086 | 143.6361 | Dense crab swarm on gravelly bottom with smalls rocks. | | | R794-091 |
| 21:18:59 Apr/12/04 | 392 | 91 | 21.6086 | 143.6361 | Another shot showing dense crab swarm. | | | R794-092 |
| 21:22:09 Apr/12/04 | 393 | 86 | 21.6087 | 143.6361 | Crab on right is harvesting bacteria off of rocks. | | | R794-093 |
| 21:23:19 Apr/12/04 | 393 | 85 | 21.6086 | 143.6361 | Crabs among barnacle-covered boulders. | | | R794-094 |
| 21:23:55 Apr/12/04 | 393 | 87 | 21.6087 | 143.6361 | We are going to collect a suction sample of the sediment. | | | |
| 21:24:15 Apr/12/04 | 393 | 84 | 21.6087 | 143.6361 | Preparing to sample sediments near Barnacle Boulders. | | | R794-095 |
| 21:25:39 Apr/12/04 | 393 | 107 | 21.6086 | 143.6361 | Similar fauna to East Diamante. Austinograe yunohaha; barnacles; red shrimp. | | | |
| 21:26:46 Apr/12/04 | 393 | 109 | 21.6086 | 143.6361 | Eh is down around 11 right now. The lowest we've seen in awhile. | | | |
| 21:27:19 Apr/12/04 | 393 | 109 | 21.6086 | 143.6361 | Suction sampling sediments. | | | R794-096 |
| 21:27:53 Apr/12/04 | 393 | 108 | 21.6086 | 143.6361 | Suction of fauna into jar 1 (1mm mesh). Eh=-75. Collecting whatever is in the sediment. Looking for polychaetes. Keith got a shrimp and a fish!! Z=393. [Kasuga-2 - Barnacle Boulders]. | R794-SS-J1-0004 | Tunnicliffe | |
| 21:31:22 Apr/12/04 | 393 | 140 | 21.6086 | 143.6361 | We see lots of crabs here. Some diffuse flow. Verena wants a flat fish. | | | |
| 21:33:33 Apr/12/04 | 393 | 158 | 21.6086 | 143.6361 | Looks a lot like Barnacle Beach on E Diamante - but not as many barnacles here. | | | |
| 21:36:22 Apr/12/04 | 392 | 144 | 21.6086 | 143.6361 | Another crab swarm amongst small barnacle-covered boulders. | | | R794-097 |
| 21:36:58 Apr/12/04 | 393 | 144 | 21.6086 | 143.6361 | Juvenile flatfish amongst the crabs. | | | R794-098 |
| 21:37:17 Apr/12/04 | 393 | 145 | 21.6086 | 143.6361 | We're creeping up on a little flat fish here. Keith thinks he can slurp it. Verena doubts it. | | | |
| 21:39:49 Apr/12/04 | 393 | 138 | 21.6086 | 143.6361 | Strike one on us. Missed the fish. Keith's going to try again. They're on to us. A couple DSC's. | | | |
| 21:40:27 Apr/12/04 | 393 | 131 | 21.6086 | 143.6361 | Attempting to suction sample a small flatfish. We got it in SS jar 1. (recorded in sample 4) | | | R794-099 |
| 21:45:05 Apr/12/04 | 393 | 106 | 21.6086 | 143.6361 | Kim wants to suction a small crab. Then we'll have all the fauna seen here. This place is covered with flat fish. DSC of fish. | | | |
| 21:47:07 Apr/12/04 | 393 | 95 | 21.6086 | 143.6361 | Trying to suck a small crab into jar 2. | | | |
| 21:47:35 Apr/12/04 | 393 | 96 | 21.6086 | 143.6361 | Suctioning sediment; crab; Provana snails into jar 2. Z=393. Collected in area of gravel without much bacterial mat cover. An area of extensive flat fish habitat. [Kasuga-2 - Barnacle Boulders]. | R794-SS-J2-0005 | Tunnicliffe / Juniper | |
| 21:49:50 Apr/12/04 | 393 | 94 | 21.6086 | 143.6361 | Close-up of flatfish and Provana (?) snails. | | | R794-100 |
| 21:49:52 Apr/12/04 | 393 | 96 | 21.6086 | 143.6361 | The little gold things on the sediment are provana (a type of snail). | | | |
| 21:52:42 Apr/12/04 | 393 | 96 | 21.6086 | 143.6361 | At least 7 flatfish in this frame. Preparing to collect snails. | | | R794-101 |
| 21:59:09 Apr/12/04 | 393 | 120 | 21.6086 | 143.6361 | Nine or ten flatfish in this shot. | | | R794-102 |
| 22:01:04 Apr/12/04 | 393 | 121 | 21.6086 | 143.6361 | Incredibly high densities of flatfish on gravelly bottom. | | | R794-103 |
| 22:02:26 Apr/12/04 | 393 | 119 | 21.6086 | 143.6361 | The whole bottom appears to be wriggling with both juvenile and adult flatfish. | | | R794-104 |
| 22:05:05 Apr/12/04 | 390 | 76 | 21.6086 | 143.6361 | Moving from area of bare cobble talus where biota were collected to adjacent area with continuous white mat that is very thick on boulder talus in sand. Boulder and cobble talus in sand. Abundant white crabs. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 22:08:50 Apr/12/04 | 391 | 74 | 21.6086 | 143.6361 | Trying to collect a barnacle-covered small cobble using suction and place in purse. Now trying with claw. We will keep in the claw for a while and try to put in purse later. | | | |
| 22:12:54 Apr/12/04 | 391 | 79 | 21.6085 | 143.6361 | Moving to Hairy Mat marker area to sample mat. | | | |
| 22:15:37 Apr/12/04 | 381 | 4 | 21.6087 | 143.6363 | Pebbles and cobbles on sediment-covered slope. Lots of flat fish and white mat are present. | | | |
| 22:17:23 Apr/12/04 | 372 | 22 | 21.6089 | 143.6364 | Abrupt transition from sand to mat. Lots of juvenile flatfish on sand side. | | | R794-105 |
| 22:17:41 Apr/12/04 | 370 | 17 | 21.6089 | 143.6364 | Some areas of yellow sediment alternating with white mat sediment. Area of rippled sand with yellow sediment and mats. Eh is -70 mV. | | | |
| 22:18:39 Apr/12/04 | 366 | 29 | 21.6090 | 143.6364 | Mat covered boulders on otherwise barren slope. | | | R794-106 |
| 22:27:14 Apr/12/04 | 348 | 205 | 21.6092 | 143.6366 | We are going to move to Mat Ridge by moving the ship and moving ROPOS through the water column. | | | |
| 22:34:16 Apr/12/04 | 385 | 214 | 21.6085 | 143.6363 | We are at mat ridge with fractured outcrops with sponges on the rocks. Will try to suction tubeworms off the rocks. The worms are living between sponges on the rock surface. | | | |
| 22:35:37 Apr/12/04 | 386 | 187 | 21.6085 | 143.6363 | What appear to be tubeworms on cliff. | | | R794-107 |
| 22:36:53 Apr/12/04 | 387 | 249 | 21.6085 | 143.6363 | Another close-up of tubeworms surrounded by sponges. | | | R794-108 |
| 22:37:01 Apr/12/04 | 387 | 249 | 21.6085 | 143.6362 | Close-up of tubeworms. | | | R794-109 |
| 22:37:30 Apr/12/04 | 387 | 230 | 21.6085 | 143.6363 | Highlights are on. | | | |
| 22:38:47 Apr/12/04 | 387 | 222 | 21.6085 | 143.6363 | And yet another close-up of tubeworms surrounded by sponges. | | | R794-110 |
| 22:38:55 Apr/12/04 | 387 | 223 | 21.6085 | 143.6363 | Lamellibrachia tubeworms will be sampled by suctioning. | | | |
| 22:39:48 Apr/12/04 | 387 | 222 | 21.6085 | 143.6363 | This one also shows laser sights with tubeworms for scale. | | | R794-111 |
| 22:40:19 Apr/12/04 | 387 | 223 | 21.6085 | 143.6363 | Dense cover of sponges surrounding worms. | | | R794-112 |
| 22:50:40 Apr/12/04 | 387 | 219 | 21.6085 | 143.6363 | Trying to suction Lamellibrachia tubeworms but is stuck in tube. Now will try to suction sponge. | | | |
| 22:52:07 Apr/12/04 | 387 | 219 | 21.6085 | 143.6363 | Suction of Lamellibrachia tubeworms; sponges; and rocks into jar 3. The worms are living between sponges on the rock surface. Z=387. [Kasuga-2 - Mat Ridge]. | R794-SS-J3-0006 | Tunnicliffe | |
| 22:56:20 Apr/12/04 | 387 | 221 | 21.6085 | 143.6363 | Tubeworms and sponges | | | R794-113 |
| 22:56:45 Apr/12/04 | 387 | 222 | 21.6085 | 143.6362 | Barnacles on a rock (sample was logged late - collected at 2208; Z=390). Carried in the claw and not secured. [Kasuga-2 - Cracked Vent]. | R794-bio/geo-0007 | Tunnicliffe | |
| 23:00:33 Apr/12/04 | 387 | 220 | 21.6085 | 143.6362 | One cluster of Lamellibrachia tube worms numbers. | | | |
| 23:04:57 Apr/12/04 | 385 | 178 | 21.6084 | 143.6363 | Cracked Vent. | | | R794-114 |
| 23:05:38 Apr/12/04 | 384 | 72 | 21.6084 | 143.6363 | Sponge rock at Cracked Vent. | | | R794-115 |
| 23:05:43 Apr/12/04 | 385 | 62 | 21.6084 | 143.6362 | Crack on Cracked Vent. | | | R794-116 |
| 23:05:46 Apr/12/04 | 385 | 77 | 21.6084 | 143.6362 | Cracked Vent close up. | | | R794-117 |
| 23:08:04 Apr/12/04 | 384 | 249 | 21.6084 | 143.6363 | Sponges near top of rock outcrop. | | | R794-118 |
| 23:11:35 Apr/12/04 | 391 | 15 | 21.6084 | 143.6362 | Shimmering water coming from crevice at "Crack Vent." | | | R794-119 |
| 23:11:40 Apr/12/04 | 391 | 19 | 21.6084 | 143.6362 | Symphurus is the genus of flatfish seen throughout this dive. | | | |
| 23:13:31 Apr/12/04 | 388 | 46 | 21.6084 | 143.6363 | Barnacles and crabs atop outcrop above shimmering water outflow. | | | R794-120 |
| 23:14:30 Apr/12/04 | 387 | 163 | 21.6084 | 143.6363 | Continuing to look for best shimmering water site at Cracked Vent site in order to do water sampling. | | | |
| 23:23:59 Apr/12/04 | 385 | 109 | 21.6084 | 143.6362 | Getting ready to do water sampling. Eh is now -84 mV. | | | |
| 23:27:49 Apr/12/04 | 386 | 240 | 21.6084 | 143.6363 | Searching for shimmering water at Crack Vent. | | | R794-121 |
| 23:29:56 Apr/12/04 | 387 | 265 | 21.6084 | 143.6363 | HFS unfiltered bag-8. Start 2335 Stop 2339. Tmax=24.3 Tavg=21.4 T2=19. Vol=572ml. Background T1=13.5. Z=388. [Kasuga-2 - Cracked Vent]. | R794-HFS-8-0008 | Butterfield | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R794 Comments: Kasuga-2 | Samples | PI | FrGrab |
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| 23:37:29 Apr/12/04 | 387 | 252 | 21.6084 | 143.6363 | Checking temperature in venting fluid at Cracked Vent. | | | R794-122 |
| 23:40:01 Apr/12/04 | 387 | 252 | 21.6085 | 143.6363 | HFS unfiltered bag-9. Start 2339 Stop 2343. Tmax=26.9 Tavg=22.0 T2=19.0. Vol=660ml. Intake probe pulled out of the flow at the end of sampling. Z=387. [Kasuga-2 - Cracked Vent]. | R794-HFS-9-0009 | Butterfield | |
| 23:40:50 Apr/12/04 | 387 | 254 | 21.6084 | 143.6362 | Firing gas tight bottle #1 (HIL GTB 9). Fired at 2341. T-firing=24. Z=387. [Kasuga-2 - Cracked Vent]. | R794-GTB-1-0010 | Lupton | |
| 23:41:44 Apr/12/04 | 387 | 254 | 21.6084 | 143.6363 | Firing gas tight bottle #2 (HIL GTB 12). Fired at 2342. T-firing=24.5. Z=387. [Kasuga-2 - Cracked Vent]. | R794-GTB-2-0011 | Lupton | |
| 23:46:16 Apr/12/04 | 387 | 248 | 21.6085 | 143.6363 | Repositioning sample intake. Arm is locked in place. | | | |
| 23:46:44 Apr/12/04 | 387 | 248 | 21.6084 | 143.6363 | HFS piston-5. Start 2346 Stop 2351. Tmax=26.5 Tavg=24.8 T2=22.0. Vol=~500ml. Z=387. [Kasuga-2 - Cracked Vent]. | R794-HFS-5-0012 | Butterfield | |
| 23:47:40 Apr/12/04 | 387 | 248 | 21.6084 | 143.6363 | Water sampling at Cracked Vent. | | | R794-123 |
| 23:52:21 Apr/12/04 | 387 | 246 | 21.6084 | 143.6363 | HFS filtered bag-11. Start 2352 Stop 2357. Tmax=26.4 Tavg=24.5 T2=22.0. Vol=760ml. Temperature is holding stable during sampling. Z=387.[Kasuga-2 - Cracked Vent]. | R794-HFS-11-0013 | Butterfield | |
| 23:57:34 Apr/12/04 | 387 | 247 | 21.6084 | 143.6363 | HFS Sterivex filter-13. Start 2357 Stop 0006. Tmax=27.0 Tavg=25.3 T2=22.0. Vol=1312ml. Z=387. [Kasuga-2 - Cracked Vent]. | R794-HFS-13-0014 | Butterfield | |
| 23:57:55 Apr/12/04 | 387 | 247 | 21.6084 | 143.6363 | Barnacles filtering in shimmering water on rock outcrop near Cracked Vent water sampling site. | | | R794-124 |
| 00:03:06 Apr/13/04 | 387 | 247 | 21.6084 | 143.6363 | Detail of feeding barnacles. | | | R794-125 |
| 00:07:11 Apr/13/04 | 386 | 250 | 21.6084 | 143.6363 | Done fluid sampling at Cracked Vent. Stowing the fluid sampler intake and heading to suction some bacterial mat at Mat Ridge. | | | |
| 00:10:58 Apr/13/04 | 390 | 226 | 21.6083 | 143.6363 | Heading 227 to Mat Ridge. Lots of white staining on the rocks and scouring from the currents. | | | |
| 00:12:03 Apr/13/04 | 393 | 217 | 21.6081 | 143.6362 | Transiting to "Mat Ridge". All the small oblong shapes on the sand are juvenile flatfish. | | | R794-126 |
| 00:13:01 Apr/13/04 | 394 | 280 | 21.6081 | 143.6361 | Passing over sediment with lots of flat fish. | | | |
| 00:13:34 Apr/13/04 | 392 | 280 | 21.6081 | 143.6359 | Arriving on Mat Ridge. | | | R794-127 |
| 00:13:51 Apr/13/04 | 391 | 243 | 21.6081 | 143.6360 | View along the crest of Mat Ridge. | | | R794-128 |
| 00:15:56 Apr/13/04 | 390 | 300 | 21.6080 | 143.6359 | We are at Mat Ridge. Ready to sample some bacterial mat. | | | |
| 00:16:21 Apr/13/04 | 391 | 286 | 21.6080 | 143.6359 | Suctioning fluffy bacterial mat into jar #4. Start 0017. Trying to suction the mat off the top without getting the orange crust below. Z=391. [Kasuga-2 - Mat Ridge]. | R794-SS-J4-0015 | Moyer | |
| 00:18:03 Apr/13/04 | 391 | 284 | 21.6080 | 143.6359 | This is a view of the bacterial vista before ravaging. | | | R794-129 |
| 00:22:21 Apr/13/04 | 391 | 299 | 21.6080 | 143.6359 | This is an example of a location that has been de-flocked. | | | R794-130 |
| 00:35:54 Apr/13/04 | 391 | 303 | 21.6080 | 143.6359 | Still suction sampling. We have repositioned a few times to get enough mat. We keep having to stop and drop extra sediment back out of the hose as well. | | | |
| 00:37:38 Apr/13/04 | 391 | 301 | 21.6080 | 143.6359 | Got some extra mat in Jar #5. It was going to be just for flushing but there was quite a bit of mat in the hose still. Calling it a sample. Z=390. [Kasuga-2 - Mat Ridge]. | R794-SS-J5-0016 | Moyer | |
| 00:38:34 Apr/13/04 | 391 | 294 | 21.6080 | 143.6359 | Dive objectives have been completed. We are headed to the surface. | | | |
| 01:02:13 Apr/13/04 | 110 | 324 | 21.6083 | 143.6363 | ROPOS is back in the cage. | | | |
| 01:10:23 Apr/13/04 | 110 | 324 | 21.6081 | 143.6365 | The vehicle is in the cage - but can't be clamped in due to loss of telemetry. The tether is holding it in. | | | |
| 01:26:48 Apr/13/04 | 110 | 324 | 21.6067 | 143.6370 | ROPOS is at the surface. | | | |
| 01:32:34 Apr/13/04 | 110 | 324 | 21.6067 | 143.6370 | ROPOS is on the deck after a skillful; scary recovery. | | | |

# 8.14 R795 Dive Log: Daikoku

| **R795: Daikoku** |
|---|
| wet time (UTC): 4/13 1259 - 4/13 1832. JD 104. 5.55 hrs. |
| bottom time (UTC): 4/13 1330 - 4/13 1750. 4.33 hrs. [7 samples] |
| **R795 DSC information:** There were 242 original DSC taken and 219 final ones were kept stating with R795_DSC_041304_140320_02125.jpg and ending with R795_DSC_041304_175122_02361.jpg |
| Exploratory dive at Daikoku. Found some diffuse venting, tubeworms and other biota. Samples: **Bottomless Pit**: 1 HFS. **Fish Spa**: 5 suctions (bottom sediments under and around flatfish), 1 bio/geo (rock and anemones). Incredible abundance of flatfish (not sampled). |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R795 Comments: Daikoku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 12:59:16 Apr/13/04 | 1 | 8 | 21.6067 | 143.6370 | ROPOS in the water. | | | |
| 13:29:54 Apr/13/04 | 382 | 356 | 21.3249 | 144.1920 | Eh started dropping at 165 m. We are now in the plume. | | | |
| 13:30:40 Apr/13/04 | 394 | 73 | 21.3249 | 144.1920 | We see the bottom. Sandy bottom covered with flatfish. | | | |
| 13:31:57 Apr/13/04 | 395 | 123 | 21.3249 | 144.1919 | We have dropped the HFS wand and trying to pick it up. Eh is -8. | | | |
| 13:34:45 Apr/13/04 | 396 | 121 | 21.3249 | 144.1919 | Seafloor at Daikoku is covered by lots of flat fish. | | | R795-001 |
| 13:35:59 Apr/13/04 | 391 | 119 | 21.3249 | 144.1919 | Checking gauges. | | | |
| 13:36:44 Apr/13/04 | 391 | 114 | 21.3249 | 144.1918 | Background temperature is 14.0 at 390 m. | | | |
| 13:38:50 Apr/13/04 | 391 | 64 | 21.3248 | 144.1919 | We are in an area of fine sediment; similar flatfish (Symforus) as at Kasuga-2. | | | |
| 13:39:27 Apr/13/04 | 392 | 62 | 21.3249 | 144.1920 | We are seeing an outcrop with clumps of tubeworms and some diffuse flow. Very dense community with tubeworms and anemones. | | | |
| 13:40:19 Apr/13/04 | 394 | 67 | 21.3250 | 144.1920 | See what looks like tubeworms with some diffuse venting at base of first outcrop. | | | R795-002 |
| 13:41:48 Apr/13/04 | 396 | 77 | 21.3250 | 144.1920 | Fish hiding among tubeworms. | | | R795-003 |
| 13:43:35 Apr/13/04 | 396 | 95 | 21.3250 | 144.1920 | Have tubeworms with their obturaculum sticking out! | | | R795-004 |
| 13:46:06 Apr/13/04 | 396 | 74 | 21.3250 | 144.1920 | Moving on from Cactus Flower. | | | |
| 13:47:10 Apr/13/04 | 392 | 91 | 21.3250 | 144.1921 | Eh is -13. Continuing to see rocks with tubeworm clumps. | | | |
| 13:48:04 Apr/13/04 | 392 | 156 | 21.3250 | 144.1921 | It is very steep to the east of our travel. Eh is now -46. | | | |
| 13:50:27 Apr/13/04 | 396 | 299 | 21.3251 | 144.1921 | Eh is back up to -37.And then back up to -23. | | | |
| 13:52:03 Apr/13/04 | 401 | 111 | 21.3252 | 144.1921 | Another rocky outcrop covered in fallout from the plume. | | | R795-005 |
| 13:52:06 Apr/13/04 | 401 | 110 | 21.3252 | 144.1921 | We see a big dike cropping out. | | | |
| 13:54:08 Apr/13/04 | 389 | 127 | 21.3251 | 144.1922 | We headed southeast to track the lower Eh. It is decreasing again. | | | |
| 13:56:50 Apr/13/04 | 394 | 66 | 21.3251 | 144.1922 | We cannot see much except for a white slope covered with flatfish. More tubeworms on the rocks. And many shrimp swimming around. | | | |
| 13:57:02 Apr/13/04 | 394 | 146 | 21.3251 | 144.1922 | Loads of sediment on the slope here. It could be sulphur snow from the plume. | | | R795-006 |
| 13:58:23 Apr/13/04 | 392 | 154 | 21.3250 | 144.1922 | Attempt to frame grab these small shrimp swimming around in front of the camera. | | | R795-007 |
| 13:59:27 Apr/13/04 | 392 | 152 | 21.3250 | 144.1922 | More tube worms on a rocky area. | | | R795-008 |
| 14:00:37 Apr/13/04 | 392 | 155 | 21.3250 | 144.1922 | We are going to try to get deeper below the white slopes to look for activity. We will head 50 m deeper. | | | |
| 14:04:20 Apr/13/04 | 395 | 135 | 21.3254 | 144.1917 | Going back down towards the NW of previous spot to see if we can spot the deepest part of the hydrothermal venting. | | | |
| 14:06:46 Apr/13/04 | 418 | 142 | 21.3253 | 144.1916 | Ash covered slope. See starfish. Lava is layered. Sediment is stained. Eh is higher than near the summit. Looks like patches of sulfur in places. | | | |
| 14:10:33 Apr/13/04 | 416 | 208 | 21.3253 | 144.1917 | Lava is sedimented here and appears to be 'older'. See sulfur patches amongst the sediment. Small boulders outcropping with small tubeworms attached locally. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R795 Comments: Daikoku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 14:11:55 Apr/13/04 | 418 | 115 | 21.3253 | 144.1918 | Clumps of tubeworms on the slope as we move up to the NE. | | | R795-009 |
| 14:13:42 Apr/13/04 | 414 | 142 | 21.3252 | 144.1918 | See lots of sulfur all over the slopes here. It appears that sulfur is the matrix for much of the slope. | | | |
| 14:14:23 Apr/13/04 | 409 | 166 | 21.3252 | 144.1918 | Generally see outcrops (several square meters) sticking up from sedimented slopes with both covered in patches of sulfur. Tubeworms are associated with most of the outcrops. Some diffuse venting seen around the outcrops. | | | |
| 14:16:40 Apr/13/04 | 400 | 108 | 21.3251 | 144.1918 | Fairly massive lava outcrop with blocky lavas. Surrounded by sediments (ash) with patches of white that probably is sulfur? Many flatfish seen here. | | | |
| 14:18:04 Apr/13/04 | 403 | 121 | 21.3250 | 144.1918 | Largest flatfish is perhaps 10 cm in length? Many smaller ones. | | | |
| 14:18:16 Apr/13/04 | 402 | 181 | 21.3250 | 144.1919 | Slope covered in flat fish and white mat covered rocks. | | | R795-010 |
| 14:19:26 Apr/13/04 | 401 | 56 | 21.3250 | 144.1919 | Mixed sediment covered slope with lots of flat fish and rocky outcrop on the left. | | | R795-011 |
| 14:20:16 Apr/13/04 | 401 | 42 | 21.3250 | 144.1919 | See lots of colonies of tubeworms. See them especially at the base of the outcrop. May stop here and attempt to take photos and also some water samples. See loads of sulfur about. | | | |
| 14:20:55 Apr/13/04 | 399 | 54 | 21.3251 | 144.1919 | Mat covered rocks and clumps of tubeworms in the distance. | | | R795-012 |
| 14:23:11 Apr/13/04 | 403 | 66 | 21.3251 | 144.1919 | Tangles of tubeworms but no visible shimmering. | | | R795-013 |
| 14:23:46 Apr/13/04 | 402 | 51 | 21.3251 | 144.1919 | Lots of diffuse venting here although not great flow. See sediment and/or sulfur particulates sitting on top of the tubeworms. | | | |
| 14:24:03 Apr/13/04 | 402 | 44 | 21.3251 | 144.1919 | Close up of tubeworm bush. | | | R795-014 |
| 14:26:37 Apr/13/04 | 399 | 115 | 21.3250 | 144.1919 | Continuing upslope and see outcrops of several meters that have signs of tubeworms associated with them but largely sediments here with patches of sulfur poking through. | | | |
| 14:29:15 Apr/13/04 | 397 | 165 | 21.3250 | 144.1921 | Area of venting on the slope with anemone covered rocks and some bacterial mat. | | | R795-015 |
| 14:31:23 Apr/13/04 | 397 | 171 | 21.3250 | 144.1921 | Facing upslope to the south there are mounds of tubeworms. | | | R795-016 |
| 14:32:04 Apr/13/04 | 396 | 153 | 21.3250 | 144.1921 | Re-positioning the sub to get some diffuse water samples and suction samples for biology. | | | |
| 14:33:03 Apr/13/04 | 396 | 116 | 21.3250 | 144.1920 | Seeing extensive clumps of tubeworms. Epifaunal anemones growing on the tubeworms and covering the rocks. Evidence of bioturbation on the sand. | | | |
| 14:34:35 Apr/13/04 | 396 | 124 | 21.3250 | 144.1920 | We are continuing upslope. See the flatfish over the sands. | | | |
| 14:37:32 Apr/13/04 | 389 | 133 | 21.3249 | 144.1921 | Dominated by sediment with flat fish all around. Eh continues to fall as we rise up the slope. | | | |
| 14:39:49 Apr/13/04 | 386 | 104 | 21.3249 | 144.1922 | More water coming right out the slope. | | | R795-017 |
| 14:39:52 Apr/13/04 | 386 | 91 | 21.3249 | 144.1922 | Lots of diffuse venting coming out of the sediments here. Whole slope is hydrothermally altered. Lots of flatfish and sulfur. | | | |
| 14:41:39 Apr/13/04 | 382 | 142 | 21.3248 | 144.1922 | See extensive shimmering of diffuse fluids on the sedimented slope especially where have these white patches of alteration. | | | |
| 14:44:11 Apr/13/04 | 380 | 142 | 21.3247 | 144.1922 | Hermit crabs and mat covered rocks. | | | R795-018 |
| 14:45:26 Apr/13/04 | 380 | 163 | 21.3247 | 144.1922 | Mat covered or sulfur covered sediments. | | | R795-019 |
| 14:46:10 Apr/13/04 | 378 | 126 | 21.3247 | 144.1922 | Swarms of flatfish over the diffuse venting area especially where there is sulfur around. | | | |
| 14:46:17 Apr/13/04 | 378 | 126 | 21.3247 | 144.1922 | It's a flat fish feeding frenzy! | | | R795-020 |
| 14:47:33 Apr/13/04 | 378 | 131 | 21.3246 | 144.1922 | Extremely high density of these flat fish. | | | R795-021 |
| 14:48:04 Apr/13/04 | 378 | 135 | 21.3246 | 144.1922 | Will try and video all the flatfish here at "Fish Swarm" locality. | | | |
| 14:50:25 Apr/13/04 | 378 | 142 | 21.3247 | 144.1923 | Incredible examples of flatfish in a swarm amongst these strange globule shaped things? Are they balls of sulfur? | | | |
| 14:54:59 Apr/13/04 | 345 | 285 | 21.3249 | 144.1921 | Tether management. | | | |
| 14:58:55 Apr/13/04 | 393 | 152 | 21.3248 | 144.1918 | Back on bottom after going through a plume. Now on bottom definitely below the plume. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R795 Comments: Daikoku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 15:00:01 Apr/13/04 | 390 | 234 | 21.3248 | 144.1919 | Eh down to -70. Lots of sediment. | | | |
| 15:01:41 Apr/13/04 | 390 | 146 | 21.3247 | 144.1919 | See a big slump scar in the sediments. There is sulfur on the fracture face. See a dark colored fish - elongate fish inside the fissure. | | | |
| 15:02:22 Apr/13/04 | 390 | 149 | 21.3247 | 144.1919 | Large crack with a huge dark fish peeking out. | | | R795-022 |
| 15:03:20 Apr/13/04 | 390 | 148 | 21.3247 | 144.1919 | Large fish or is it an eel? | | | R795-023 |
| 15:03:37 Apr/13/04 | 390 | 148 | 21.3247 | 144.1919 | Huge cracks in the seafloor. | | | R795-024 |
| 15:04:24 Apr/13/04 | 388 | 157 | 21.3247 | 144.1919 | Fracture appears to be oriented N-S and possibly down to the west? | | | |
| 15:05:40 Apr/13/04 | 382 | 187 | 21.3246 | 144.1918 | Looks like slabs of sulfur cemented ash about 10 cm thick. | | | |
| 15:05:48 Apr/13/04 | 383 | 181 | 21.3246 | 144.1918 | Sulfur cemented ash about 10cm thick. | | | R795-025 |
| 15:06:50 Apr/13/04 | 380 | 163 | 21.3246 | 144.1919 | Looks like the large slabs of crust break up in various places and are cracked. | | | |
| 15:08:40 Apr/13/04 | 376 | 93 | 21.3245 | 144.1919 | Move back to NE along about 375 m water depth. | | | |
| 15:08:52 Apr/13/04 | 376 | 109 | 21.3245 | 144.1919 | More of these cemented ash plates on the slope. | | | R795-026 |
| 15:09:05 Apr/13/04 | 375 | 136 | 21.3245 | 144.1920 | Another interesting cemented ash feature. | | | R795-027 |
| 15:09:47 Apr/13/04 | 374 | 118 | 21.3245 | 144.1920 | See very nice examples of indurated ash as slabs on slopes of volcano. | | | |
| 15:12:02 Apr/13/04 | 376 | 164 | 21.3245 | 144.1921 | See lots of anemones covering hydrothermally altered rocks. Rocks outcrop with adjacent white-colored sediments all around. | | | |
| 15:14:25 Apr/13/04 | 377 | 94 | 21.3246 | 144.1922 | See plume coming straight at us as we move E. See sulfur as matrix to sediment on slope. | | | |
| 15:18:13 Apr/13/04 | 376 | 126 | 21.3246 | 144.1925 | Mostly see sediment in this shallow or upper part of the slope. Some outcrop which is blocky lava and covered with anemones. | | | |
| 15:23:18 Apr/13/04 | 377 | 267 | 21.3245 | 144.1927 | Descended into the small crater above the saddle to the east. | | | |
| 15:23:57 Apr/13/04 | 378 | 267 | 21.3244 | 144.1927 | See massive lavas here quite blocky and jumbled. Looks like flows locally. Very murky water. Bedded ash perhaps? | | | |
| 15:27:06 Apr/13/04 | 399 | 280 | 21.3244 | 144.1927 | Going down a very steep wall that defines a crater or crevasse at the 'saddle' of this volcano. | | | |
| 15:31:31 Apr/13/04 | 409 | 237 | 21.3244 | 144.1928 | This crater is about 10-20 m wide at the SW end and perhaps 30 m wide at the other end (NE). Bottom is 420 m. | | | |
| 15:37:30 Apr/13/04 | 434 | 191 | 21.3245 | 144.1928 | Very deep probable volcanic vent here. Keeps going down. | | | |
| 15:43:25 Apr/13/04 | 444 | 196 | 21.3245 | 144.1928 | Continue to go down this incredibly steep hole/vent. | | | |
| 15:44:33 Apr/13/04 | 448 | 194 | 21.3245 | 144.1928 | 448 m with altimeter on ROPOS still reading 60 m to go! Started about 375 m so at least 135 m deep!! | | | |
| 15:49:41 Apr/13/04 | 420 | 139 | 21.3245 | 144.1929 | About 60 m across and appears mostly circular although possibly more elliptical near the top. | | | |
| 15:51:49 Apr/13/04 | 404 | 148 | 21.3247 | 144.1929 | HSF unfiltered bag-9. Start=15:51 Stop=15:56. T1=14.7 T2=14.6. Vol=730ml. Background water sample. Z=400 to 375m (which is pretty much entirely contained within the bottomless pit. Z=148. [Daikoku - Bottomless Pit]. | R795-HSF-9-0001 | Butterfield | |
| 15:57:52 Apr/13/04 | 373 | 172 | 21.3242 | 144.1928 | Up out of the pit now and have the sediment-covered slopes again. Heading south and resuming the track line up to the summit. | | | |
| 15:59:02 Apr/13/04 | 367 | 191 | 21.3240 | 144.1928 | At point 'B' and now will traverse a little west of south. Moving upslope. Eh was down at -80 inside the volcanic vent and now is up to -10. | | | |
| 16:00:58 Apr/13/04 | 362 | 177 | 21.3238 | 144.1929 | See lots of boulders of lava as we traverse up the slope. See bubbles coming out of the ground here. | | | |
| 16:02:40 Apr/13/04 | 353 | 213 | 21.3236 | 144.1928 | Big boulders of volcaniclastic material? Lots of white bacterial mat(?) and sulfur coated rocks. | | | |
| 16:03:38 Apr/13/04 | 349 | 200 | 21.3235 | 144.1927 | See lots of talus here and milky plume here. | | | |
| 16:05:20 Apr/13/04 | 343 | 248 | 21.3234 | 144.1927 | Heading up slope to the south and seeing some more white staining. | | | R795-028 |
| 16:05:38 Apr/13/04 | 344 | 297 | 21.3235 | 144.1927 | Very steep rocky slope with lots of evidence for alteration on what is a very steep cliff. Called "bluff". See shimmering water from some places. | | | |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R795 Comments: Daikoku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 16:08:51 Apr/13/04 | 320 | 197 | 21.3234 | 144.1927 | See really milky plume near summit of this volcano. See sulfur staining on the rocks. | | | |
| 16:09:06 Apr/13/04 | 320 | 196 | 21.3234 | 144.1927 | Coming up through a milky plume. There is some discoloration in the cracks of the rocks. | | | R795-029 |
| 16:10:39 Apr/13/04 | 318 | 178 | 21.3234 | 144.1927 | Knife-edge ridge forms the top of this volcano (summit). | | | |
| 16:11:43 Apr/13/04 | 313 | 167 | 21.3233 | 144.1927 | Milky white fluid seems to be wafting out of several large cracks in the rock. | | | R795-030 |
| 16:12:15 Apr/13/04 | 311 | 146 | 21.3233 | 144.1927 | This is the summit. More white fluid wafting out of this hole. | | | R795-031 |
| 16:12:22 Apr/13/04 | 310 | 146 | 21.3233 | 144.1927 | Summit is here at about 310 m. Lots of plumes here at the summit. Looks like sulfur-rich plumes wafting around the summit. | | | |
| 16:13:54 Apr/13/04 | 308 | 155 | 21.3233 | 144.1927 | View of the smoky summit. | | | R795-032 |
| 16:16:49 Apr/13/04 | 314 | 263 | 21.3233 | 144.1928 | More views of the summit facing SW. White staining on the rocks and lots of fish. | | | R795-033 |
| 16:17:59 Apr/13/04 | 313 | 194 | 21.3233 | 144.1928 | Summit looks like accumulation of numerous lava bombs? | | | |
| 16:20:19 Apr/13/04 | 339 | 185 | 21.3235 | 144.1927 | Incredibly steep slope composed of lavas and volcaniclastics. Lots of smoke wafting around here. | | | |
| 16:22:38 Apr/13/04 | 344 | 254 | 21.3234 | 144.1927 | More white stained outcrop. | | | R795-034 |
| 16:29:44 Apr/13/04 | 344 | 306 | 21.3234 | 144.1927 | Apparently we are getting ready to do some fluid sampling here. | | | |
| 16:30:02 Apr/13/04 | 345 | 303 | 21.3234 | 144.1927 | Positioning to sample water at bluff. | | Butterfield | R795-035 |
| 16:30:40 Apr/13/04 | 344 | 269 | 21.3234 | 144.1927 | We don't have a proper grip on the fluid sampler probe. Try to get a better grip but not fluid sampling here. | | | |
| 16:33:00 Apr/13/04 | 342 | 200 | 21.3234 | 144.1927 | Going to go back to point A where we saw more diffuse vents and tubeworms and do fluid sampling there. | | | |
| 16:35:23 Apr/13/04 | 336 | 72 | 21.3236 | 144.1928 | Heading back to the landing site. Transiting there through the water off the bottom. Highlights off. | | | |
| 16:53:48 Apr/13/04 | 303 | 162 | 21.3251 | 144.1919 | Ship in position. Heading back down to the bottom. Back at site where the dive began. | | | |
| 17:01:06 Apr/13/04 | 388 | 115 | 21.3250 | 144.1919 | Coming down through a thick plume at about 17 meters off the bottom. | | | |
| 17:01:43 Apr/13/04 | 392 | 117 | 21.3250 | 144.1919 | Eh is dropping down quickly as we descend. | | | |
| 17:03:15 Apr/13/04 | 397 | 101 | 21.3251 | 144.1920 | Bottom is in sight. Looking for a good place to take both fluid and biology samples. | | | |
| 17:05:46 Apr/13/04 | 398 | 152 | 21.3250 | 144.1920 | Possible sampling site near initial landing. | | | R795-036 |
| 17:06:20 Apr/13/04 | 398 | 155 | 21.3250 | 144.1920 | Looking around some tubeworm bushes but there doesn't seem to be any visible venting. | | | |
| 17:09:08 Apr/13/04 | 396 | 146 | 21.3249 | 144.1920 | Looking around for another tubeworm bush. | | | |
| 17:12:06 Apr/13/04 | 397 | 132 | 21.3250 | 144.1920 | Not really seeing any venting associated with the tubeworm bushes. Look around a little more then go to Fish Spa. | | | |
| 17:14:00 Apr/13/04 | 390 | 149 | 21.3249 | 144.1921 | Going to Fish Spa. Passing over some sediment with ripple marks. | | | |
| 17:16:16 Apr/13/04 | 377 | 232 | 21.3246 | 144.1922 | We are at Fish Spa. Looking for a thick patch of flat fish where we can suction up some of the sediment below. | | | |
| 17:18:22 Apr/13/04 | 378 | 142 | 21.3246 | 144.1922 | Using the fluid sampler to check the temperature here. | | | |
| 17:19:43 Apr/13/04 | 378 | 141 | 21.3246 | 144.1922 | Bottom of fish. | | | R795-037 |
| 17:20:20 Apr/13/04 | 378 | 139 | 21.3246 | 144.1922 | The arm is not working properly so we are skipping temperature measurements for now. | | | |
| 17:21:05 Apr/13/04 | 378 | 141 | 21.3246 | 144.1922 | On to some suction sampling of sediment. | | | |
| 17:25:11 Apr/13/04 | 378 | 133 | 21.3246 | 144.1922 | Suction sampling may not be possible either. There is some connection between the malfunctioning arm and the suction sampler. Trying to correct the problem. | | | |
| 17:29:42 Apr/13/04 | 378 | 146 | 21.3246 | 144.1922 | Looks like we will be able to suction sample now. | | | |
| 17:30:46 Apr/13/04 | 378 | 143 | 21.3246 | 144.1922 | Suctioning large "dumpling" sediment deposits that are around the dense populations of flat fish into jar 2. Start 1732. Z=378. [Daikoku - Fish Spa]. | R795-SS-J2-0002 | Tunnicliffe/ Juniper | |
| 17:32:27 Apr/13/04 | 378 | 132 | 21.3246 | 144.1922 | Suction sampling at Fish Spa. | | | R795-038 |

| UTC | Z(m) | Hdg | Lat (N) | Long (E) | R795 Comments: Daikoku | Samples | PI | FrGrab |
|---|---|---|---|---|---|---|---|---|
| 17:36:18 Apr/13/04 | 378 | 137 | 21.3246 | 144.1922 | Suctioning finer sediments under the dense populations of flat fish into jar 3. (same location as jar 2) Start 1738. Z=378. [Daikoku - Fish Spa]. | R795-SS-J3-0003 | Tunnicliffe/ Juniper | |
| 17:38:55 Apr/13/04 | 378 | 134 | 21.3246 | 144.1922 | Same sampling area as before. | | | R795-039 |
| 17:41:16 Apr/13/04 | 378 | 139 | 21.3246 | 144.1922 | Suctioning a combination of bottom material from under the dense populations of flat fish into jar 4. Start 1740. Z=378. [Daikoku - Fish Spa]. | R795-SS-J4-0004 | Tunnicliffe/ Juniper | |
| 17:42:39 Apr/13/04 | 378 | 146 | 21.3246 | 144.1922 | Suctioning a combination of bottom material from under the dense populations of flat fish into Jar 5. Start 1742. Z=378. [Daikoku - Fish Spa]. | R795-SS-J5-0005 | Moyer | |
| 17:44:16 Apr/13/04 | 378 | 145 | 21.3246 | 144.1922 | Flushing suction sampler into Jar 6. | | | |
| 17:45:24 Apr/13/04 | 377 | 52 | 21.3246 | 144.1922 | Heading East to find a piece of outcrop to sample. | | | |
| 17:46:12 Apr/13/04 | 377 | 111 | 21.3247 | 144.1923 | We have found a rock! It is about 15-20cm in diameter. | | | |
| 17:46:18 Apr/13/04 | 377 | 126 | 21.3247 | 144.1923 | Rock sample. | | | R795-040 |
| 17:47:16 Apr/13/04 | 378 | 123 | 21.3247 | 144.1924 | Sampling a rock that is covered with anemones. It is about 15-20 cm in diameter and was sitting in the middle of a sandy slope. Z=378. [Daikoku - East of Fish Spa]. | R795-bio/geo-0006 | SROF geo team | |
| 17:47:39 Apr/13/04 | 378 | 129 | 21.3247 | 144.1924 | Close up of rock sample. | | | R795-041 |
| 17:50:09 Apr/13/04 | 361 | 108 | 21.3248 | 144.1923 | That is the end of the dive. Heading to the surface. | | | |
| 18:09:06 Apr/13/04 | 290 | 20 | 21.3251 | 144.1920 | ROPOS having the same problem as on last dive. The telemetry is out and the vehicle isn't secure inside the cage. | | | |
| 18:32:55 Apr/13/04 | 290 | 20 | 21.3204 | 144.1931 | ROPOS at surface. | | | |
| 18:35:00 Apr/13/04 | 290 | 20 | 21.3236 | 144.1917 | ROPOS on deck. End of ROPOS operations for SROF 2004. | | | |

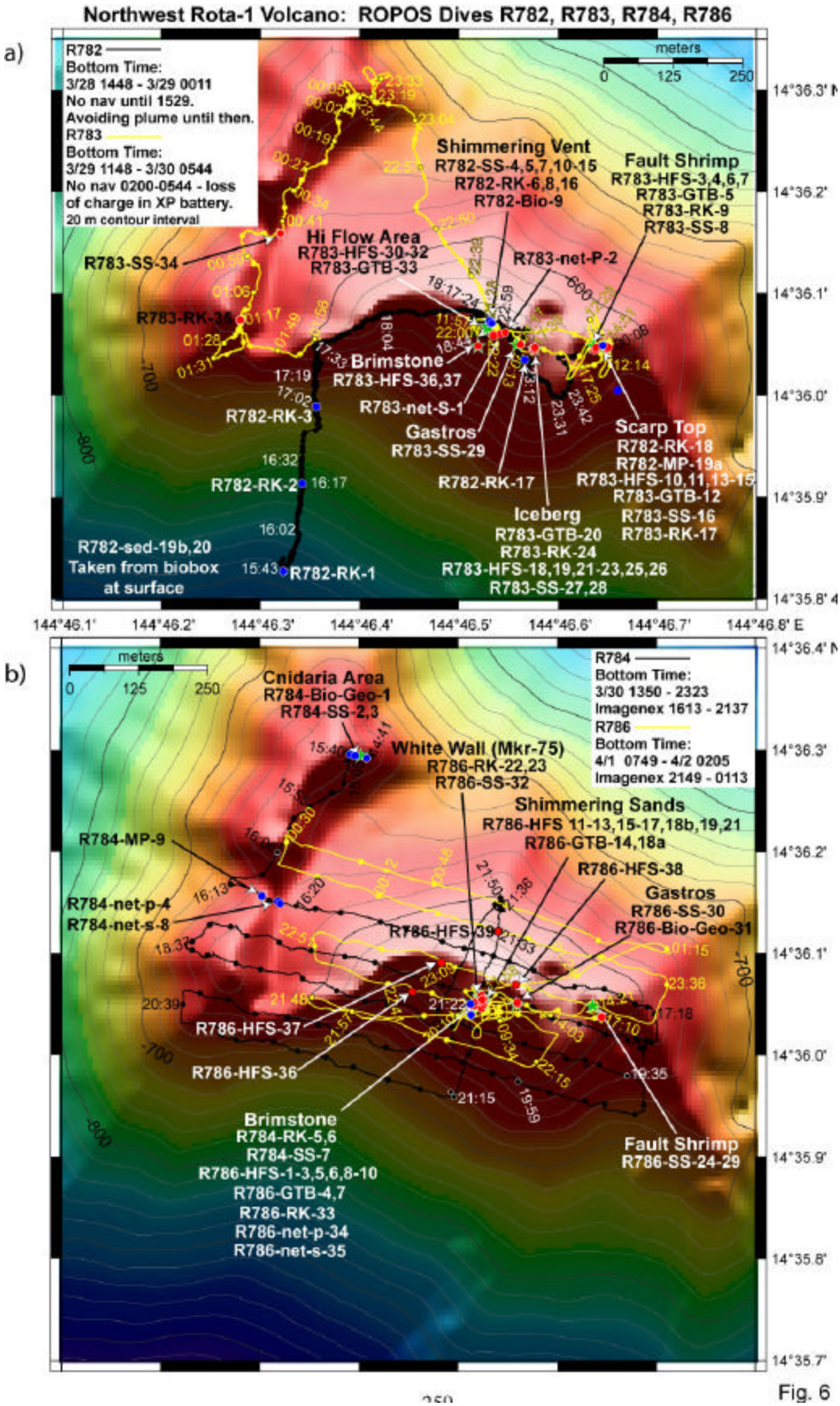

Northwest Rota-1 Volcano: ROPOS Dives R782, R783, R784, R786
a)
R782
Bottom Time:
3/28 1448 - 3/29 0011
No nav until 1529.
Avoiding plume until then.
R783
Bottom Time:
3/29 1148 - 3/30 0544
No nav 0200-0544 - loss of charge in XP battery.
20 m contour interval
meters
0 125 250
Shimmering Vent
R782-SS-4,5,7,10-15
R782-RK-6,8,16
R782-Bio-9
Fault Shrimp
R783-HFS-3,4,6,7
R783-GTB-5
R783-RK-9
R783-SS-8
Hi Flow Area
R783-HFS-30-32
R783-GTB-33
R783-SS-34
R783-net-P-2
R783-RK-35
Brimstone
R783-HFS-36,37
R783-net-S-1
R782-RK-3
Gastros
R783-SS-29
Scarp Top
R782-RK-18
R782-MP-19a
R783-HFS-10,11,13-15
R783-GTB-12
R783-SS-16
R783-RK-17
R782-RK-2
R782-RK-17
Iceberg
R783-GTB-20
R783-RK-24
R783-HFS-18,19,21-23,25,26
R783-SS-27,28
R782-sed-19b,20
Taken from biobox at surface
R782-RK-1
14°36.3' N
14°36.2'
14°36.1'
14°36.0'
14°35.9'
14°35.8'
144°46.1' 144°46.2' 144°46.3' 144°46.4' 144°46.5' 144°46.6' 144°46.7' 144°46.8' E
b)
meters
0 125 250
Cnidaria Area
R784-Bio-Geo-1
R784-SS-2,3
White Wall (Mkr-75)
R786-RK-22,23
R786-SS-32
R784
Bottom Time:
3/30 1350 - 2323
Imagenex 1613 - 2137
R786
Bottom Time:
4/1 0749 - 4/2 0205
Imagenex 2149 - 0113
Shimmering Sands
R786-HFS 11-13,15-17,18b,19,21
R786-GTB-14,18a
R784-MP-9
R786-HFS-38
Gastros
R786-SS-30
R786-Bio-Geo-31
R784-net-p-4
R784-net-s-8
R786-HFS-39
R786-HFS-37
R786-HFS-36
Brimstone
R784-RK-5,6
R784-SS-7
R786-HFS-1-3,5,6,8-10
R786-GTB-4,7
R786-RK-33
R786-net-p-34
R786-net-s-35
Fault Shrimp
R786-SS-24-29
14°36.4' N
14°36.3'
14°36.2'
14°36.1'
14°36.0'
14°35.9'
14°35.8'
14°35.7'

Fig. 6

Figure 6 back

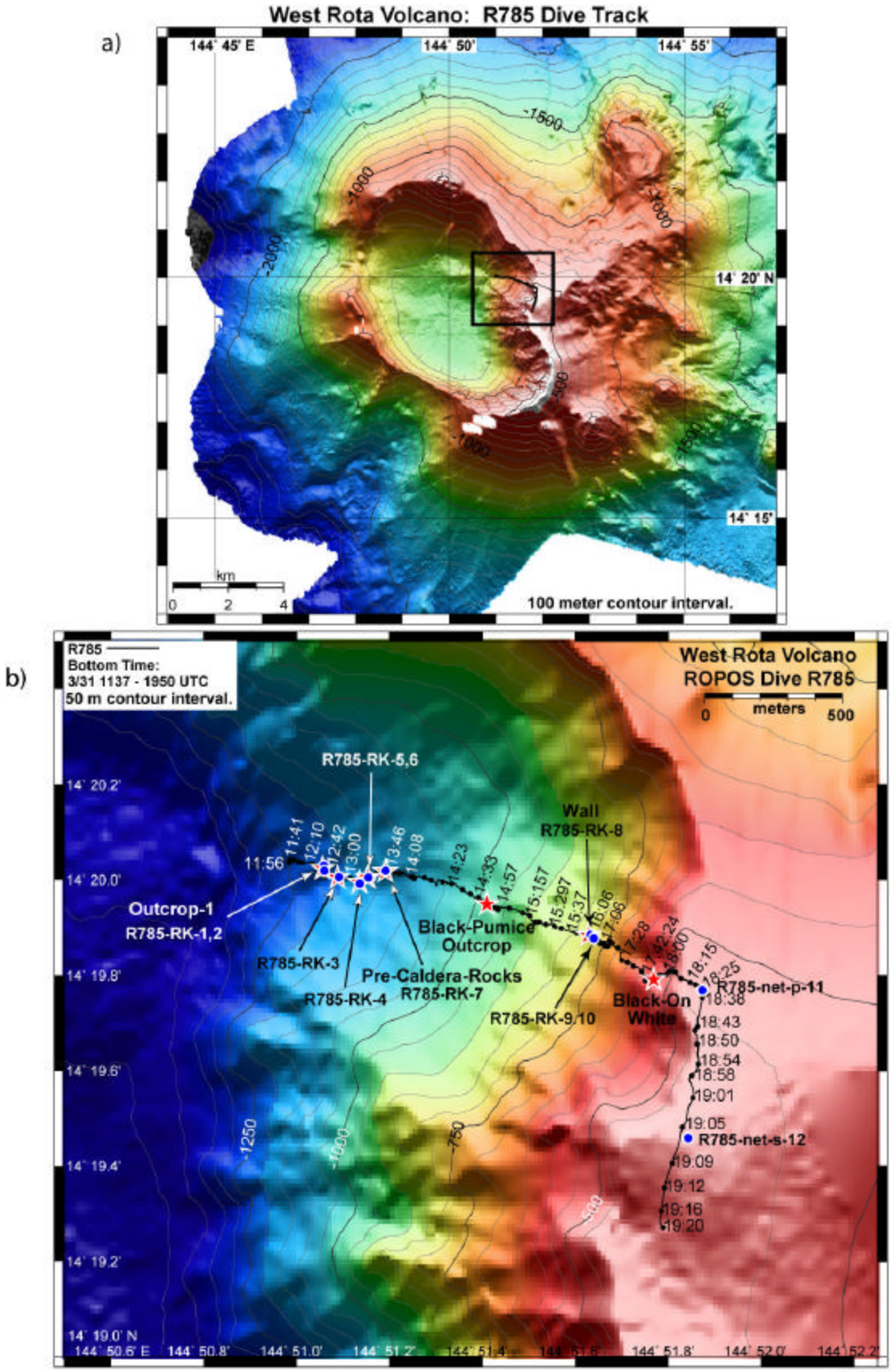
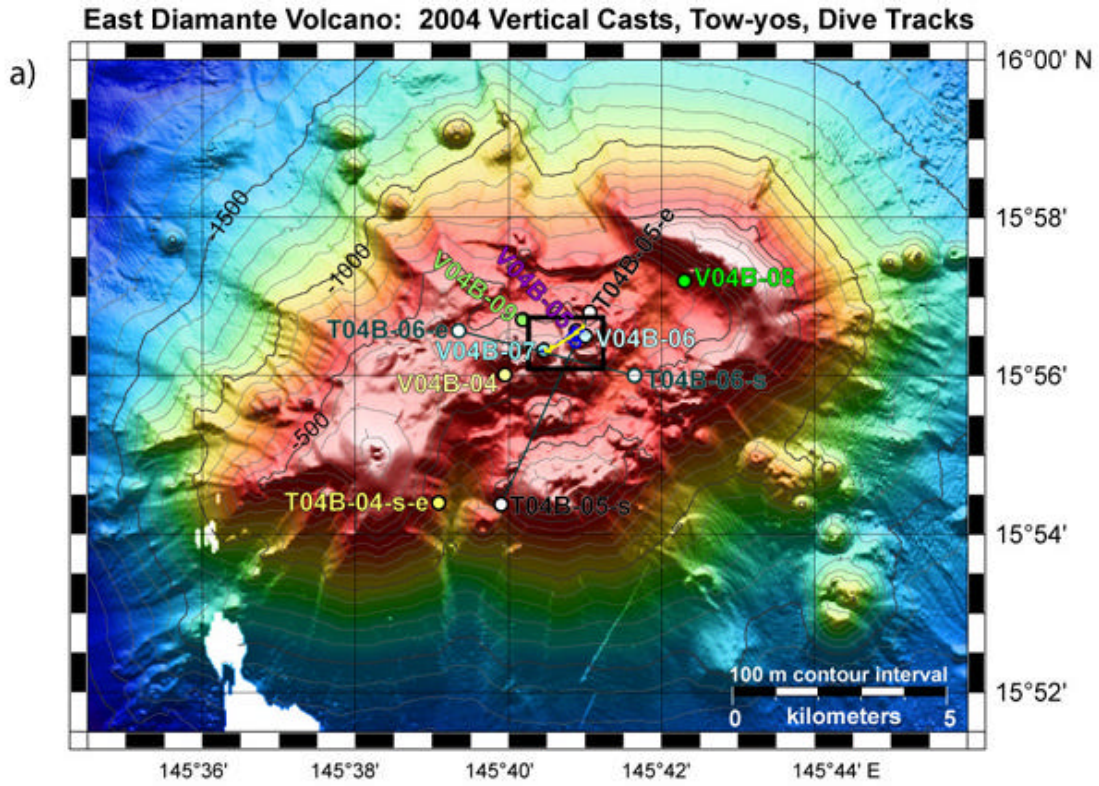

a)
West Rota Volcano: R785 Dive Track
144° 45' E
144° 50'
144° 55'
14° 20' N
14° 15'
-1500
-1000
-2000
-1000
-500
-1000
-1500
km
0 2 4
100 meter contour interval.
b)
R785
Bottom Time:
3/31 1137 - 1950 UTC
50 m contour interval.
West Rota Volcano
ROPOS Dive R785
0 meters 500
R785-RK-5,6
Wall
R785-RK-8
Outcrop-1
R785-RK-1,2
R785-RK-3
R785-RK-4
Pre-Caldera-Rocks
R785-RK-7
Black-Pumice
Outcrop
R785-RK-9,10
Black-On
White
R785-net-p-11
R785-net-s-12
11:56
11:41
12:10
12:42
13:00
13:46
14:08
14:23
14:33
14:57
15:157
15:297
15:37
16:06
17:06
17:28
17:42
17:24
18:00
18:15
18:25
18:36
18:43
18:50
18:54
18:58
19:01
19:05
19:09
19:12
19:16
19:20
14° 20.2'
14° 20.0'
14° 19.8'
14° 19.6'
14° 19.4'
14° 19.2'
14° 19.0' N
144° 50.6' E
144° 50.8'
144° 51.0'
144° 51.2'
144° 51.4'
144° 51.6'
144° 51.8'
144° 52.0'
144° 52.2'
-1250
-1000
-750
-500

Fig. 7

Figure 7 back


East Diamante Volcano: 2004 Vertical Casts, Tow-yos, Dive Tracks
a)
16°00' N
15°58'
15°56'
15°54'
15°52'
145°36'
145°38'
145°40'
145°42'
145°44' E
-1500
-1000
-500
V04B-08
V04B-09
V04B-05
T04B-05-e
T04B-06-e
V04B-07
V04B-06
V04B-04
T04B-06-s
T04B-04-s-e
T04B-05-s
100 m contour interval
0 kilometers 5

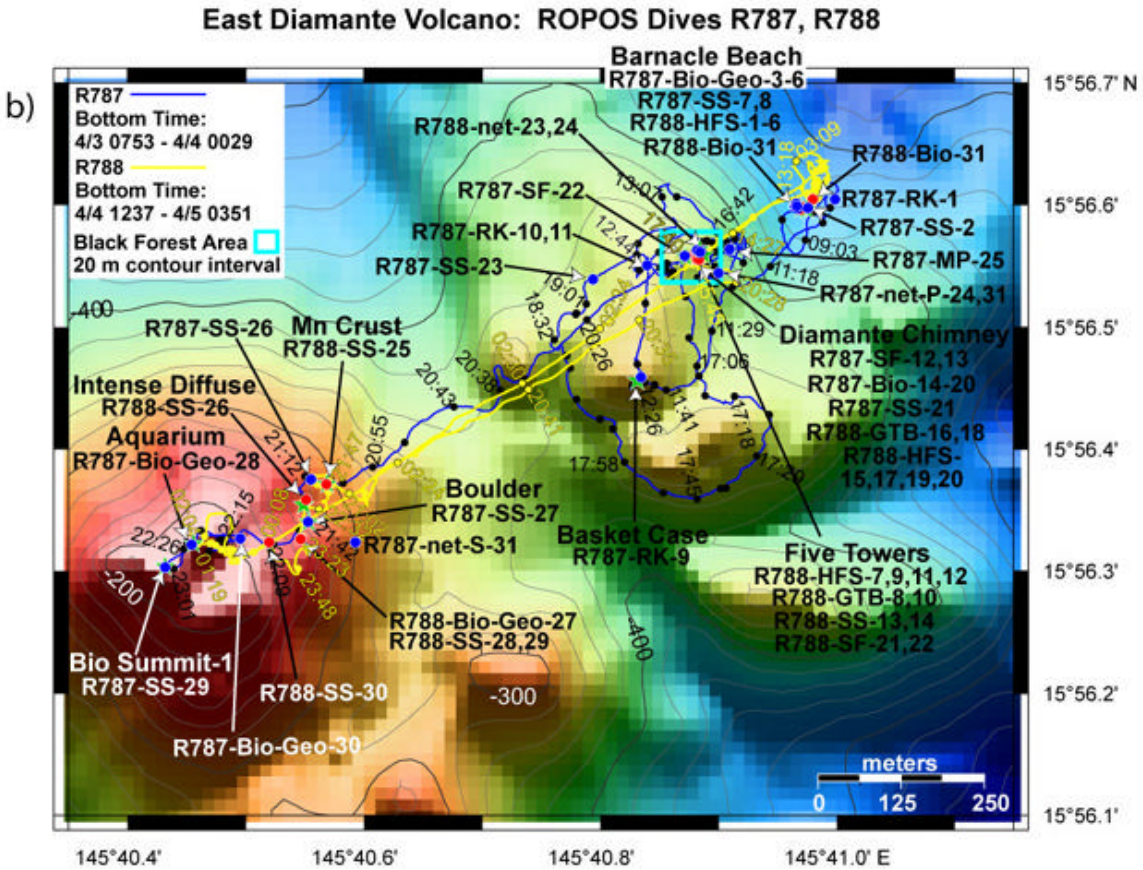

East Diamante Volcano: ROPOS Dives R787, R788
b)
R787
Bottom Time:
4/3 0753 - 4/4 0029
R788
Bottom Time:
4/4 1237 - 4/5 0351
Black Forest Area
20 m contour interval
Barnacle Beach
R787-Bio-Geo-3-6
R787-SS-7,8
R788-HFS-1-6
R788-Bio-31
R788-net-23,24
R788-Bio-31
R787-SF-22
R787-RK-1
R787-SS-2
R787-RK-10,11
R787-MP-25
R787-SS-23
R787-net-P-24,31
R787-SS-26
Mn Crust
R788-SS-25
Diamante Chimney
R787-SF-12,13
R787-Bio-14-20
R787-SS-21
R788-GTB-16,18
R788-HFS-15,17,19,20
Intense Diffuse
R788-SS-26
Aquarium
R787-Bio-Geo-28
Boulder
R787-SS-27
R787-net-S-31
Basket Case
R787-RK-9
Five Towers
R788-HFS-7,9,11,12
R788-GTB-8,10
R788-SS-13,14
R788-SF-21,22
R788-Bio-Geo-27
R788-SS-28,29
Bio Summit-1
R787-SS-29
R788-SS-30
R787-Bio-Geo-30
-400
-300
-200
meters
0 125 250
15°56.7' N
15°56.6'
15°56.5'
15°56.4'
15°56.3'
15°56.2'
15°56.1'
145°40.4'
145°40.6'
145°40.8'
145°41.0' E

Fig. 8

Figure 8 back

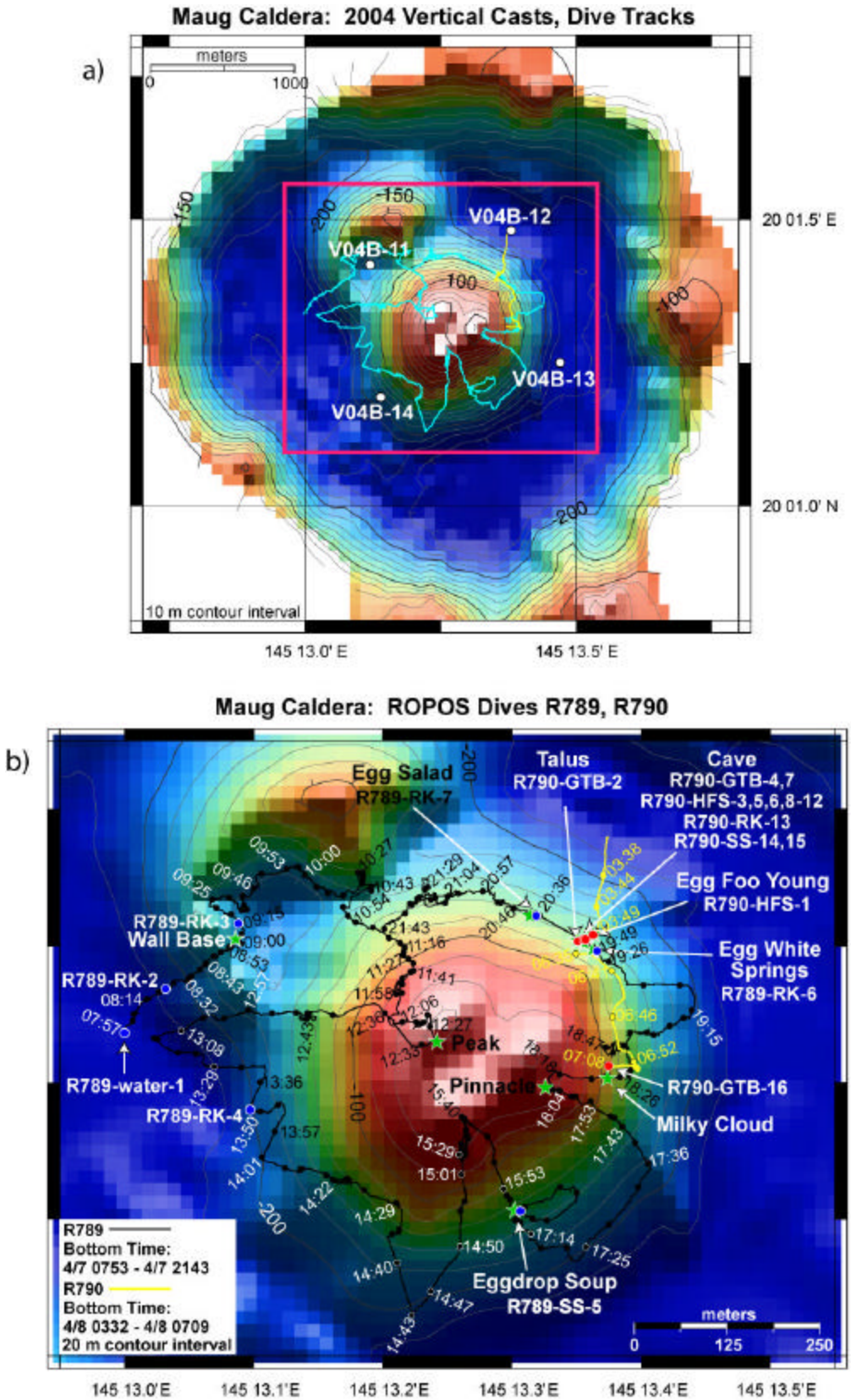

Maug Caldera: 2004 Vertical Casts, Dive Tracks
a)
meters
0
1000
V04B-12
V04B-11
V04B-13
V04B-14
-150
-200
100
20 01.5' E
20 01.0' N
10 m contour interval
145 13.0' E
145 13.5' E
Maug Caldera: ROPOS Dives R789, R790
b)
Egg Salad
R789-RK-7
Talus
R790-GTB-2
Cave
R790-GTB-4,7
R790-HFS-3,5,6,8-12
R790-RK-13
R790-SS-14,15
Egg Foo Young
R790-HFS-1
Egg White
Springs
R789-RK-6
R789-RK-3
Wall Base
R789-RK-2
R789-water-1
R789-RK-4
Peak
Pinnacle
R790-GTB-16
Milky Cloud
Eggdrop Soup
R789-SS-5
R789
Bottom Time:
4/7 0753 - 4/7 2143
R790
Bottom Time:
4/8 0332 - 4/8 0709
20 m contour interval
meters
0
125
250
20 01.5'N
20 01.4'N
20 01.3'N
20 01.2'N
20 01.1'N
145 13.0'E
145 13.1'E
145 13.2'E
145 13.3'E
145 13.4'E
145 13.5'E

Fig. 9

Figure 9 back

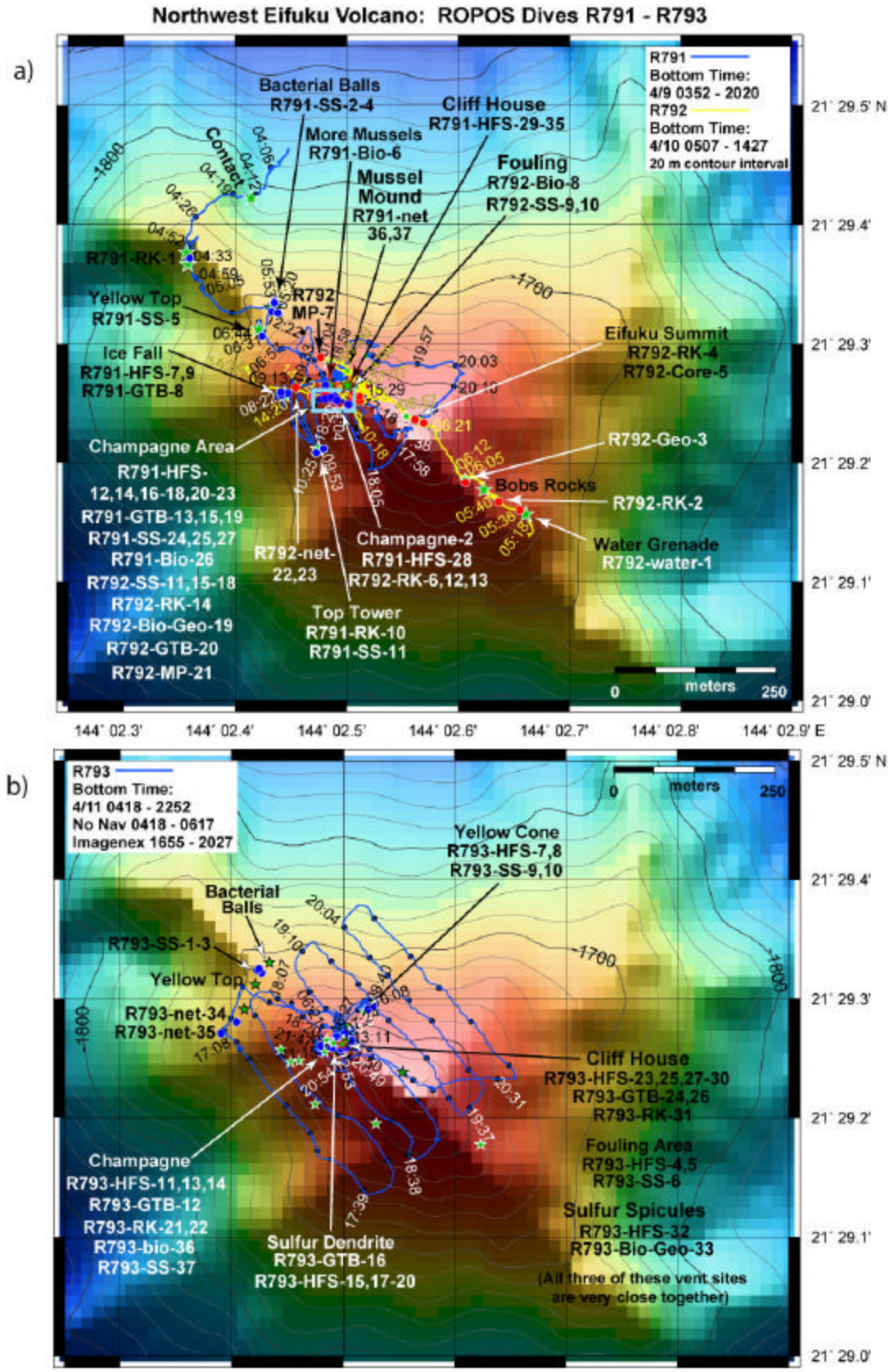

Northwest Eifuku Volcano: ROPOS Dives R791 - R793
a)
R791
Bottom Time:
4/9 0352 - 2020
R792
Bottom Time:
4/10 0507 - 1427
20 m contour interval
Bacterial Balls
R791-SS-2-4
Cliff House
R791-HFS-29-35
More Mussels
R791-Bio-6
Fouling
R792-Bio-8
R792-SS-9,10
Mussel Mound
R791-net
36,37
Contact
R791-RK-1
Yellow Top
R791-SS-5
R792
MP-7
Ice Fall
R791-HFS-7,9
R791-GTB-8
Eifuku Summit
R792-RK-4
R792-Core-5
Champagne Area
R791-HFS-
12,14,16-18,20-23
R791-GTB-13,15,19
R791-SS-24,25,27
R791-Bio-26
R792-SS-11,15-18
R792-RK-14
R792-Bio-Geo-19
R792-GTB-20
R792-MP-21
R792-Geo-3
Bobs Rocks
R792-RK-2
Water Grenade
R792-water-1
R792-net-
22,23
Champagne-2
R791-HFS-28
R792-RK-6,12,13
Top Tower
R791-RK-10
R791-SS-11
0
meters
250
21° 29.5' N
21° 29.4'
21° 29.3'
21° 29.2'
21° 29.1'
21° 29.0'
144° 02.3'
144° 02.4'
144° 02.5'
144° 02.6'
144° 02.7'
144° 02.8'
144° 02.9' E
b)
R793
Bottom Time:
4/11 0418 - 2252
No Nav 0418 - 0617
Imagenex 1655 - 2027
Yellow Cone
R793-HFS-7,8
R793-SS-9,10
Bacterial Balls
R793-SS-1-3
Yellow Top
R793-net-34
R793-net-35
Cliff House
R793-HFS-23,25,27-30
R793-GTB-24,26
R793-RK-31
Fouling Area
R793-HFS-4,5
R793-SS-6
Champagne
R793-HFS-11,13,14
R793-GTB-12
R793-RK-21,22
R793-bio-36
R793-SS-37
Sulfur Dendrite
R793-GTB-16
R793-HFS-15,17-20
Sulfur Spicules
R793-HFS-32
R793-Bio-Geo-33
(All three of these vent sites
are very close together)
0
meters
250
21° 29.5' N
21° 29.4'
21° 29.3'
21° 29.2'
21° 29.1'
21° 29.0'

Fig. 10

Figure 10 back

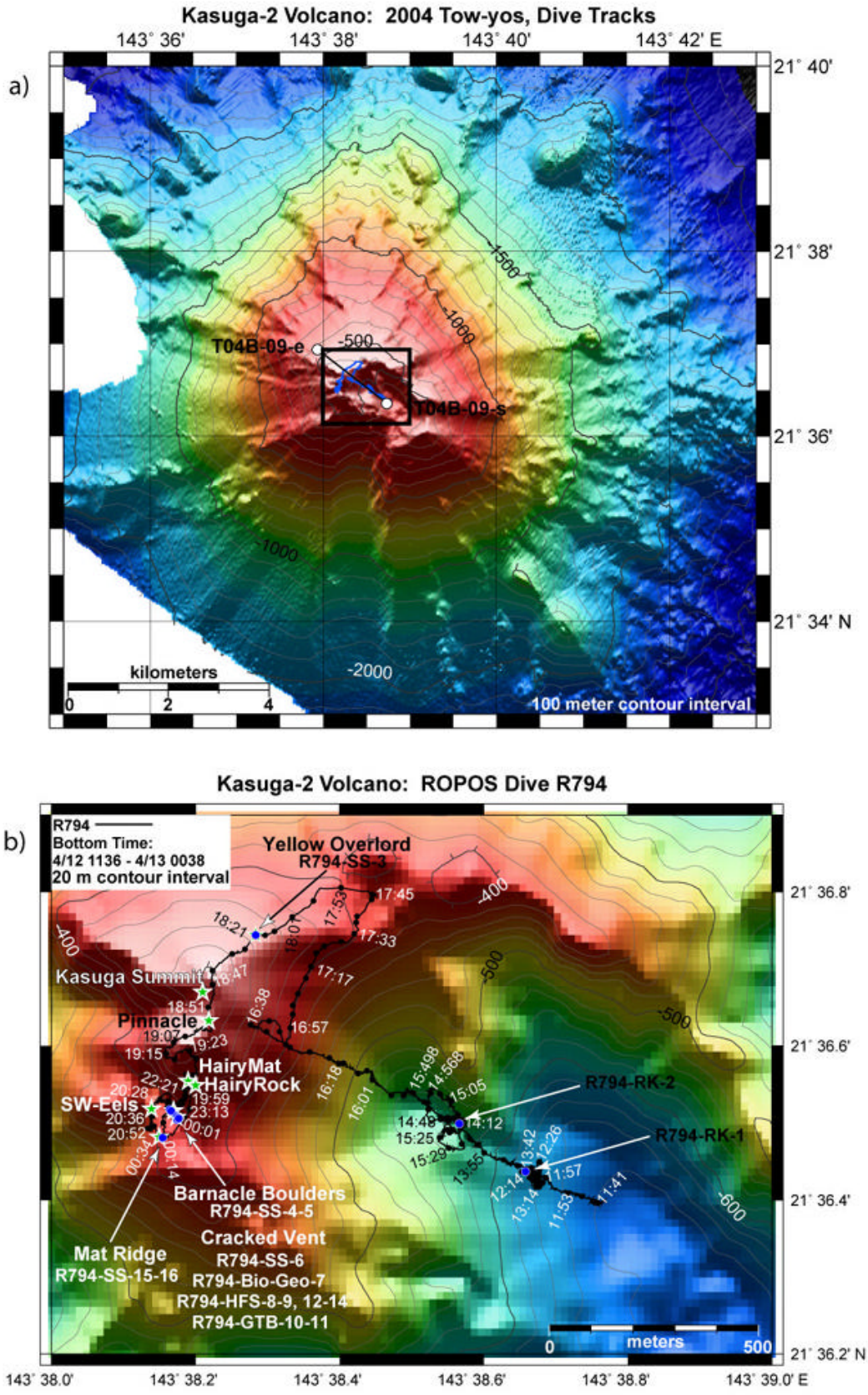
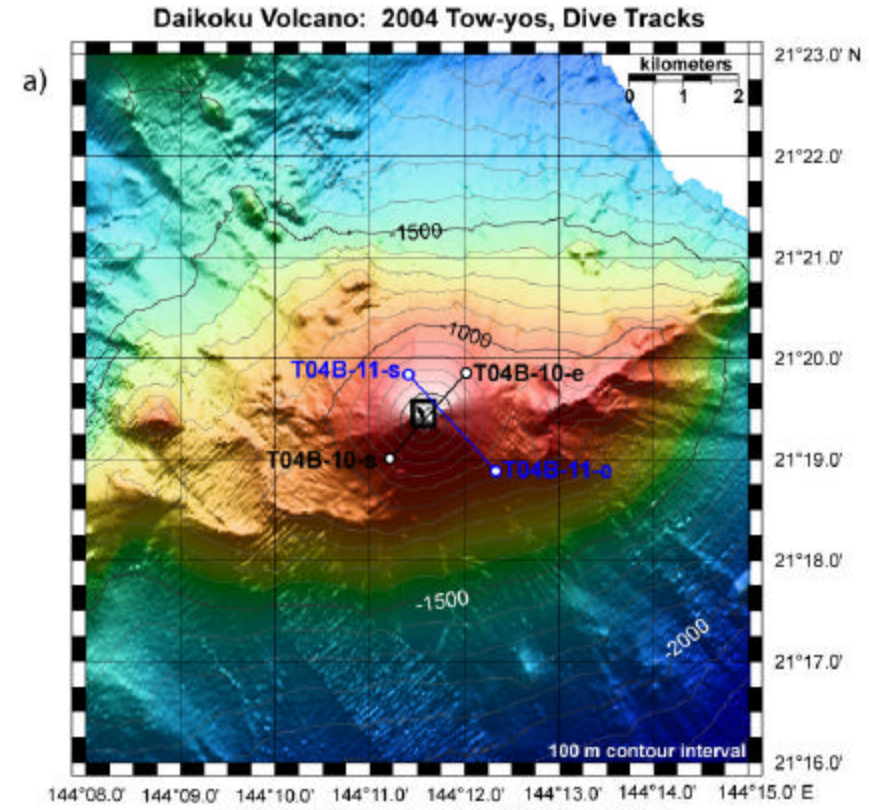

a)
Kasuga-2 Volcano: 2004 Tow-yos, Dive Tracks
143° 36'
143° 38'
143° 40'
143° 42' E
21° 40'
21° 38'
21° 36'
21° 34' N
T04B-09-e
T04B-09-s
-500
-1000
-1500
-2000
kilometers
0
2
4
100 meter contour interval
b)
Kasuga-2 Volcano: ROPOS Dive R794
R794
Bottom Time:
4/12 1136 - 4/13 0038
20 m contour interval
Yellow Overlord
R794-SS-3
Kasuga Summit
Pinnacle
HairyMat
HairyRock
SW-Eels
Barnacle Boulders
R794-SS-4-5
Cracked Vent
R794-SS-6
R794-Bio-Geo-7
R794-HFS-8-9, 12-14
R794-GTB-10-11
Mat Ridge
R794-SS-15-16
R794-RK-2
R794-RK-1
-400
-500
-600
meters
0
500
21° 36.8'
21° 36.6'
21° 36.4'
21° 36.2' N
143° 38.0'
143° 38.2'
143° 38.4'
143° 38.6'
143° 38.8'
143° 39.0' E

Fig. 11

Figure 11 back


Daikoku Volcano: 2004 Tow-yos, Dive Tracks
a)
kilometers
0 1 2
21°23.0' N
21°22.0'
21°21.0'
21°20.0'
21°19.0'
21°18.0'
21°17.0'
21°16.0'
-1500
-1000
-2000
T04B-11-s
T04B-10-e
T04B-10-s
T04B-11-e
100 m contour interval
144°08.0' 144°09.0' 144°10.0' 144°11.0' 144°12.0' 144°13.0' 144°14.0' 144°15.0' E

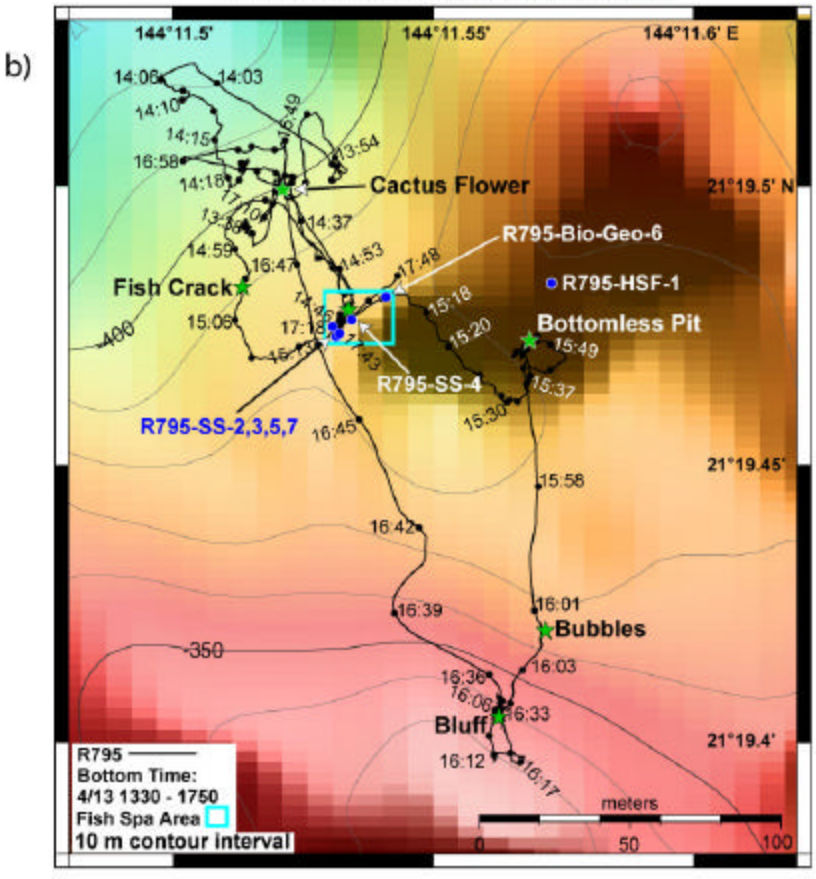

Daikoku Volcano: ROPOS Dive R795
b)
144°11.5'
144°11.55'
144°11.6' E
21°19.5' N
21°19.45'
21°19.4'
Cactus Flower
R795-Bio-Geo-6
R795-HSF-1
Fish Crack
Bottomless Pit
R795-SS-4
R795-SS-2,3,5,7
Bubbles
Bluff
-400
-350
R795
Bottom Time:
4/13 1330 - 1750
Fish Spa Area
10 m contour interval
meters
0 50 100

Fig. 12

Figure 12 back

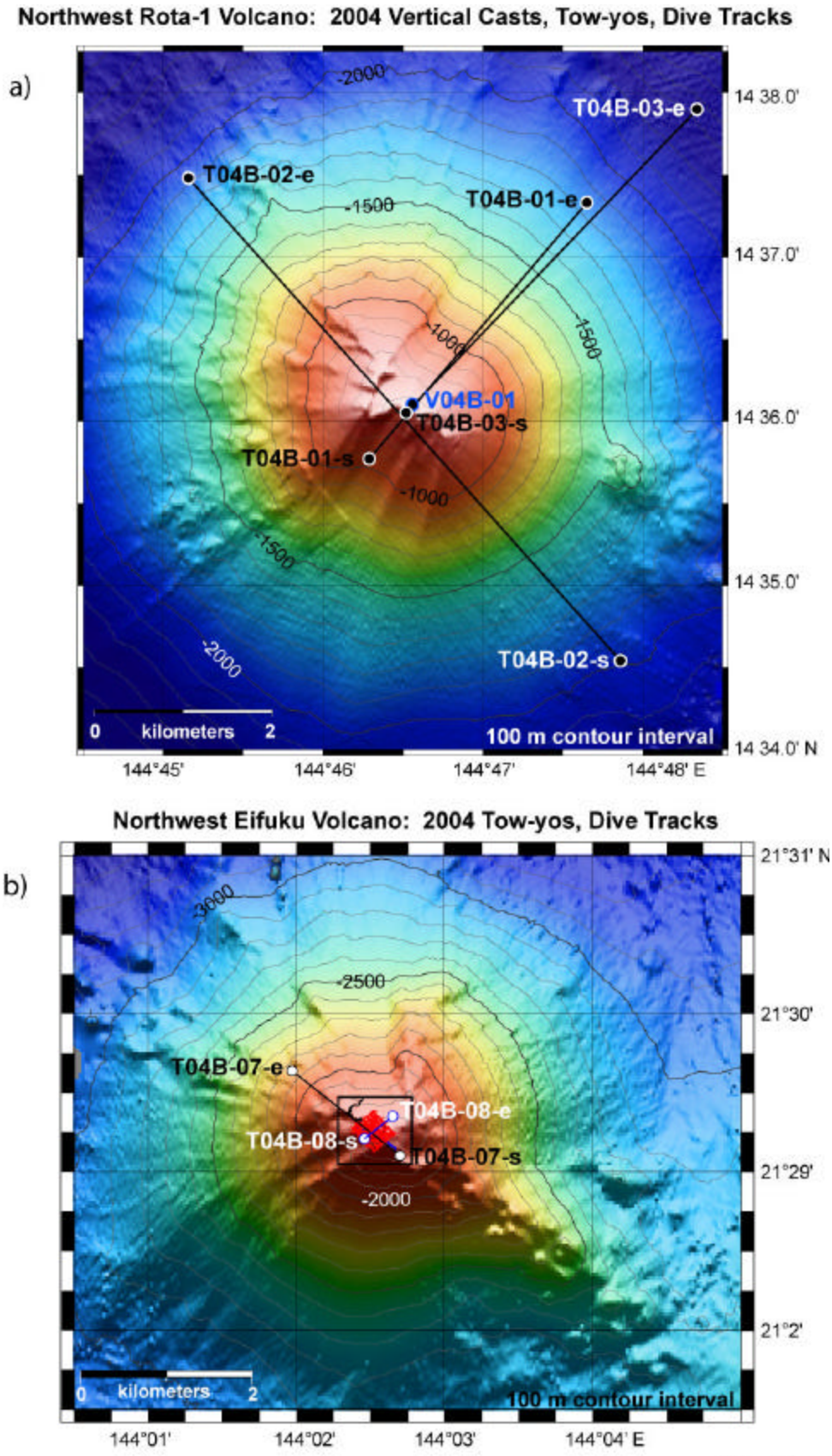

Northwest Rota-1 Volcano: 2004 Vertical Casts, Tow-yos, Dive Tracks
a)
-2000
T04B-03-e
14 38.0'
T04B-02-e
-1500
T04B-01-e
14 37.0'
-1000
-1500
V04B-01
T04B-03-s
14 36.0'
T04B-01-s
-1000
-1500
14 35.0'
-2000
T04B-02-s
0 kilometers 2
100 m contour interval
14 34.0' N
144°45'
144°46'
144°47'
144°48' E
Northwest Eifuku Volcano: 2004 Tow-yos, Dive Tracks
b)
21°31' N
-3000
-2500
21°30'
T04B-07-e
T04B-08-e
T04B-08-s
T04B-07-s
21°29'
-2000
21°2'
0 kilometers 2
100 m contour interval
144°01'
144°02'
144°03'
144°04' E

Fig. 13

Figure 13 back