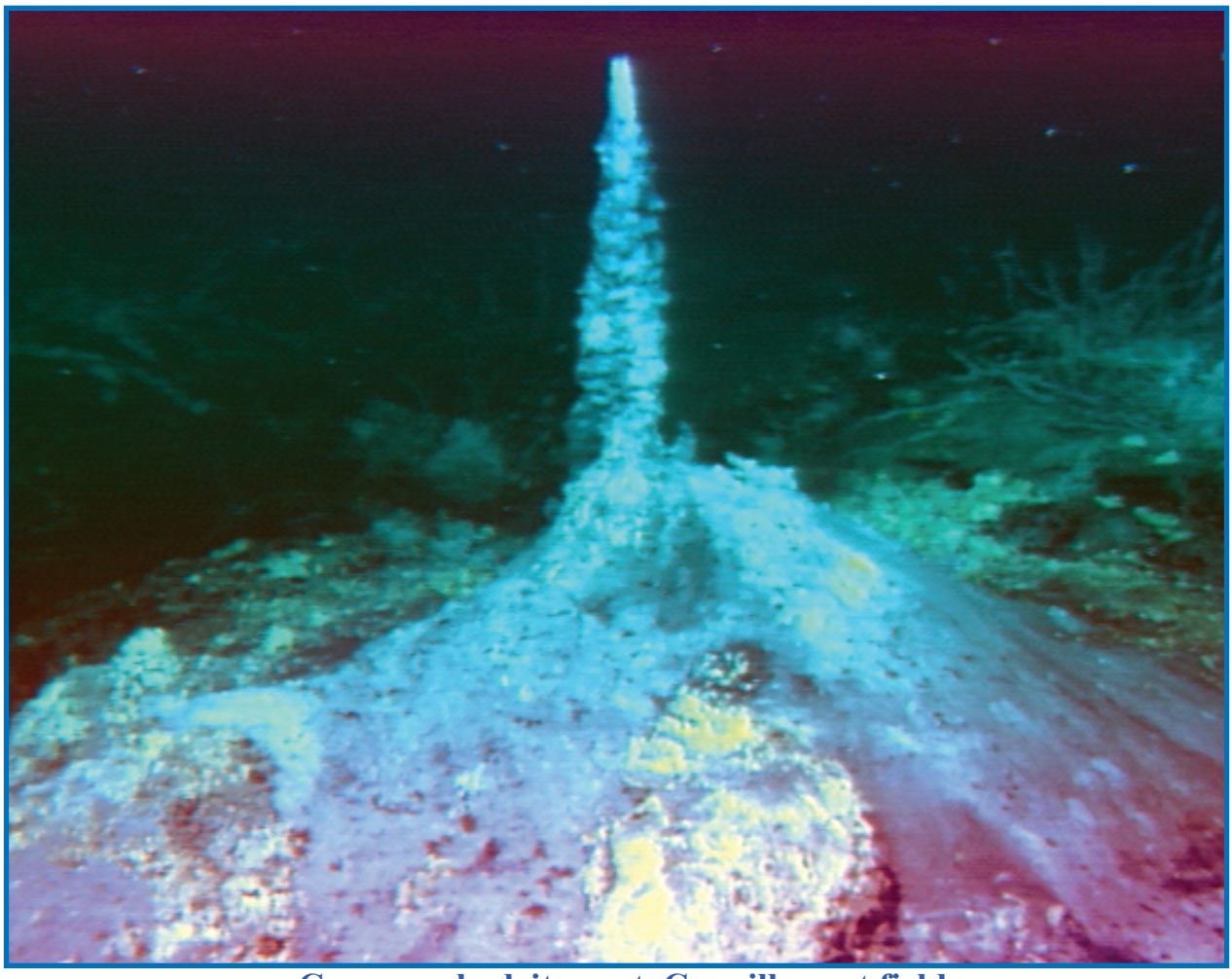
NeMO 2001 Cruise Report

R/V RONALD H. BROWN Cruise RB-01-06

14 July - 1 August

Newport, Oregon - Victoria, British Columbia

Juan de Fuca Ridge, Axial Volcano



Casper anhydrite vent, Coquille vent field

APRIL 2014: REPORT REVISED TO CREATE PDF.
INSERTED MAPS, DIVE LOGS, RE-PAGINATED, ETC. WHERE APPROPRIATE.

Report compiled by Susan Merle, assisted by Bob Embley and Bill Chadwick

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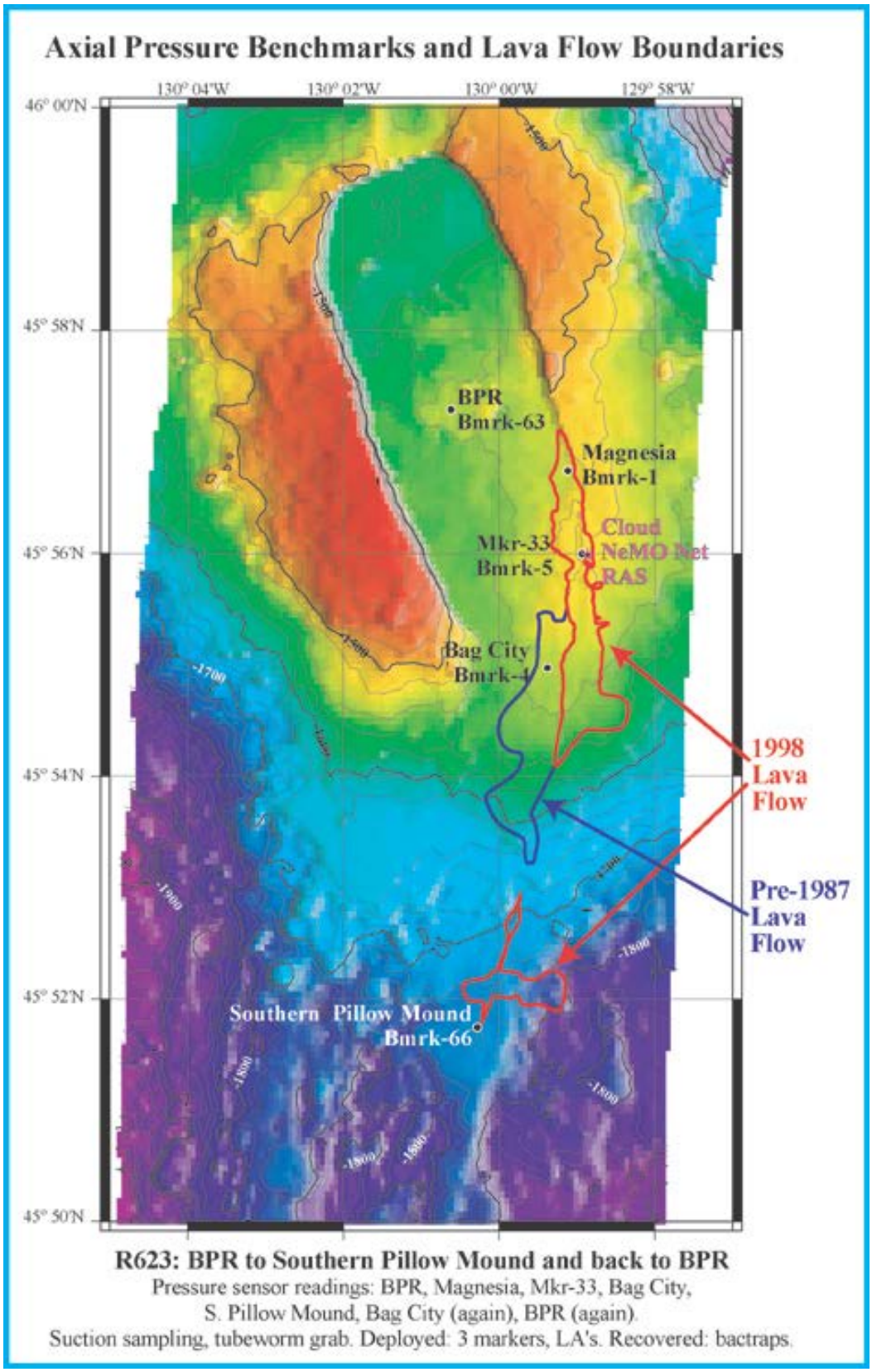
Axial Pressure Benchmarks and Lava Flow Boundaries
130° 04'W
130° 02'W
130° 00'W
129° 58'W
46° 00'N
45° 58'N
45° 56'N
45° 54'N
45° 52'N
45° 50'N
BPR
Bmrk-63
Magnesia
Bmrk-1
Mkr-33
Bmrk-5
Cloud
NeMO Net
RAS
Bag City
Bmrk-4
1998
Lava
Flow
Pre-1987
Lava
Flow
Southern Pillow Mound
Bmrk-66
-1500
-1600
-1700
-1800
-1900
R623: BPR to Southern Pillow Mound and back to BPR
Pressure sensor readings: BPR, Magnesia, Mkr-33, Bag City,
S. Pillow Mound, Bag City (again), BPR (again).
Suction sampling, tubeworm grab. Deployed: 3 markers, LA's. Recovered: bactraps.

Axial Pressure Benchmarks – back
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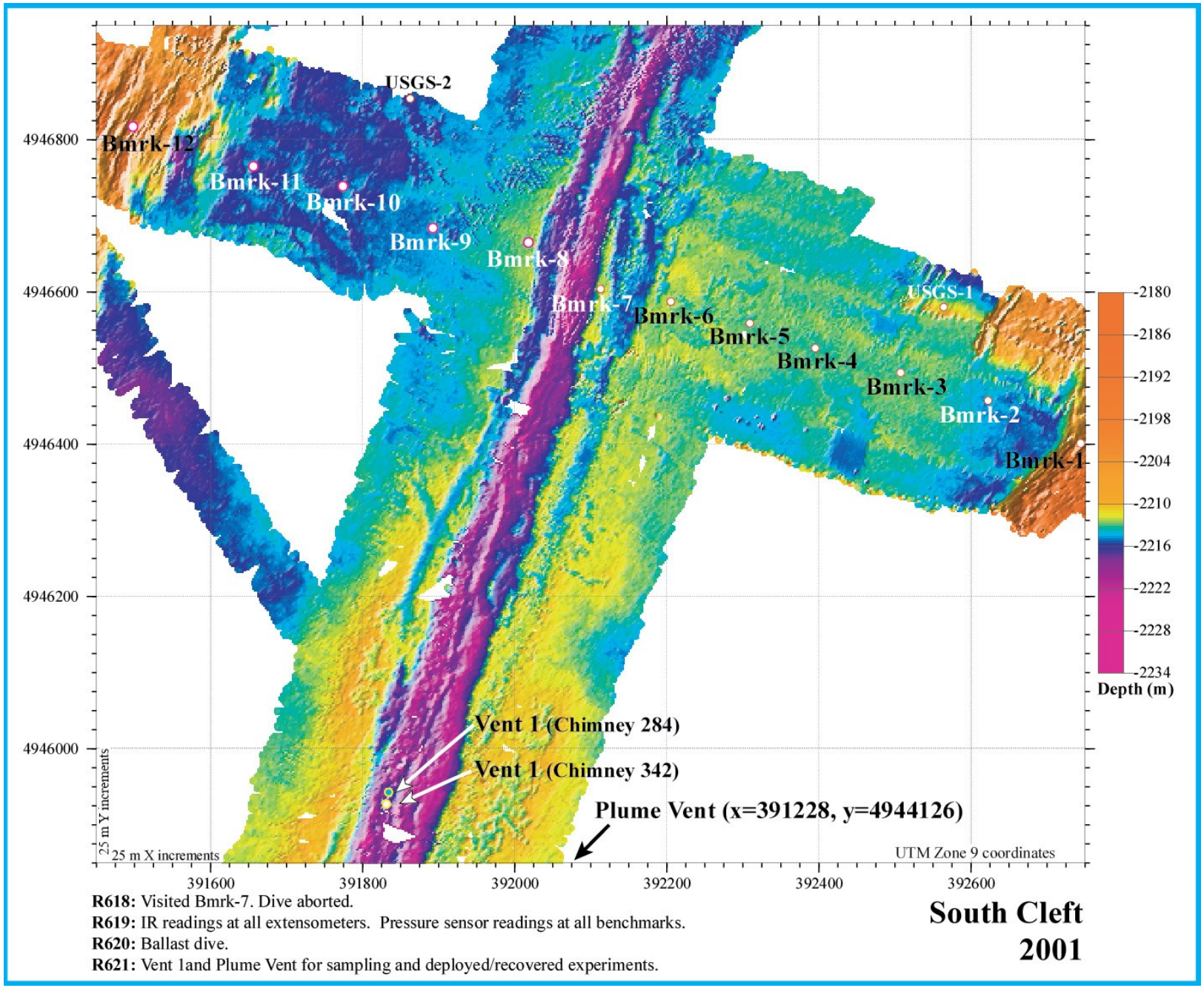

R618: Visited Bmrk-7. Dive aborted.
R619: IR readings at all extensometers. Pressure sensor readings at all benchmarks.
R620: Ballast dive.
R621: Vent 1and Plume Vent for sampling and deployed/recovered experiments.

South Cleft 2001

S Cleft (back)
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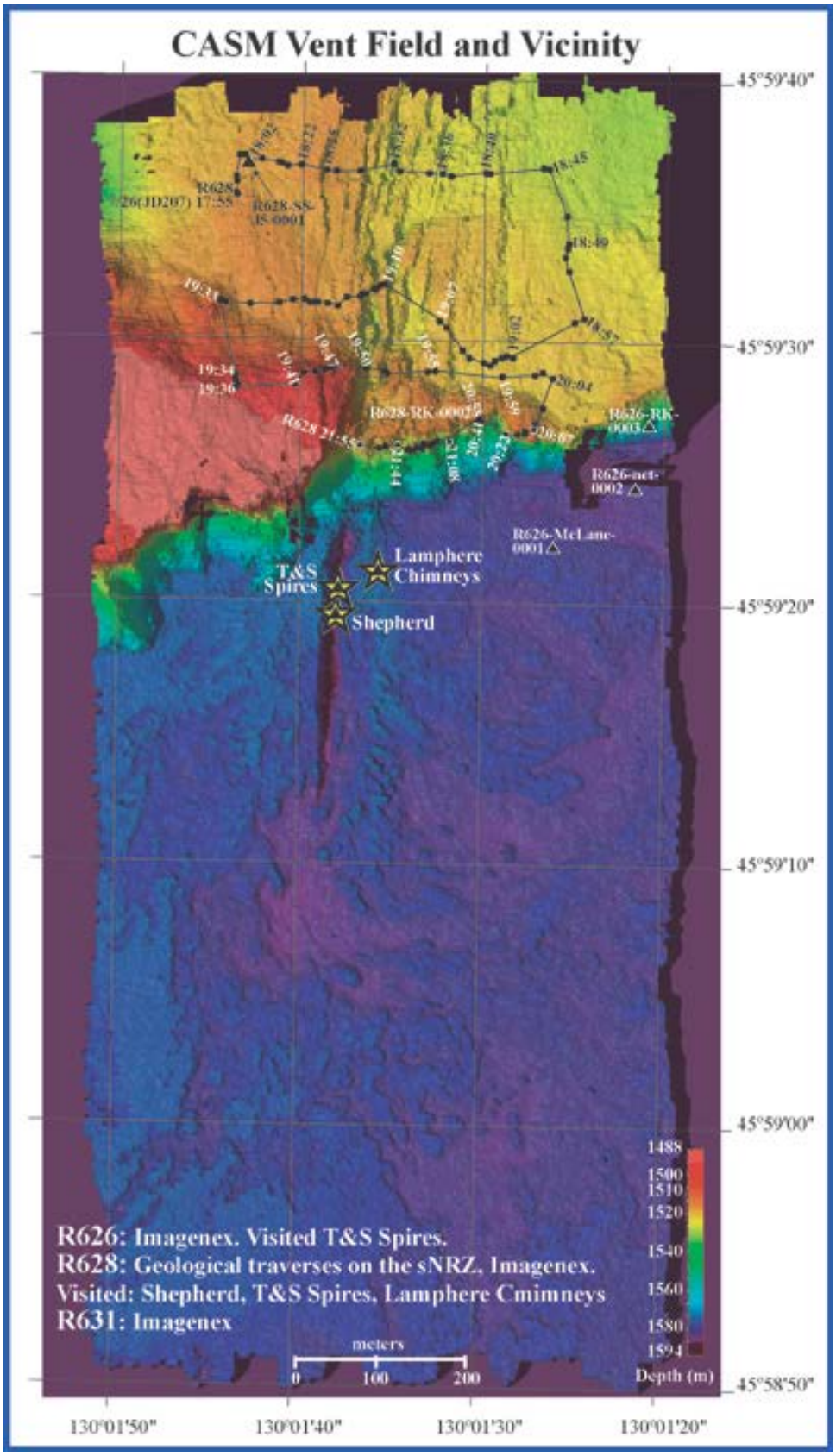
CASM Vent Field and Vicinity
45°59'40"
45°59'30"
45°59'20"
45°59'10"
45°59'00"
45°58'50"
130°01'50"
130°01'40"
130°01'30"
130°01'20"
R628
26(JD207) 17:55
R628-SR-IS-0001
R628-RK-0002
R626-RK-0003
R626-net-0002
R626-McLane-0001
Lamphere Chimneys
T&S Spires
Shepherd
1488
1500
1510
1520
1540
1560
1580
1594
Depth (m)
R626: Imagenex. Visited T&S Spires.
R628: Geological traverses on the sNRZ, Imagenex.
Visited: Shepherd, T&S Spires, Lamphere Cmimneys
R631: Imagenex
meters
0
100
200

CASM (back)
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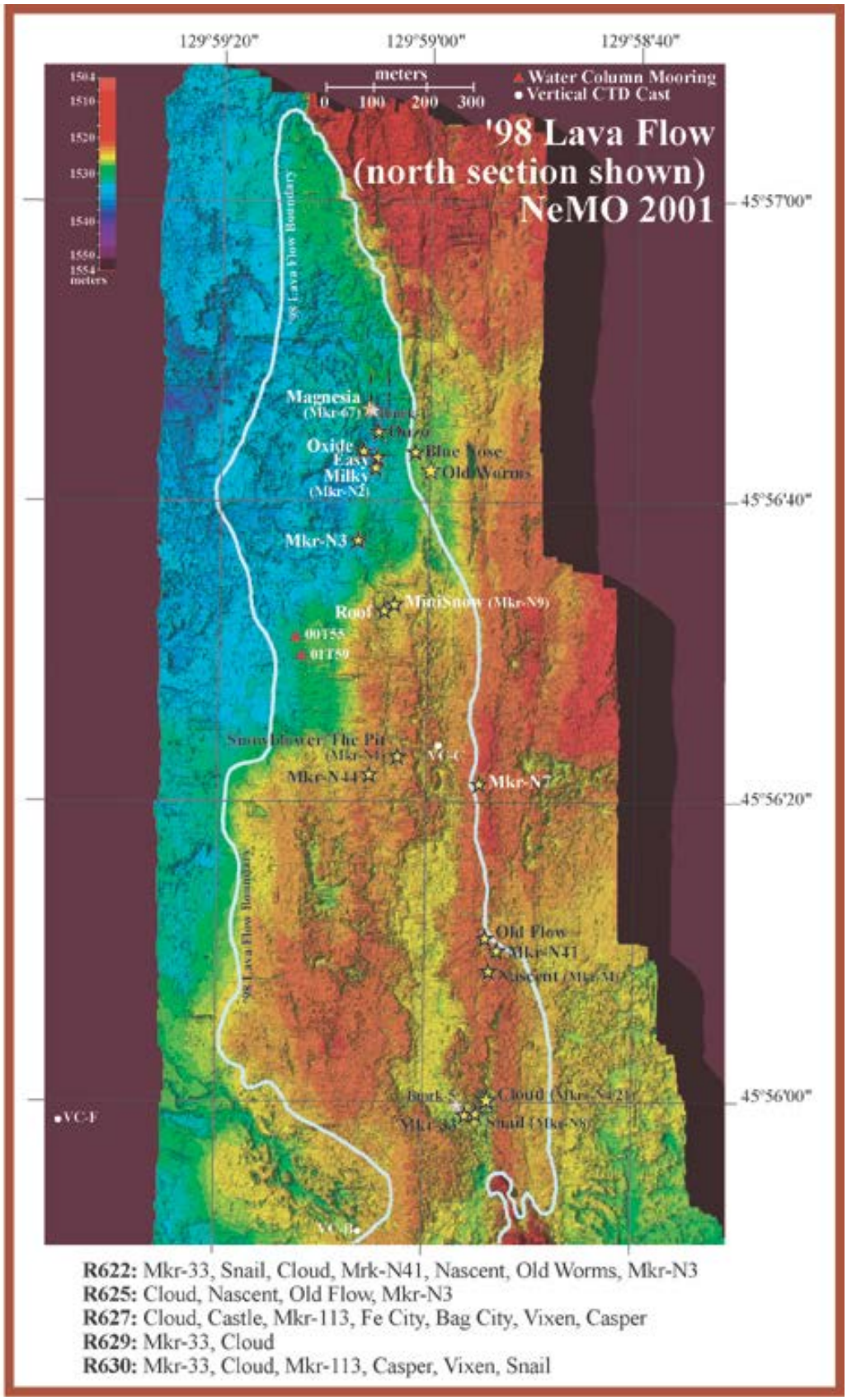

R622: Mkr-33, Snail, Cloud, Mrk-N41, Nascent, Old Worms, Mkr-N3
R625: Cloud, Nascent, Old Flow, Mkr-N3
R627: Cloud, Castle, Mkr-113, Fe City, Bag City, Vixen, Casper
R629: Mkr-33, Cloud
R630: Mkr-33, Cloud, Mkr-113, Casper, Vixen, Snail

’98 lava flow north (back)
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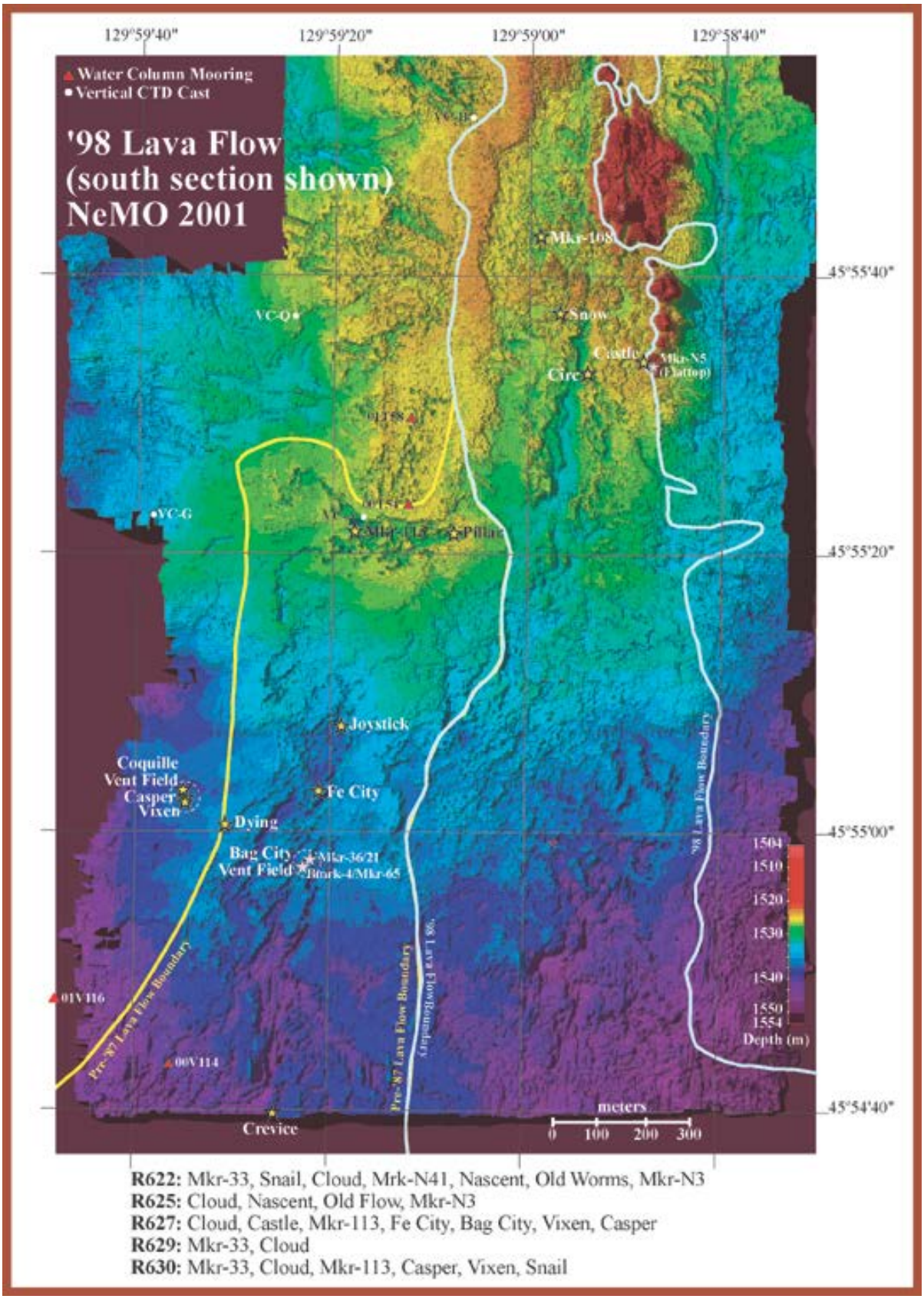

R622: Mkr-33, Snail, Cloud, Mrk-N41, Nascent, Old Worms, Mkr-N3
R625: Cloud, Nascent, Old Flow, Mkr-N3
R627: Cloud, Castle, Mkr-113, Fe City, Bag City, Vixen, Casper
R629: Mkr-33, Cloud
R630: Mkr-33, Cloud, Mkr-113, Casper, Vixen, Snail

’98 lava flow south (back)
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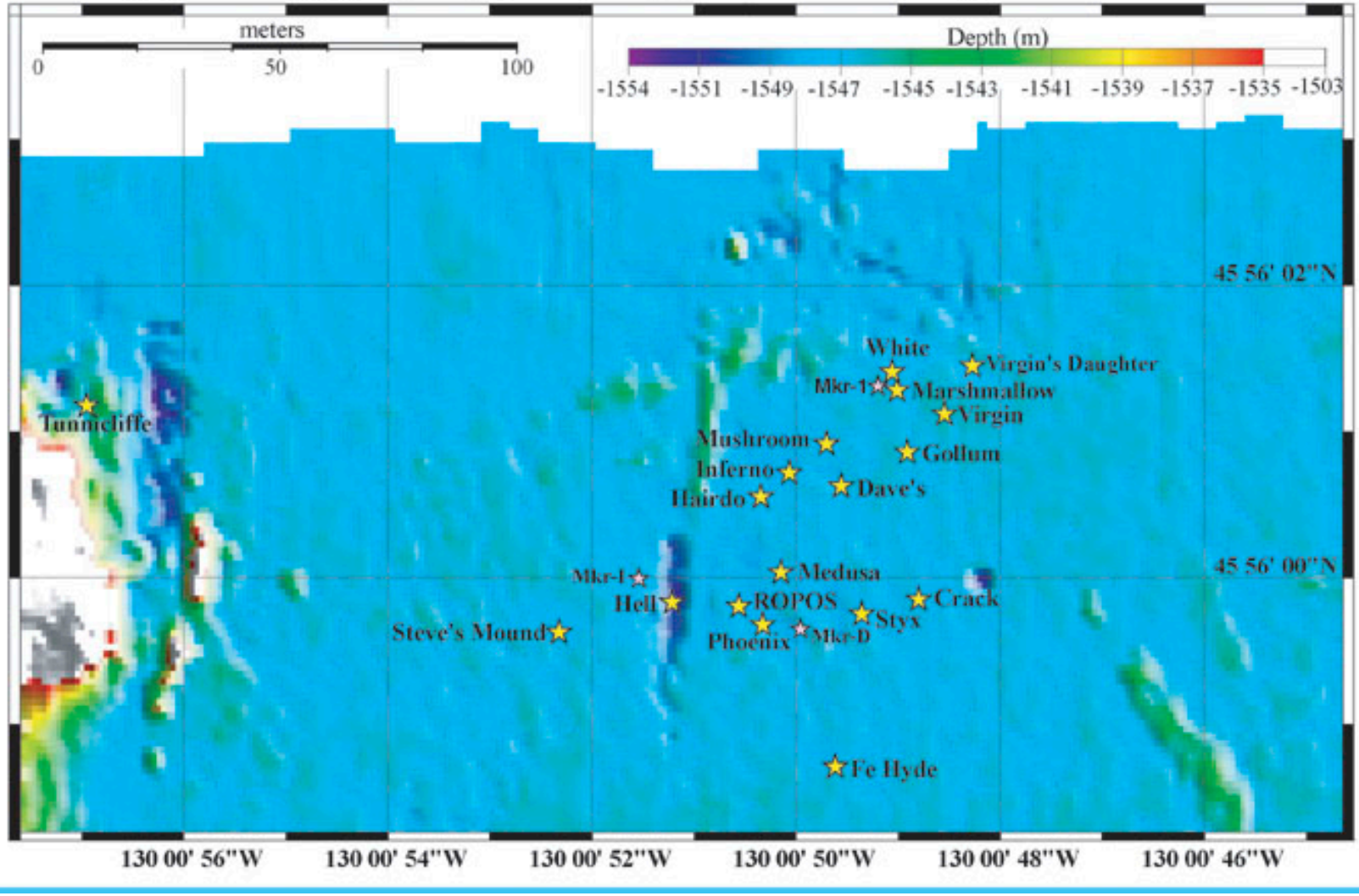
ASHES Vent Field - NeMO 2001

R624: Styx, Gollum, Marshmallow, Virgin, Inferno, Crack, Hell, Phoenix, Fe Hyde, Tunnicliffe, ROPOS

HFS, Suction Sampling, Sulfide worm observations. Deployed: Johnson flowmeter, hobos, LA, LT's, MTR. Recovered:MTR, osmo.

R632: Virgin, ROPOS, Gollum, Virgin's Daughter, Medusa, Hell, Phoenix, Inferno, Crack

Suction Sampling, Sulfide sampling, gastights. Deployed: LA's, bactraps, hobos. Recovered:LT's, bactraps, Johnson flow meter.



ASHES vent field (back)
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1.0 NeMO 2001 OVERVIEW - Bob Embley, Chief Scientist

The fourth NeMO expedition was the most productive to date. The cruise departed Newport on July 14, 2001 and arrived in Victoria, B.C. on 1 August, 2001. There were four dives at South Cleft (R618-R621) and 11 dives at the NeMO site (R622-R629). The dives averaged 15 hours of bottom time during which more than 200 samples were collected and numerous experiments deployed and recovered. During the four NeMO expeditions to date, more than 1000 samples for chemical, biologic and geologic studies have been collected. The vents continued to evolve biologcically three years after the eruption in January, 1998, but at an apparently lesser rate than in the past years. The temperatures at the Mkr 33 and Cloud vents declined slightly compared to those made during the NeMO 2000 expedition.

The priorities on NeMO2001 were: (1) time-series fluid sampling of the major vents at the 98 Lava field area and ASHES vent field for chemical and biological studies, (2) recovery and deployment of larval traps and settling arrays, (3) recovery and redeployment (some) of MTRS, HOBOS, and microbial traps deployed the previous year or years, (4) mapping the CASM area with the Imagenex sonar mounted on ROPOS, (5) continuation of the pressure measurements at the benchmarks established in 2000, (6) a range of hydrothermal and biologic samples for various studies, and (7) the deployment of the chemical sampler (RAS) at Cloud vent and the NeMONet buoy. All of these objectives were (mostly) accomplished.

Two previously unknown high temperature vents, Vixen and Casper, were discovered at the Coquille site in the southwestern part of the caldera on Dive 627. These are anhydrite chimneys similar in appearance to the Virgin Mound at the ASHES vent field. Their temperatures were over 300ºC.

The sections to follow detail the work that was accomplished during NeMO2001.

Acknowledgments:

The personnel of the Ronald H. Brown for their excellent support of NeMO2001.

The ROPOS Group for their excellence in the ROV operations.

PMEL for supporting all the infrastructure that goes into making expeditions like this successful.

The West Coast and Polar Program Undersea Research Center for funding support.

The Canadian National Science and Environmental Research Council for funding support.

The National Science Foundation for funding support.

The NOAA VENTS Program for funding support.

1.1 PARTICIPATING ORGANIZATIONS

NOAA Pacific Marine Environmental Lab (PMEL)
Oregon State University (OSU)
Western Washington University (WWU)
University of Washington (UW)
University of Victoria (UVIC)
University of Quebec at Montreal (UQAM)

University of Toronto (UTOR)
University of Florida (U FLORIDA)
Geological Survey of Canada
Dalhousie University (Dalhousie U)

1.2 PERSONNEL

PARTICIPATING SCIENTISTS

NAME	TITLE	SEX	NAT.	INSTITUTION
Bob Embley	Chief Scientist	M	US	PMEL/NOAA
Bill Chadwick	Geologist	M	US	OSU/CIMRS
Susan Merle	Navigation/Data MngmtF	US	OSU/CIMRS	
Sebastien Durand	Navigation	M	CAN	UQAM
Susan Hanneman	Navigation	F	US	Private Contractor
Dave Butterfield	Chemist	M	US	UW/JISAO
Susan Lang	Chemist/RA	F	US	UW/JISAO
Kevin Roe	Chemist	M	US	UW/JISAO
Julie Huber	GS/Microbiol	F	US.	UW
Mausmi Mehta	GS/Microbiol	F	US	UW
Verena Tunnicliffe	Biologist	F	CAN	UVIC
Jean Marcus	GS/Biol.	F	CAN	UVIC
Amanda Bates	GS/Biol.	F	CAN	UVIC
Anna Metaxas	Biologist	F	CAN	Dalhousie U.
Hannah Chapman	Biologist	F	CAN	Dalhousie U.
Richard Laveille	Geochemist	M	CAN	UQAM
Damien Grelon	Biologist	M	CAN	UQAM
Antoine Page	Geochemist/Biologist	M	CAN	UQAM
Jeff Engebretson	Microbiol.	M	US	WWU
Craig Moyer	Microbiol.	M	US	WWU
Jeff Goodrich	Teacher	M	US	Lake Oswego H.S.
Chris Kennedy	GS/Geologist	M	CAN	UTOR
Susan Kulp	Geologist	F	US	U FLORIDA
Kevin Lilley	Gas Chemist	M	US	UW
Leigh Evans	Chemist	M	US	NOAA/PMEL
Chris Meinig	Engineer	M	US	NOAA/PMEL
Mike Stapp	Engineer	M	US	NOAA/PMEL
Nick Delich	Engineer	M	US	NOAA/PMEL
Keith Shepherd	ROPOS Team Leader	M	CAN	CSSF
Bob Holland	ROPOS	M	CAN	CFO
Keith Tamburri	ROPOS	M	CAN	CSSF
Kim Wallace	ROPOS	M	CAN	CSSF
Mike Dempsey	ROPOS	M	CAN	CSSF
Ian Murdock	ROPOS	M	CAN	CSSF

TOTAL = 34

2.0 DISCIPLINE SUMMARIES

2.1 VOLCANOLOGY

2.1.1 NeMO 2001 Cruise Report Summary for Geology and Volcanology - Bill Chadwick and Bob Embley

The NeMO 2001 cruise began again this year at the southern Cleft segment where we had 3 dive days funded by the NSF/RIDGE Program in order to download data from our extensometer instruments there. ROPOS dives R618-621 were made at south Cleft. R618 made it to the bottom but was aborted soon after because the new ROPOS tether needed oil and the IR link was not working. ROPOS dive R619 visited all the extensometer instruments, made pressure measurements, and downloaded data at each one. ROPOS dive R620 was a ballast dive that never reached the bottom. ROPOS dive R621 visited the Vent1 and Plume hydrothermal sites to recover and deploy HOBO temperature probes. A HOBO probe recovered from Plume vent shows temperature changes associated with earthquakes on the Blanco Fracture Zone to the south. The extensometer instruments make daily measurements of the distance to their neighbors up and down the array. We are using the instruments to look for horizontal deformation across the axis of spreading that might accompany magmatic or tectonic events. The first year of measurements show that the distance measurement were made to within about ±2 cm (about the resolution we were hoping for) and no deformation events occurred during the first year. The data show that some of the instruments had better success ranging than others, and we recovered 4 of the instruments to try to troubleshoot that problem. The instruments have 5-year battery lifetimes and we hope to revisit the array annually with an ROV to download the previous year's data.

At Axial, we continued our instrumental monitoring efforts to measure inflation and deflation of the volcano. One aspect of these efforts is a Bottom Pressure Recorder (BPR), which we left deployed near the center of the caldera for another year. It was deployed last year will need to be recovered and turned around next year. The BPR can detect any sudden deflations of the caldera. In addition, we used a precision pressure sensor on the ROPOS vehicle again this year to make pressure measurements at 5 benchmarks inside and outside the caldera. The benchmarks are located at: the caldera center (next to the BPR), Magnesia vent, Marker 33, Bag City vent, and the southern anomaly lava flow (10 km from the caldera center). The pressure sensor can measure the relative depths between benchmarks to within a few cm, so by making annual measurements at these benchmarks and assuming that the outer-most benchmark is stable, we will be able to see if caldera is moving up or down relative to the outermost one. The third prong of our instrumental monitoring effort is our prototype extensometer array deployed on Axial's north rift zone. This array was deployed last year and will be recovered next year.

The other focus of our work at Axial during NeMO 2001 was continued geologic mapping to study the dynamics of the 1998 eruption and the structure of hydrothermal vent sites. This year we collected an Imagenex survey of the CASM vent field and the adjacent caldera wall and caldera rim. The survey shows that CASM is located exactly where the north rift zone intersects the caldera, and the CASM fissure is probably an old eruptive fissure. The area surrounding CASM is characterized by collapsed sheet-flow morphology, similar to much of the 1998 lava flow. The Imagenex data were collected during ROPOS dives R626 (12 hrs for the caldera floor and 6 hrs for the caldera rim), R628 (5 hrs for the caldera wall), and R631 (1 hrs for the caldera wall) for a total of 24 hours of survey time. The Imagenex data were again processed and displayed at sea. Geologic transects were made across the north caldera rim during dive R628, but we were not able to make transects in the caldera floor part of the survey. During ROPOS dive R630, we made a series of frame grabs on lava pillars near the rumbleometer site. These will allow us to make quantitative measurements of the thickness and spacing of lava crusts on the sides of the pillars using the lasers on ROPOS. We will then compare these measurements with theoretical models for lava crust formation along with the data from the rumbleometer .

Dive summaries from south Cleft dives

618: ROPOS made it to the bottom but the dive was aborted soon after because the new ROPOS tether needed oil and the IR link was not working
619: ROPOS dive R619 visited all the extensometer instruments, made pressure measurements and downloaded data at each one. In addition, instrument E01 (which had not been deployed last year) was moved from the elevator to BM01, instruments E02, E03, E04, and E05 (which had flooded) were put into the elevator and recovered because they appeared to have problems, and instrument E09 was moved to BM03 so that the axial valley could still be spanned with the remaining 8 instruments (E09 was reprogrammed to be unit 5 in BM03, and E01 was reprogrammed to be unit 4 in BM01). Note that the date was mistakenly reset back one day in extensometers E10, E11, and E12 during the data downloads. This will have to be corrected during the next site visit.
620: ROPOS dive R620 was a ballast dive that never reached the bottom.
621: ROPOS dive R621 visited the Vent1 and Plume hydrothermal sites to recover and deploy HOBO temperature probes. HOBO#129, which was deployed last year on the top of the 342 chimney at Vent1, was not found (HOBO#136 was also not found here the year before, so two HOBOs are missing from this chimney, presumably buried under debris at the base). New HOBO #134 was deployed at the top of the 342 chimney and HOBO #150 was deployed in the vigorous vent about half way up the same chimney. The pump from the vent fluid sampler was not working but we took two gastight samples from the lower orifice that HOBO #150 was in (Tmax was 300°C). After a transit to Plume vent HOBO #137 was recovered (which had been deployed in 1999), and HOBO #133 was deployed in a small chimney a little south of where HOBO #137 had been located.

2.2 CHEMISTRY

2.2.1 NeMO 2001 Fluid Chemistry Program - Dave Butterfield

Program goals:
Long-term time series
Post-eruption time series and near real-time monitoring
Understanding sub-seafloor reaction zones
Connecting fluid chemistry with microbial and faunal community structure

One of our principal goals is to monitor the fluid composition at the various vent sites at Axial Volcano and relate the fluid chemistry to volcanic processes. We sampled the ASHES vent field in the years 1986-1988, then returned for a single dive in 1995. We renewed this time series sampling with the beginning of the NeMO project in 1998. This year we obtained good samples from Virgin Mound (299.9C), Inferno (294C), Hell (284C), and several diffuse vents in the ASHES field. Over this entire sampling interval, the composition of the lowest chlorinity vent (Virgin Mound) has been very steady, while the other hot vents have shown changes in composition, with a shift to lower chlorinity in 1995. However, the character of the ASHES hot fluids has not changed dramatically over our period of observation, maintaining very high CO2 levels and moderate metal concentrations. There was a temporary increase in temperature of about 20 degrees C in 1995, which put Inferno vent on the boiling curve and gave it the “flaming” appearance.

Since the January 1998 eruption in the SE caldera, we have followed the composition of fluids in the eruption zone. This year we again sampled vents over a wide area on and near the 1998 lava flow. From north to south, we sampled Old Worms (just E of the lava flow), marker N3 (where we found a cavern beneath a lobate roof that was completely lined/covered with white floc and venting “snowballs”), marker N41/Nascent, marker 33, Cloud N6, Castle, mkr 113, Fe City, Bag City, and Coquille, where we found two previously unseen anhydrite vents (Vixen at 313°C and Casper). Vixen vent has the same refractive index (14 per mil) as our sample from Virgin Mound, but only about ½ to 2/3 the gas content. There have been marked changes in composition in the eruption

zone. The chlorinity of the source fluid has steadily increased from very low to near-seawater levels from 1998 to 2000. (Chloride results for 2001 will have to await high-precision work in the lab.) Over the same period, the H2S/heat ratio has declined. These changes together are consistent with the general model for post-eruptive fluid chemistry, with immediate post-eruptive fluids being vapor-dominated. We have no sign yet of any brine venting.

Once again, the primary tool we use for vent fluid chemistry is the Hydrothermal Fluid and Particle Sampler, commonly known as the Beast. The fluid pathway is titanium and teflon. The actual sample containers are Tedlar bags and PVC pistons. Temperature is measured at the inlet (T1) and within the flow path of the manifold where samplers are attached (T2). Some modifications have been made to the Beast this year. Additional titanium pieces replaced teflon parts in the sample manifold, sensors for pH and H2S were added, and the software upgraded to operate under Windows. The sensors are deep-sea capable, purchased from AMT Gmbh, Rostock, Germany. The pH sensor showed very good stability over the 4 Beast dives in which we used it, and the H2S sensor provided valuable in-situ data for H2S. However, the H2S sensor data do not agree well with lab results on discrete samples over the range of concentrations encountered in diffuse fluids. At higher levels, the in-situ sensor gives lower readings than we measure in the lab. It's possible that we can re-calibrate and get better agreement, but the tabulated results in this report for in-situ H2S should NOT be considered accurate. The H2S sensor was first in the flow stream, seeing the signal of the fluid before the pH sensor, which results in an initial artificial peak in H2S because there is a real-time pH correction applied to the H2S response. The signal flattens out after the pH stabilizes. After the final Beast dive (ROPOS 627) the H2S sensor malfunctioned, giving very high and unstable output voltage at zero H2S concentration. The spare H2S sensor showed the same behavior. We will continue to work with this technology and try to improve accuracy and longevity of the sensors.

Monitoring vent chemistry and microbiology with RAS and NeMO-Net:
In addition to our widespread sampling with the Beast at ASHES and the SE caldera, we are conducting a major new experiment to monitor and sample a vent in real time using the NeMO-Net acoustic modem/satellite link. The experiment had two parts this year. We chose Cloud marker N6 vent because it is a low-temperature vent (hence amenable to long-term instrumentation) with a unique high flow-rate plumbing structure that largely eliminates any fluctuations in temperature inside the vent due to tidal currents. The first part of the experiment was to deploy the McLane RAS (Remote Access Sampler) at marker N6 over a short period to look for any tidal signal in the temperature or chemistry. In 2000, we deployed the RAS 4 times at the Main Endeavour Field and saw clear tidal changes in temperature and composition each time. In the 28-hour deployment at Cloud N6 all 48 samples were taken with only two failures (one due to a broken filter holder that allowed seawater to leak in, the other due to some undetermined cause). We saw virtually no tidal signal in this 28-hour record.. For example, the silica concentration was 493 +/- 8 micromol/liter (+/- 1.6%) for all samples. We have established a solid starting point for the experiment this year, and we have data from the previous 3 years for context. There is no tidal signal in long-term temperature records from this vent, so it is an ideal place to monitor long-term changes with a discrete sampler like the RAS.

Taking a large number of discrete samples from a diffuse vent allows us to address the precision and reproducibility of all of our measurements, including oxygen-sensitive volatiles (H2S), trace metals at low levels, organic compounds, microbe counts and genetic material.

The second part of the experiment is unprecedented. We installed the RAS in a bottom package designed and built by PMEL Engineering to communicate with a surface buoy via acoustic modem. The package will transmit hourly temperature data once per day, take pH sensor data twice per week, and take sensor data and a water/filter sample once per week. We will have a year-long record of fluid chemistry when we recover the sampler next summer. If we should be fortunate enough to have a seismic or volcanic event that perturbs the hydrothermal system at Axial Volcano, then we can respond by commanding the instrument to collect additional samples. Most of the samples on the RAS will be filtered either through glass fiber, 0.4micron membranes for SEM, or 0.2 micron membranes for DNA analysis. We have included the option to add a preservative (ethanol/NaCl/EDTA)

for DNA to selected filters throughout the deployment. We hope that this will allow us to characterize changes in the community structure over time in this vent. Because the vent is low-temperature and low in sulfide, we may see the transition to sulfide-depleted conditions before the end of the year.

Shipboard Analysis:
We had a great team of chemists and microbiologists working on fluid sampling this year. We had the great benefit of having Chris Meinig and Nick Delich of PMEL engineering for NeMO-Net installation and interfacing and troubleshooting the Beast. Scott Stalin helped in cruise staging for NeMO-Net and did the electronic design and programming. Dealing with the RAS and the Beast together required some marathon performances, and those went extremely well. This was a most congenial and efficient group. Personnel and their responsibilities follow:
Kevin Roe (JISAO/UW/PMEL) Beast preparation/maintenance/operation, sample splitting, colorimetric analysis of H2S, Si, and NH3.
Leigh Evans (CIMRS/OSU/PMEL) Gas sampling and splitting using titanium gas-tight samplers and gas pistons on the Beast.
Susan Lang (UW Chemical Oceanography) RAS preparation, pH/alkalinity analysis, DOC analysis.
Julie Huber (UW Biological Oceanography) RAS/Beast preparation/operation/logging and microbial sampling/culturing.
Mausmi Mehta (UW Biological Oceanography) RAS/Beast preparation and microbial sampling/culturing.
Kevin Lilley (UW Oceanography) Gas chromatographic analysis of methane and hydrogen.
Dave Butterfield (JISAO/UW/PMEL) Journeyman plumber.
Chris Meinig (PMEL Engineering) NeMO-Net design and installation.
Nick Delich (PMEL Engineering) Beast interfacing, troubleshooting, NeMO-Net installation.

DOC analysis:
Over the past 4 years, we have collected samples for DOC and organic acid analysis. The results for both have been ambiguous. Dennis Hansell analyzed DOC in samples from Axial Volcano in 1998, 1999, and 2000. Susan Lang analyzed samples from Endeavour in 2000. This year, both Susan and Dennis will analyze samples from Axial, and Susan has brought her DOC system on board. Susan's shipboard results this year are similar to what we have seen in the previous years. Some, but not all of the high-temperature vents have DOC levels below ambient seawater, while low temperature vents tend to have slightly elevated DOC. A few samples have DOC more than twice ambient seawater. The story is not simple or complete yet, and more work needs to be done. In our labs on shore, we will be working on the composition of the organic carbon in these vents.

ROPOS Dive R622 - Lava 7/18/01

Valve	Sample Type	Location	Avg T	T SD	Max T	pH	H_2S	Volume	Comments
1	Sterivex	Old Worms	12.1	0.05	12.2	5.67	151.2	1 L	
2	Sensor								
3	47mm, RNA	Mkr 33	17.0	n/a	n/a	5.54	18.5	700	T1 broken
4	Piston, gas	Mkr 33	12.4	0.86	13.9	5.76	57.0	106	
5	Piston, gas	Cloud N6	9.6	0.02	9.7	6.67	12.1	182	
6	47mm, FISH	Mkr 33	17.3	n/a	n/a	5.54	18.5	1 L	T1 broken
7	47mm, FISH	Mkr 33	14.8	2.30	18.8	5.76	57.0	1 L	
8	bag	Cloud N6	9.6	0.05	9.7	6.67	12.1	640	
9	bag	Mkr N41	12.0	0.80	11.2	6.61	5.30	500	
10	47mm, GFF	Near N3-1	8.6	n/a	n/a	5.80	100.0	1050	T1 broken
11	bag, filter GFF	Cloud N6	9.6	0.05	9.7	6.67	12.1	680	
12	Sterivex	Cloud N6	9.7	0.02	9.7	6.67	12.1	1 L	
13	Sterivex	Mkr N41	12.0	1.85	11.8	6.61	5.30	1 L	
14	bag	Near N3-1	7.8	n/a	n/a	5.80	100.0	650	T1 broken

Valve	Sample Type	Location	Avg T	T SD	Max T	pH	H_2S	Volume	Comments
15	Sterivex	Mkr 33	11.8	1.65	15.2	5.76	57.0	1 L	
16	bag	Old Worms	12.0	0.08	12.2	5.67	151.2	650	
17	bag, filter GFF	Old Worms	12.0	0.11	12.2	5.67	151.2	650	
18	bag	Near N3-2	12.5	n/a	n/a	5.31	127.0	600	T1 broken
19	bag, filter GFF	Mkr 33	12.4	0.58	13.6	5.76	57.0	630	
20	Piston, chem	Mkr 33	16.0	n/a	n/a	5.54	18.5	800	T1 broken
21	Empty								
22	Piston, chem	Mkr 33	13.0	0.70	14.2	5.76	57.0	629	
23	Piston, gas	Cloud N6	9.7	0.05	9.7	6.67	12.1	160.0	
24	Piston, gas	Mkr N41	10.0	0.66	10.3	6.61	5.30	100.0	

ROPOS Dive R624 - ASHES 07/21/01 - 07/22/01

Valve	Sample Type	Location	Avg T	T SD	Max T	pH	H2S	Volume	Comments
1	Sterivex	Old Worms	12.1	0.05	12.2	5.67	151.2	1 L	
3	47mm, RNA	Mkr 33	17.0	n/a	n/a	5.54	18.5	700	T1 broken
4	Piston, gas	Mkr 33	12.4	0.86	13.9	5.76	57.0	106	
5	Piston, gas	Cloud N6	9.6	0.02	9.7	6.67	12.1	182	
6	47mm, FISH	Mkr 33	17.3	n/a	n/a	5.54	18.5	1 L	T1 broken
7	47mm, FISH	Mkr 33	14.8	2.30	18.8	5.76	57.0	1 L	
8	bag	Cloud N6	9.6	0.05	9.7	6.67	12.1	640	
9	bag	Mkr N41	12.0	0.80	11.2	6.61	5.30	500	
10	47mm, GFF	Near N3-1	8.6	n/a	n/a	5.80	100.0	1050	T1 broken
11	bag, filter GFF	Cloud N6	9.6	0.05	9.7	6.67	12.1	680	
12	Sterivex	Cloud N6	9.7	0.02	9.7	6.67	12.1	1 L	
13	Sterivex	Mkr N41	12.0	1.85	11.8	6.61	5.30	1 L	
14	bag	Near N3-1	7.8	n/a	n/a	5.80	100.0	650	T1 broken
15	Sterivex	Mkr 33	11.8	1.65	15.2	5.76	57.0	1 L	
16	bag	Old Worms	12.0	0.08	12.2	5.67	151.2	650	
17	bag, filter GFF	Old Worms	12.0	0.11	12.2	5.67	151.2	650	
18	bag	Near N3-2	12.5	n/a	n/a	5.31	127.0	600	T1 broken
19	bag, filter GFF	Mkr 33	12.4	0.58	13.6	5.76	57.0	630	
20	Piston, chem	Mkr 33	16.0	n/a	n/a	5.54	18.5	800	T1 broken
22	Piston, chem	Mkr 33	13.0	0.70	14.2	5.76	57.0	629	
23	Piston, gas	Cloud N6	9.7	0.05	9.7	6.67	12.1	160.0	
24	Piston, gas	Mkr N41	10.0	0.66	10.3	6.61	5.30	100.0	

ROPOS Dive R627 - South Rift Zone 7/25/01

Valve	Sample Type	Location	Avg T	SD T	Max T	pH	H2S	Volume	Comments
1	Sterivex	Fe-City	7.6	0.54	8.6	7.094	1.0	1003	filamentous white mat and Fe-oxides
2	Sensor								
3	47mm, RNA	Casper	43.2	0.10	43.4	5.390	163.0	1077	base of anhydrite chimney
4	Piston, gas	Mkr 113	19.7	1.44	21.5	5.965	202.0	141	in tube worm bush
5	Piston, gas	Fe-City	7.4	0.15	7.7	7.094	1.0	135	filamentous white mat and Fe-oxides
6	47mm, FISH	Casper	43.3	0.10	43.6	5.390	16.3	1 L	base of anhydrite chimney
7	47mm, FISH	Bag City	18.1	0.70	19.3	6.450	80$\pm$2	1005	large diameter flow from tube worm bush
8	bag	Bag City	18.6	0.45	19.4	6.450		725	large diameter flow from tube worm bush

Valve	Sample Type	Location	Avg T	SD T	Max T	pH	H2S	Volume	Comments
9	bag	Fe-City	7.6	0.50	9.1	7.094	1.0	671	filamentous white mat and Fe-oxides
10	47mm, GFF	Fe-City	9.6	0.43	10.3	7.094	1.0	1200	filamentous white mat and Fe-oxides
11	bag, filter GFF	Bag City	18.7	0.20	19.1	6.450	80+2	700	large diameter flow from tube worm bush
12	Sterivex	Casper	43.0	0.40	43.5	6.090	39.6	1 L	half at lower temp (15);base of chimney
13	Sterivex	Bag City	17.2	0.30	17.8	6.450		1005	large diameter flow from tube worm bush
14	bag	Casper	14.9	0.10	15.0	6.090	39.6	600	T2 = 10 at base of Casper
15	Sterivex	Mkr 113	20.1	1.00	21.7	5.965	202.0	1003	in tube worm bush
16	bag	Vixen	312.7	0.09	312.9	n/a	n/a	250	new anhydrite chimeny near Coquille
17	bag, filter GFF	Mkr 113	21.0	0.48	21.8	5.965	202.0	650	in tube worm bush
18	bag	Mkr 113	20.0	1.28	21.8	5.965	202.0	653	in tube worm bush
19	bag, filter GFF	Castle	259.3	0.11	259.4	n/a	n/a	350	
20	Piston, chem	Vixen	312.6	0.10	312.7	n/a	n/a	500	new anhydrite chimeny near Coquille
21	47mm, FISH	Mkr 113	21.7	0.18	21.9	5.965	202.0	917	in tube worm bush
22	Piston, chem	Castle	259.1	0.05	259.2	n/a	n/a	350	
23	Piston, gas	Vixen	312.6	0.10	312.7	n/a	n/a	200	new anhydrite chimeny near Coquille
24	Piston, gas	Castle	259.1	0.06	259.2	n/a	n/a	200	
	Background		2.10		2.7	-5.60	7.5		

2.2.2 PMEL Helium Group Cruise Report Summary on NeMO 2001 - Leigh Evans

This year two improvements in the quality of helium samples were attempted while continuing time series sampling at several vents. One involved inserting a titanium fitting into the middle of the plumbing of the Hot Fluid Sampler (HFS) and connecting it to gastight bottles with flexible plastic tubing. The other used the same basic scheme as in past years in which flexible plastic tubing was plumbed to short pieces of titanium tubing but rather than attempting to attach it to ROPOS' 7 function arm, a stainless steel wand was used as a terminator. This scheme served to get the tubing out of harms way by allowing it to be stored in a holster on the front of the bio box.

While the former, HFS method produced a good sample at Vent 1 at South Cleft, it ran into some difficulties when sampling anhydrite vents at Ashes and Castle. It is suspected that larger chunks of particulate pumped by HFS caused a clog in the flexible tubing. This and other troubles with the gas pistons of HFS suggest that either a second generation gas piston would be necessary for reliable sampling on HFS dives. The latter wand technique has successfully sampled the newly discovered Vixen anhydrite vent and T&S Spires.

Vixen vent is the third place on Axial Volcano in which anhydrite vents have been found. It is further south than Castle and Virgin Mound and has about half the raw gas concentration of either.

Helium Gas Samples - NeMO 2001

2001 Dive	sample #	date	Type	Bot#	Vent	T (C)	wt (g)	CM1	CM2	cal vol (cc)	room T	nominal gas conc from cal Vol only	scc/g 300 cc front end	total gas conc scc/g	
R621	R621-gtb6-stbd	7/18	manifold gtb	gtb6	Vent 1 former 340 degree chimney	~300	140	8.16	165.8	109.63	20.9	0.158	0.021	0.1797	11.9%
R621	R621-gtb5-port	7/18	manifold gtb	gtb5	Vent 1 used as HFS pump	?	69	4.06	85.8	108.52	20.7	0.165	0.022	0.1866	11.6%
R622	R622-hfs4	7/18	gas piston	GP4	mkr 33	12.5 (19 max)	140	5.33	109.7	108.85	20.3	0.105	0.014	0.1188	11.8%
R622	R622-hfs5	7/18	gas piston	GP5	cloud N6	9.6	228	4.06	85.8	108.52	20.7	0.050	0.007	0.0564	11.6%
R622	R622-hfs24	7/18	gas piston	GP24	mkr N41	10	132	3.46	71.1	108.31	20.9	0.071	0.010	0.0808	11.9%
R622	R622-gtb2-port	7/18	manifold gtb	gtb2	mkr 33	15 (19 max)	160	9.28	187.9	109.94	20.8	0.158	0.021	0.1790	11.9%
R622	R622-gtb7-stbd	7/18	manifold gtb	gtb7	Cloud	9.6	none								
R624	R624-hfs-5	7/22	gas piston	GP5	Virgin Mound	300	130	42.62	612	1027.9	20	5.946	0.121	6.0674	2.0%

2001 Dive	sample #	date	Type	Bot#	Vent	T (C)	wt (g)	CM1	CM2	cal vol (cc)	room T	nominal gas conc from cal Vol only	scc/g 300 cc front end	total gas conc scc/g	
R624	R624-hfs-23	7/22	gas piston	GP23	Inferno	294	134	15.86	310.2	111.63	20.8	0.316	0.043	0.3599	12.1%
R624	R624-hfs-4	7/22	gas piston	GP4	Marshmallow	222	168	44.23	691	1027.9	20.7	5.159	0.096	5.2552	1.8%
R624	R624-hfs-24	7/22	gas piston	GP24	Hell	284	183	12.1	132.4	1027.9	20.9	0.911	0.024	0.9353	2.6%
R624	R624-gtb5-port	7/22	manifold gtb	gtb5	Virgin Mound	300	33	8.38	168.4	1027.9	20.9	6.411	0.093	6.5044	1.4%
R624	R624-gtb6-stbd	7/22	manifold gtb	gtb6	Inferno	294	6.3	2.85	51.2	108.04	20.8	1.074	0.166	1.2395	13.4%
R626	R626-gtb7-stbd	7/24	wand	gtb7	T&S Spires	?	171	7.78	159.4	109.54	20.8	0.125	0.017	0.1413	11.8%
R626	R626-gtb2-port	7/24	wand	gtb2	T&S Spires	?	160	5.11	105.6	108.79	20.8	0.088	0.012	0.0993	11.8%
R627	R627-hfs4	7/25	gas piston	GP4	Castle Anhydrite	259	51.2	10.75	175	1027.9	20.5	4.300	0.077	4.3772	1.8%
R627	R627-hfs24	7/25	gas piston	GP24	mkr 113	19.7 (21 max)	172	6.26	128.5	109.11	20.8	0.099	0.013	0.1127	11.8%
R627	R627-hfs23	7/25	gas piston	GP23	Vixen	313	212	21.37	252.6	1027.9	20.5	1.500	0.037	1.5368	2.4%
R627	R627-hfs5	7/25	gas piston	GP5	Iron City	7.4 (10.9 avg)	164	4.35	88.9	108.56	20.8	0.072	0.010	0.0818	11.9%
R627	R627-gtb6-stbd	7/25	manifold gtb	gtb6	Castle Anhydrite	259	16.8	20.86	416.5	113.11	20.8	3.429	0.455	3.8841	11.7%
R627	R627-gtb5-port	7/25	manifold gtb	gtb5	Bag City	16.8 (18.6 max)	50.6	2.66	55	108.09	20.8	0.144	0.019	0.1629	11.8%
R630	R630-gtb5-port	7/28	wand	gtb5	Vixen	313	139	12.92	210.8	1027.9	20.1	1.911	0.034	1.9447	1.8%
R630	R630-gtb6-stbd	7/28	wand	gtb6	Vixen	313	159	14.67	248	1027.9	20.7	1.960	0.034	1.9936	1.7%

NeMO 2001 Gas Samples for Helium Isotope Analysis (gas concentrations not corrected for dilution in seawater)

Vent	**Quality**	**Sample #**	**Type**	**Vent Temp (C)**	**Mass (g)**	**Gas (scc/g)**
Vent 1(340)	good	R621-gtb6-stbd	manifold gtb	~300	140.3	0.18
Vent 1(340)	poor	R621-gtb5-port	manifold gtb	?	69	0.187
Mkr-33	good	R622-hfs4	gas piston	12.5 (19 max)	139.6	0.119
Cloud Mkr-N6	good	R622-hfs5	gas piston	9.6	228.4	0.056
Mkr-N41	good	R622-hfs24	gas piston	10	132.2	0.081
Mkr-33	good	R622-gtb2-port	manifold gtb	15 (19 max)	160.1	0.179
Cloud	poor	R622-gtb7-stbd	manifold gtb	9.6	none	
Virgin	questionable	R624-hfs-5	gas piston	300	129.7	6.067
Inferno	good	R624-hfs-23	gas piston	294	133.8	0.36
Marshmallow	good	R624-hfs-4	gas piston	222	168.4	5.255
Hell	good	R624-hfs-24	gas piston	284	182.6	0.935
Virgin	questionable	R624-gtb5-port	manifold gtb	300	33	6.504
Inferno	good	R624-gtb6-stbd	manifold gtb	294	6.3	1.239
T&S Spires	good	R626-gtb7-stbd	wand	?	171.3	0.141
T&S Spires	good	R626-gtb2-port	wand	?	160.3	0.099
Castle Anhydrite	questionable	R627-hfs4	gas piston	259	51.2	4.377
Mkr-113	good	R627-hfs24	gas piston	19.7 (21 max)	172.5	0.113
Vixen	good	R627-hfs23	gas piston	312.6	211.9	1.537
Iron City	good	R627-hfs5	gas piston	7.4 (10.9 avg)	163.8	0.082
Castle Anhydrite	questionable	R627-gtb6-stbd	manifold gtb	259	16.8	3.884
Bag City	questionable	R627-gtb5-port	manifold gtb	16.8 (18.6 max)	50.6	0.163
Vixen	good	R630-gtb5-port	wand	313	139	1.945
Vixen	good	R630-gtb6-stbd	wand	313	159.1	1.994

2.3 MICROBIOLOGY

2.3.1 Microbiological Sampling for Molecular Microbial Ecology Analysis - Craig L. Moyer & Jeff Engebretson

Introduction

The characterization of any microbial community entails the analysis of taxon diversity and abundance. The identification of dominant community members results in a better understanding of potentially important metabolic processes affecting mineral cycling, community succession patterns, interactions of a microbial populations upon higher trophic levels, and hints of what early life may have been like on Earth, especially as it relates to the deep subsurface biosphere.

Because selective enrichment culture methodologies severely underestimate the numbers and types of microbial populations present within a community, we have focused our efforts using cell component analyses to study the microbial ecology of the hydrothermal systems at Axial Volcano. More specifically, we have predominantly used a pair of molecular methods for this study: amplified ribosomal DNA restriction analysis or ARDRA and terminal-restriction fragment length polymorphism or T-RFLP. These are both relatively new molecular methods and their application to microbial community analysis is more thoroughly described by Moyer (2001).

Progress Report

Both the community structure and phylogenetic diversity of bacterial communities has been determined from four hydrothermal vent sites at Axial Volcano. Genomic DNA was extracted from slurp-gun sampled microbial communities and amplified using small subunit ribosomal DNA (SSU rDNA) oligonucleotide primers specific to the domain *Bacteria*. PCR products were then used to generate clone libraries from each sample. ARDRA was performed on individual SSU rDNA clones to determine the dominant populations or Axial *Bacteria* operational taxonomic units (AX*B* OTUs). Fifteen bacterial AX*B* OTUs were identified from a total of 249 clones screened. Overall, organismal diversity in all samples examined was relatively high as determined by rarefaction. Phylogenetic analyses were performed to determine the genetic relatedness of the representative phylotypes. Three of the sample sites were located among the caldera's recent 1998 lava flow (Marker 33 Vent, Snow Blower and Easy Vent), while the fourth site (North Rift) was on an old lava flow north of the caldera. Marker 33 Vent microbial mats were dominated by members of the ε-*Proteobacteria* (17.2%) and δ-*Proteobacteria* (8.6%). The floc-ejecta collected from the Snow Blower Vent contained representatives from the ε-*Proteobacteri*a (25.1%) and Green Non-Sulfur *Bacteria* (12.5%). The Easy Vent bacterial mat community was dominated by members of the ε-*Proteobacteria* (14.3%) and γ-*Proteobacteria* (5.4%). The distal microbial mat from North Rift was dominated exclusively by members of the Flexibacter-Cytophaga-Bacteroides division (43%), possibly representing higher trophic level interactions and secondary production. The organismal and phylogenetic diversity of the ε-*Proteobacteria* found at the new lava vent sites was exceptional, indicating the ecology of these microorganisms plays a significant role at hydrothermal vents especially after recent eruptive events.

A couple of other notable discoveries based on this phylogenetic study were: (a) the abundance of AX*B* OTU 5 (8.6%) from Marker 33, which is closely related to *Desulfocapsa sulfoexigens*, serving as evidence that the anaerobic chemolithotrophic process of sulfur disproportionation (i.e., sulfur-cycling through fermentation pathways) is potentially occurring within this community, and (b) the abundance of AX*B* OTU 6 (12.5%) from Snow Blower, which is a member of the Green Non-Sulfur *Bacteria*, a deeply-rooted branch within the domain *Bacteria*, with the closest relative in culture as *Dehalococcoides ethenogenes* (another obligate anaerobe), and is possibly responsible for the transformation of halogenated organic compounds and degradation of hydrocarbons. Both of these AX*B* OTUs were unique to their respective sampling sites and as anaerobes indicate the possibility of originating in the deep subsurface.

More recently, we have focused our efforts on using a high-throughput approach for tracking microbial

populations, terminal-restriction fragment length polymorphism or T-RFLP. This recently-developed method allows for the rapid analysis of potentially complex microbial communities and offers the capability of tracking specific populations from within these communities. T-RFLP is a quantitative technique that employs fluorescently-labeled PCR primers to amplify selected regions of microbial SSU rDNA from community DNA. PCR products are then digested with a suite of tetrameric restriction enzymes (TREs), and the fluorescently-labeled terminal restriction fragments are precisely measured. The basic idea is that the method provides a "bar code" pattern where each peak is representative of a population. Each sample represents a snap shot of the microbial community and each "bar code" can then be analyzed via cluster analysis. Dominant members of a given community can be inferred phylogenetically by comparison with T-RFLP patterns from an online database through the ribosomal database project (or RDP) at the Center for Microbial Ecology at Michigan State University.

We have used this technique to analyze slurp-gun collected samples from Axial and elsewhere. Preliminary T-RFLP data show that microbial mats from vents located on the caldera's eastern (post-98 eruption) new lava flow all generally cluster together more closely than with other distal sites such as Hydrate Ridge, Guaymas and Loihi. We have also seen an indication that the community sampled at CASM (T&S site) is as different from all the new lava mats as it is to the distal non-Axial mat samples, spurring us to collect more samples from the CASM area this year. Interestingly, variations in the communities at Cloud and Marker 33 are distinguishable. The Magnesia vent community is more similar to Cloud and Easy vent is more similar to Marker 33. The communities from Snow Blower and the North Rift zone are dissimilar but are still contained within a cluster with other Axial vent communities. Jeff plans to continue this work with the bacteria traps in an attempt to decipher community succession dynamics. Over the next couple of months, he plans to develop a more robust DNA extraction method for the bacterial trap samples. He also plans to write a program to aid with the taxon identification by comparison with the RDP database and to compare these results of community similarity with indices derived by other NeMO scientists.

References

Moyer, C. L. 2001. Molecular phylogeny: Applications and implications for marine microbiology, p. 375-394. *In* J. H. Paul (ed.), Marine Microbiology. Methods in Microbiology, Vol. 30. Academic Press, London.

Microbiology Sample List – NeMO 2001

Slurp-Gun Samples

1.	R621	Bottle 4	South Cleft: Plume Vent	
2.	R622	Bottle 5	M33	
3.	R622	Bottle 6	Cloud: N6	
4.	R623	Bottle 6	Bag City	
5.	R624	Bottle 5	Ashes: Fe-hyde	
6.	R625	Bottle 3	Near marker N3	
7.	R626	Bottles 1 & 2	CASM: T&S vent	
8.	R627	Bottle 1	Fe-City	
9.	R627	Bottle 6	Axial Gardens: M113	
10.	R628	Bottles 1 thru 4	CASM: T&S vent	
11.	R630	Bottles 6 & 7	M33	Backside and southern end

Bacteria Traps

1.	R622	Deploy 55 & 56	M33	
2.	R622	Deploy 57 & 58	Cloud: N6	
3.	R623	Recover 51 & 52	M33	
4.	R625	Recover 53 & 54	Cloud: N4	
5.	R629	Deploy 59 & 60	Cloud: N6	
6.	R629	Recover 55 & 56	M33	(note: 56 inverted)
7.	R629	Recover 57	Cloud: N6	
8.	R630	Deploy 61 & 62	M33	
9.	R630	Recover 4 & 19	Axial Gardens: M113	(Found them at last!)
10.	R632	Deploy 63 & 64	Ashes: Gollum Vent	

11.	R632	Recover 33 & 50	Ashes: Gollum Vent	
Osmo Samplers and Fe-analyzers				
1.	R624	Recover	Ashes: Hell Vent	HT Osmo sampler (MTR # 339)
2.	R627	Deploy	Cloud: N6	Red Osmo sampler (MTR # 380)
3.	R629	Reposition	Cloud: N6	Red Osmo sampler (MTR # 380)
4.	R629	Recover	Cloud: N6	Osmo sampler (MTR # 1051)
5.	R629	Recover	M33	Fe-analyzer osmo (MTR # 1052)
6.	R630	Deploy	M33	Green Osmo sampler (MTR # 379)
WaDaRs and Hobos				
1.	R624	Recover	Ashes: Virgin Mound	Hobo #127
2.	R627	Deploy	Axial Gardens: M113	MTR # 1055 (Topside of flow)
3.	R632	Deploy	Ashes: Virgin Mound	Hobo #126

2.3.2 **Hydrothermal Fluid Microbiology** - Mausmi Mehta and Julie Huber

Our work at Axial uses diffuse fluids as a window into the subsurface biosphere and combines molecular, culture, and microscopic techniques to characterize and quantify microorganisms in diffuse fluids and examine their link to fluid chemistry in the subsurface biosphere at Axial Seamount over both time and space. Using the hot fluid sampler over the past four years, we have collected over 70 diffuse and high temperature fluid samples, including multiple samples from the same vent in different years. This unique time series of changes in microbial community and chemistry of fluids since the 1998 eruption has already yielded many interesting results, while also providing opportunity for new directions in our subsurface research.

Over the last four years, we have performed semi-quantitative enrichments (MPNs, Most-Probable Number technique) to monitor the presence of hyperthermophiles and thermophiles at certain vents over time. A table showing the preliminary results of these MPNs is shown below.

Preliminary Results of Most-Probable Number Technique

Year	Location	Sample T (C)	Culture T (C)	Type of Microbe	Microbes/L
1998	Marshmallow	>65	90	Hyperthermophilic heterotroph	$\geq$ 48,000
1999	Marshmallow	72	90	Hyperthermophilic heterotroph	1420-48,000
2000	Marshmallow	136	90	Hyperthermophilic heterotroph	$\geq$48,000
2001	Marshmallow	212	90	Hyperthermophilic heterotroph	80-2400
1998	Marker 33	36	90	Hyperthermophilic heterotroph	$\geq$ 48,000
1999	Marker 33	78	90	Hyperthermophilic heterotroph	3000-96,000
2000	Marker 33	33	90	Hyperthermophilic heterotroph	$\geq$48,000
2001	Marker 33	16	90	Hyperthermophilic heterotroph	720-26,000
1998	Marker 33	36	90	Hyperthermophilic autotroph	280-4600
1999	Marker 33	78	90	Hyperthermophilic autotroph	600-8800
2000	Marker 33	33	90	Hyperthermophilic autotroph	720-26,000
2001	Marker 33	16	90	Hyperthermophilic autotroph	300-7600
1999	Bag City	23	90	Hyperthermophilic heterotroph	300-7600
2001	Bag City	19	90	Hyperthermophilic heterotroph	60-880
1999	Nascent	26	90	Hyperthermophilic heterotroph	140-4200
2000	Nascent	15	90	Hyperthermophilic heterotroph	20-720
2000	Gollum	30	90	Hyperthermophilic autotroph	300-7600
2000	Gollum	30	70	Thermophilic autotroph	60-880
2001	Gollum	16	90	Hyperthermophilic autotroph	80-2400
2000	Cloud N6	16	70	Thermophilic heterotroph	720-26,000
2001	Cloud N6	10	70	Thermophilic heterotroph	300-7600

Results indicate there are still high numbers of anaerobic hyperthermophiles and thermophiles at Marker 33 and Cloud N6 vents, although the temperature at both vents continues to decrease. Additionally, we continue to find populations of hyperthermophiles at Bag City, Nascent, Gollum, and Marshmallow. The presence of hyperthermophiles and thermophiles in fluids either drastically below or above the optimum growth temperature of these microorganisms strongly supports the idea of a warm subsurface in the crust where organisms can thrive and grow before being brought to the seafloor in vent fluids.

This year we tried to culture some unique subsurface microbes by designing new media. One example is a media devoid of any phosphorus (necessary for microbial growth) except in the mineral form to see if the microbes are capable of extracting nutrients from rocks, a likely subsurface characteristic. Another focus of our research this year is to enrich for microorganisms that are able to use N_2 gas as a source of nitrogen (nitrogen fixers). Using media that has no nitrogen other than N_2 gas, we may be able to isolate a nitrogen-fixer in culture. Being able to use N_2 gas, which is present is high concentrations in seawater and hydrothermal fluid, may be necessary in the subseafloor, where other sources of nitrogen are limiting.
With the hot fluid sampler, we are also able to obtain a variety of in-situ filtered fluid samples for DNA/RNA extraction to look at microbial diversity and microbial gene expression, and FISH (Fluorescent In-Situ Hybridization) to quantify and track certain microbes within and between vents. Already we have a three-year series of the phylogenetic diversity of bacteria and archaea at Marker 33. Using 16S rRNA phylogenetic analyses of particle-attached and free-living microbial populations, we found an indigenous subsurface population of microbes related to both mesophilic and hyperthermophilic methanogens all three years. The bacterial population reflects both hyperthermophilic members, as seen in the *Thermodesulfobacteria* and *Aquificales*, as well as a mesophilic component of sulfide and methane oxidizers. The particle-attached population consistently had more diversity compared to the free-living population, suggesting the important role of particle-attachment and biofilm formation in the subsurface.

The DNA extracted from in situ filtered fluid samples can also be used to look for genes responsible for microbial metabolic processes such as nitrogen fixation. Using Marker 33 fluid samples from 1999 and 2000, we were able to identify a potential nitrogen-fixing community there, based on the *nif* genes that encode nitrogenase, the enzyme responsible for nitrogen fixation. Those results indicate that a diverse group of Archaea and Bacteria at Marker 33 possess *nif* genes and could be expressing them when fixed nitrogen is limiting. In order to determine whether these *nif* genes are being expressed in situ, it is necessary to isolate RNA from the diffuse fluids, which is something we will try from samples taken this year. This method can be applied to any gene of interest, and other genes that indicate relevant metabolic processes will be used in the future.

We have also obtained a unique isolate from these diffuse fluids, likely a new genus, and exhibiting subsurface characteristics such as thermophily, autotrophy, and the ability to form biofilms. Temperature, hydrogen sulfide concentration, and chlorinity of vent fluids reflect a cooling of the system according to post-eruptive fluid evolution models, although we continue to culture significant numbers of anaerobic hyperthermophilic heterotrophic and methanogenic archaea for all three years. This suggests that while the system is cooling down, there is still a viable hot subsurface where abundant indicator organisms like hyperthermophiles are maintained.

A unique part of our work this year is the short and long-term deployments of the RAS sampler. After the short term deployment at Cloud N6, we were able to culture thermophiles from 12 time points over the sampling period, and on land we will perform microscopic counts on preserved fluids to see if we can find any variability in the size of the population, as well as analyze some filtered samples for changes in microbial diversity. The long-term RAS at Cloud N6 is also equipped with filters and cell preservatives for microbial research as well. With over 14 new diffuse samples collected this year, many of them re-sampled from previous years, we will continue our investigation of changes within and between vents in the caldera in order to gain a better understanding of the link between chemistry and microbiology in the subsurface biosphere at Axial Seamount.

2.4 MACROBIOLOGY

2.4.1 NeMO 2001 Macrobiology Report - Amanda Bates, Jean Marcus, Anna Metaxas, Verena Tunnicliffe

NEMO 2001 continues several biological studies on Axial Volcano and initiates some new ones. The familiarity of investigators with each others' studies and with ROV capabilities resulted in increased efficiency in sample collection and sharing. And it meant pushing ROPOS performance to new extremes. Our research is trying to determine the pattern of animal distribution in eruptive and non-eruptive areas of the Volcano; it also seeks to test ideas about the processes underlying the patterns. This year's work examined several themes:

Temporal Change of New Lava Communities
Vents created by the 1998 eruption of Axial Volcano were sampled for associated fauna in the summers of 1998, 1999, 2000 and 2001. Preliminary analyses of the post-eruption data reveal several interesting trends. First, vent animals quickly colonized new vents: of the 55 species known from Axial, 28 (51%) had reached the new vents by 7 months, and 42 (76%) by 18 months post-eruption. Second, initial colonization was heterogeneous. Some vents were dominated by the tubeworm *Ridgeia piscesae*, others by polychaetes and one vent by snails. Causes of this variability are unknown. Possible factors include vent differences in temperature, chemistry, area, distance to source populations, and chance recruitment events. Third, the limpet *Lepetodrilus fucensis*, present at most vents in low numbers in 1998 and 1999, dramatically increased its abundance at all vents from 1999 to 2000 and remains dominant in 2001. Last, initial differences between vent animal assemblages seem to persist through time. Vents most similar to one another in species composition in 1998 are more similar to each other than to other vents in 2000, suggesting that early colonists influence future assemblage structure.

A New Species
One of the dominant colonizers of the new vents in 1998 was a large, bright red scale worm. We recently described this worm (manuscript submitted to the Proceedings of the Biological Society of Washington), and named it *Vampiropolynoe embleyi*. This species is so different from known deep-sea and vent scale worms, that it warranted the erection of a new subfamily scale worms. This species is particularly interesting because it seems adapted to post-eruptive conditions: it has only been seen or sampled in the few years following an eruption on the Juan de Fuca Ridge (CoAxial Segment and Axial Volcano). By 2000, *V. embleyi* was no longer evident in bottom observations (although one specimen was sampled in a tube worm grab) and there is no evidence of its presence in 2001. Where this species goes in between eruptions remains a mystery…

Gastropod Ecology
Following the work of Maia Tsurumi and Jean Marcus, we now recognize that two gastropods dominate vent communities the length of Juan de Fuca Ridge: the limpet (*Lepetodrilus fucensis*) and glob snail (*Depressigyra globulus*). A pilot study last year demonstrated we can keep these animals alive for several weeks in varying conditions of temperature and sulphide concentrations. This year's collecting strategy focused on defining the range of these species and their physiological condition. Samples were preserved for subsequent work on enzyme character, symbiont abundance, reproductive state and population features. It appears that the limpet may be so successful because of a feeding strategy that changes to suit the conditions. On the vent periphery, they graze using a scraping radula. In higher sulphide areas, the epibiotic bacteria on the gills appear to contribute to the animal's nutrition. Where limpet densities are very high, they engage in a stacking behavior that implies they are suspension feeding on waterborne particulates.

Live animals were maintained shipboard and placed in chambers to study responses to temperature and sulphide gradients. As behavioral results can be difficult to interpret, we cannot be conclusive yet. Several responses were noted: i) that both species respond to a temperature gradient ii) the glob snail may prefer a higher temperature iii) limpets can tolerate high sulphide concentrations for several hours iv) both species move away from high sulphide. Live specimens are being transported to a high pressure facility on shore to continue the observations.

***Ridgeia* Ecology**

The Juan de Fuca ridge vent community is structured around the tubeworm *Ridgeia piscesae*. It forms the substratum that most other species colonize. Because of the bizarre symbiosis it harbors, this and other vestimentiferan species are the focus of many studies. Little is known about the processes that govern the successful recruitment of this animal. This year we made the final collections (two) to examine the relative abundance of juveniles on recruiting on the new lavas. There was a significantly greater number of the smallest size class in 1998 suggesting that mortality was much lower for these new recruits in the first year. We are currently testing the idea that grazing pressures in the subsequent years increase as limpet numbers build.

By comparing new lava worm tubes with those on the old lavas, we found that the 1998 worms had a distinctly different form. By 2000, the Nascent worms were up to 130cm long and similar in form to old lava animals. It was interesting to find that this year, these worms had all died and a new generation was attached to the decaying tubes.

We expand this work this year by collecting earliest juveniles and *Ridgeia* larvae. As the symbionts are not present at the earliest settlement stages, it is presumed that the feeding larva must ingest the appropriate bacterial strain which converts to a symbiosis in the gut lining. Sectioning and electron microscopy will examine the stage at which this happens.

Larval Dynamics

We are using three different approaches to describe patterns in larval availability and colonization. As in 2000, we deployed a number of passive larval collectors (larval traps, operating in principle like sediment traps) at three locations (Cloud, Virgin and ROPOS) for one week. These traps allow us to obtain an estimate of the spatial distribution of larvae, as they are passively transported near the bottom by the currents (larval availability). To measure abundance of larvae in the water column, we use nets and high volume pumps. In 2001, we collected four pump samples (1mab at Marker 33; 35-120 mab in transit from Marker 33 to Bag City to South Pillow Mound to Bag City; 2-4 mab, during video survey at Cloud; 25 mab, during Imagenex transits over Casm) and did three net tows (25 mab, during Imagenex transits over Casm; 80 mab, transiting from Marker 33 to Coquille; and 20-30 mab along the caldera wall at Casm) both near vents and away from vents along the ridge. A cursory examination of samples from larval traps deployed at Marker 33 and near Crack in 2000, and from nets and pumps in 2000 and 2001 revealed that gastropods and polychaetes are the dominant larval taxa both near the bottom and in the water column. To measure patterns in colonization and explore factors that may affect these patterns (grazing, distance from vent fluids), we deployed arrays of settlement plates at Cloud (near the vent and ~10 away), ROPOS, Virgin and Gollum. Each array included plates with two different substrates (basalt and scour pads) and, for each substrate, two levels of accessibility by grazers (low and high). One set of the arrays will be recovered in 2002 and another in 2003. Over the short term, we found no colonizers in an array recovered from Cloud after one week.

Macrobiology Sample List – NeMO 2001

(This listing includes samples targeted for us, and samples shared with others.)

South Cleft

R619-1: grab of wood block from extensometer #9
R619-2: grab of wood block from extensometer #2
R619-3: hydroids picked from extensometers #2-4

Axial Volcano Northern South Rift Zone

R622-20: suction sample of periphery fauna from Cloud, Mkr N6
R622-39: suction sample of limpets in flow near Mkr N3
R622-40: suction sample of limpets a few inches from flow near Mkr N3
R622-41: suction sample in "Amphisamytha zone" near Mkr N3
R623-2: McLane pump sample from BM#5 near Mkr 33 for 20 minutes
R623-3: tubeworm grab in crack at Mkr 33
R623-6: suction sample ~6-10 cm from crack lip at Mkr 33
R623-7: suction sample ~3m from crack at Mkr 33
R623-8: tubeworm grab of healthy worms on edge of Cloud (N6) pit
R623-10: McLane pump sample during transit from Cloud(Bag City(S. Pillow Mound(Bag City; 3529L pumped
R625-1: McLane pump sample from near Cloud vent; pumped 2-4 m above bottom for 120 minutes at 10L/minute.
R625-4: tubeworm grab at Nascent (near Mkr M)
R625-6: suction sample of fauna at edge of Nascent venting area; ~4m NE from Mkr M
R625-7: suction sample for fauna at the far periphery of Nascent venting area; ~10m from Mkr M
R625-10: tubeworm grab at Old Flow vent; most associated fauna shaken off
R629-10: recovered larval settlement array (K) that was deployed at Cloud vent (N6) for one week
R629-1: recovered larval trap #7 from Cloud (N6) after a week-long deployment
R629-2: recovered larval trap #5 from Cloud (N6) after a week-long deployment
R629-3: recovered larval trap #6 from Cloud (N6) after a week-long deployment
R629-4: recovered larval trap #8 from Cloud (N6) after a week-long deployment
R630-4: suction of fauna on far periphery from Mkr 33 crack (~8 m out)
R630-8: plankton net sample of transit from Mkr 33(Casper vent
R630-9: suction sample of 'Provanna patch' just beyond flow at Casper
R630-10: suction sample of gastropods in flow at Casper

CASM vent field

R626-1: McLane pump over CASM caldera floor during Imagenex; 5831L pumped over 12 hours and 28 minutes
R626-2: plankton net sample from tow over CASM during Imagenex
R628-3: suction sample of limpets at Shepherd's vent, beyond flow
R628-4: suction sample of limpets at Shepherd's vent, in flow
R631-1: plankton net sample of tow up CASM wall for 80 minutes

ASHES vent field

R624-7: suction sample of fauna near flow at Gollum
R624-8: suction sample of fauna beyond flow at Gollum

2.5 MACRO/MICROECOLOGY and GEOMICROBIOLOGY

2.5.1 NeMO 2001 Report - Kim Juniper Lab, University of Quebec at Montreal

Sébastien Durand, Damien Grelon, Richard Léveillé and Antoine Pagé, from the Geotop Research Centre of the University of Québec at Montréal, participated in the NeMO 2001 ROPOS cruise. Video footage, backscatter sonar data and various biological and mineralogical samples were collected for ongoing and new studies.

Food Web Dynamics
For the 4th consecutive field season, we have sampled at the new vents on the 1998 lava flow as part of a study of the post-eruptive development of food webs at new hydrothermal vents. PhD student Christian Levesque is using stable carbon and nitrogen isotope ratios in animal tissues and detrital material to identify food sources and trophic levels within the faunal community. Continued collaboration and sample sharing with Verena Tunnicliffe's group will permit this work to be correlated with their study of colonization of new vents and subsequent community change over time. During NeMO 2001, we sampled from 6 vents (particulate matter and fauna) and from 2 locations away from the vents (sediments). This work will be complemented by lipid analysis of animal tissues and particulate material. As well, microbial biomass estimates will be performed by ATP analysis and bacterial counts on particulate matter, sediments and sulphide worm tubes.

Small-scale Remote Sensing of Macrofaunal Communities
For the fourth consecutive year, a video survey of the Cloud vent area was performed in order to follow the development of the site. The distribution and relative density of Polynoids and Vestimentiferans were mapped in each year. A final map will be produced showing the different rates of community evolution and distribution based on the 4 years of data.

This year, Imagenex 801 backscatter sonar information was collected during the video-survey in order to produce a texture map of the area. Once compared with the video-survey, the different textures will be associated with the different types of communities found on the site and consequently defined as community texture signatures. This will allow us to remotely sense an area with poor visibility such as Cloud and detect the different biological characteristics using textural information obtained through backscatter analysis.

Feeding Behavior of Sulphide Worms
We also continued work on the deposit-feeding behavior of the sulphide worm *Paralvinella sulfincola*. Detailed video observations were made at Hell and Phoenix vents using the ROPOS 3-CCD camera with zoom capability. Previous work has shown a territorial behavior with a regular distribution pattern over the substratum surface. These observations have not yet been explained, but we think that food plays a major role in the organism's distribution pattern. Video footage showing the biomechanics of particle collection and feeding behavior is being studied by graduate student Marie Morineaux. Lipid tracer analysis will be also used to quantify the available food over the substrata and secreted tubes of *P. sulfincola*.

Microbiology
A new study by MSc student Antoine Pagé is focusing on the ecology of microorganisms associated with *Paralvinella sulfincola* and its surroundings. Sheeted mucus tubes of *P. sulfincola* were sampled from ASHES Vent Field (Hell, Phoenix, Inferno) and CASM Vent Field (T&S) and were frozen on board for later analysis of the associated microbial community using 16S rRNA sequencing. Data from this analysis will be used in a comparative study of the microbial communities associated with mucus secretions of polycheatous annelid worms from similar habitats on the Juan de Fuca Ridge and the East Pacific Rise (*Paralvinella sulfincola-Alvinella pompejana* and *Paralvinella palmiformis-Paralvinella grasslei*). For this project, we are collaborating with Dr. Marie-Anne Cambon-Bonavita from IFREMER Centre de Brest.

In parallel, samples of active chimney adjacent to one of the *P. sulfincola* colonies were collected and will also be investigated for microbial diversity. This work aims at identifying the effect of the colonization by *P. sulfincola* on the diversity of the microbial community found on active chimneys.

Sulphide Weathering
We have continued to sample various sulphide chimney deposits as part of a microbial sulphide weathering project by postdoctoral researcher Richard Léveillé. Sulphides were collected from South Cleft, CASM and ASHES vent fields for later mineralogical, chemical and electron microscope investigations. These sulphides, and their natural populations of bacteria, will be used in laboratory experiments on sulphide mineral alteration. The goal of these experiments will be to quantify the rates of alteration (weathering) of sulphide minerals in the near-vent environment and to determine the role of naturally-occurring bacteria in this alteration.

To complement these laboratory studies, a new *in situ* experiment was begun this year. Small blocks and disks (1" diameter) of sulphides were fixed to plastic trays, placed on Anna Metaxas' settling arrays (1 per array) and positioned near various vents. The arrays will be left in place for 1-2 years. After recovery, they will be examined by electron microscopy for signs of microbial colonization and evidence (textural/chemical) of mineral alteration.

2.6 BIOGEOCHEMISTRY

2.6.1 Iron Oxides

Chris Kennedy – Department of Geology, University of Toronto
Supervised by S.D. Scott (Scotia Bank Marine Geology Laboratory) and F.G. Ferris (Microbial Geochemistry Laboratory)

Biogeochemistry investigates the roles microbes play in the cycling of various elements in the environment. Specific to the study here at Axial Volcano is the role bacteria play in the formation of iron oxide deposits. The structure of the bacterial cell wall is intrinsically reactive with a variety of dissolved ions (i.e. Fe^{3+}) and as a result, provides a highly abundant (bacterial concentration ~10^6 cells/ml) nucleation site for mineral formation. Bacteria are thought to enhance the rate of iron oxide formation as compared to when bacteria are absent. As a consequence of Fe-oxides mineralizing on bacterial cell walls, the morphology of a soft bodied organism is preserved that would otherwise degrade away. The bacteriogenic nature of these iron oxides results in a material that is highly unordered with a large surface area ratio. The study of iron oxides at Axial Volcano, which has been undertaken as a part of my Ph.D. thesis, is investigating three main themes: (1) the role bacteria play in the genesis of mid-ocean ridge iron oxides, (2) the potential for mineralized bacteria to become microfossils as applied to paleoenvironmental analysis and astrobiology and (3) characterizing the surface chemistry and surface structure of iron oxides to better understand their ability to adsorb a large variety of elements from the aqueous milieu (i.e. partitioning ability).

Samples collected at Axial Volcano last year were used for a preliminary characterization study that involved light microscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM), energy dispersive spectroscopy (EDS), select area electron diffraction (SAED), inductively coupled plasma-atomic emission spectroscopy (ICP-AES), X-ray diffraction (XRD), and loss on ignition (LOI) analysis. Iron oxide deposits at Axial Volcano exist as the XRD "2-line" ferrihydrite phase with its overall structure lacking any long range (i.e. > 8 Å) order of lattice arrangement. Microscopy revealed that bacterial cell wall mineralization intimately follows the contour of the wall and it was also noted that the dominant morphological feature seen in the "2-line" ferrihydrite was overwhelmingly mineralized bacteria. These deposits concentrated several elements by 3-6 (log values) orders of magnitude relative to the surrounding seawater of the vent system, with some elements such as Cu, Ni, Zn and Cr present at several thousand ppm.

The samples collected this year at Axial Volcano will be used to continue my research on Fe-oxides.

Environmental scanning electron microscopy (ESEM), which permits observation of these deposits in their most natural state possible, will be used to aid in my investigation of the bacterial relationship in these iron oxides. I will also test the resilience of the mineralized bacteria to determine their resistance to taphonomy and assess the potential for fossilization to occur. I will study the surface chemistry and surface structure of these iron oxides by using acid-base titrations and X-ray photoelectron microscopy (XPS) to understand how these deposits are able to partition so strongly. The surface chemistry investigation will aid in assessing the role iron oxide deposits play in cycling trace elements in the world's oceans since iron oxides are likely abundant along all mid-ocean ridges.

NeMO 2001 Fe Oxide Sample List

Dive	Site	Lat	Long	Depth (m)	Sample #	Processing	Comments
R621	South Cleft	44 38.536	130 11.195	2233	R621-SSJ4-0005	2x 1.5ml fixed with 5% glut	lots of iron oxides at this location but suction sampler broke - priority if site visited in years to come -check frame grabs
R624	Phoenix	45 55.995	130 0.839	1544	R624-SSJ1-0029	1x 1L sediment + water	mounds and also present in the crack
						1x 125mL 0.2 micron filtered	check fram grabs for "crack"
						3x 1.5 ml fixed with 5% glut	watch for sulfide when analyzing
						1- S (SEM)	
						2- E (ESEM)	
						3- ST (spare/TEM)	
R624	Fe-Hyde1	45 55.979	130 0.827	1544	R624-SSJ2-0030	1x 1L sediment + water	look like cabbage patches or termite hills
						1x 125mL 0.2 micron filtered	prolific -- Fe-oxide highway
						3x 1.5 ml fixed with 5% glut	perhaps on top of diffuse venting
						1- S (SEM)	
						2- E (ESEM)	Fe-Hyde was the purest sample recovered
						3- ST (spare/TEM)	retrieved large quantity
R624	Fe-Hyde2	45 55.979	130 0.827	1544	R624-SSJ3-0031	1x 1L sediment + water	
						1x 125mL 0.2 micron filtered	
						3x 1.5 ml fixed with 5% glut	
						1- S (SEM)	
						2- E (ESEM)	
						3- ST (spare/TEM)	
R624	W Wall of caldera	45 56.035	130 0.967	1544	R624-SSJ4-0032	1x 1L sediment + water	deposits here are flanking the wall and
						1x 125mL 0.2 micron filtered	appearing like a blanket over the seafloor
						3x 1.5 ml fixed with 5% glut	
						1- S (SEM)	for analysis, this sample had lots of basalt
						2- E (ESEM)	chips in it
						3- ST (spare/TEM)	
R624	Mkr 33	45 55.996	129 58.935	1524	R624-SSJ8	1x ziplock bag of basalt	for Danielle Fortin @ U. Ottawa
						fragments	
R625	Old flow	45 56.186	129 58.902	1534	R625-SSJ7-0011	1x 1L sediment + water	Fe-oxide is sitting in cracks of rocks and
						1x 125mL 0.2 micron filtered	appearing like a stream
						3x 1.5 ml fixed with 5% glut	a weathering product perhaps
						1- S (SEM)	looking "yellower" than others
						2- E (ESEM)	
						3- ST (spare/TEM)	
R625	Cloud-N4	45 56.005	129 58.900	1523	R625-BT54-0003	3x 1.5 ml fixed with 5% glut	this is a subsample of C. Moyer's bac trap
						1- S (SEM)	that was coated with iron oxide
						2- E (ESEM)	looking for "bugs" on this
						3- ST (spare/TEM)	
R627	Fe-City	45 55.052	129 59.351	1535	R627-SSJ7-0015	1x 120mL sediment + water	lots of Fe oxide blanketing the surface

						1x 125mL 0.2 micron filtered	active very diffuse venting at site of Fe-oxide
						3x 1.5 ml fixed with 5% glut	some life around vent
						1- S (SEM)	look at frame grabs
						2- E (ESEM)	
						3- ST (spare/TEM)	
R627					R627-HFS9-0017	3x 1.5 ml fixed with 5% glut	HFS subsample to look for "fresh" bacteria
						1- S (SEM)	pH = 7.094
						2- E (ESEM)	temp = 9.6
						3- ST (spare/TEM)	H2S = at detection (1 +/- 1.3 micromolar)
						1x 5ml fixed with 5% glut	

2.7 BASALT SAMPLING

2.7.1 All Basalt Wax-Cores Collected at Axial 1998 - 2001 (most recent listed first)

14 wax-cores recovered during 2001cruise

Year	rk samp#	Longitude	Latitude	location	description
2001	RC 124	-130.030833	45.748333	South Rift	n/a
2001	RC 125a	-130.037000	45.763333	South Rift	n/a
2001	RC 126	-130.033333	45.926667	West Flank	n/a
2001	RC 127	-129.961667	45.919167	East Flank	n/a
2001	RC 128	-129.920000	45.908667	East Flank	n/a
2001	RC 129	-130.025000	46.007500	N. Rift Zone	n/a
2001	RC 130	-129.992833	46.056166	N. Rift Zone	n/a
2001	RC 131	-129.979166	46.036666	N. Rift Zone	n/a
2001	RC 132	-129.995000	46.028333	N. Rift Zone	n/a
2001	RC 133	-129.979166	46.025000	N. Rift Zone	n/a
2001	RC 134	-130.023333	46.023333	N. Rift Zone	n/a
2001	RC 135	-130.025000	46.001666	N. Rift Zone	n/a
2001	RC 136	-130.000000	45.956667	Caldera Site	n/a
2001	RC 137?	-130.043333	46.000167	N. Rift Zone	n/a
2000	RC 111	-130.426667	44.666700	S.Cleft	sediment
2000	RC 112	-130.429983	44.583367	S.Cleft	basalt
2000	RC 113	-129.982483	45.916517	1998 flow	fresh -1
2000	RC 114	-129.857567	45.901667	E. of Axial	altered-3
2000	RC 115	-129.860300	45.890200	E. of Axial	altered-3
2000	RC 116	-130.031667	45.828317	SRZ	less alter-2
2000	RC 117	-130.016833	45.818967	SRZ	fresh -1
2000	RC 118	-129.968367	45.916683	E.of 1998	check
2000	RC 119	-129.992833	46.056167	NRZ	fresh -1
2000	RC 120	-130.009250	46.061867	NRZ	less alter-2
2000	RC 121	-130.027483	46.070000	NRZ	altered-3
2000	RC 122	-130.013367	46.055050	NRZ	less alter-2
2000	RC 123	-129.984833	45.839833	E. of SRZ	less alter-2
1999	99-RC-50	-130.000000	45.014683	none	none
1999	99-RC-51	-130.000250	45.014950	none	none
1999	99-RC-52	-130.000350	45.014600	none	none
1999	99-RC-53	-130.000500	45.014367	none	none
1999	99-RC-54	-130.001300	45.010933	none	none
1999	99-RC-55	-130.001200	45.011450	none	none
1999	99-RC-56	-130.001367	45.011533	none	none
1999	99-RC-57	-130.001367	45.011683	none	none
1999	99-RC-58	-130.001067	45.012617	none	none
1999	99-RC-59	-130.001050	45.012767	none	none
1999	99-RC-60	-130.001050	45.012950	none	none
1999	99-RC-61	-130.002300	45.012550	none	none
1999	99-RC-62	-130.000850	45.014450	none	none
1999	99-RC-63	-130.000883	45.014283	none	none
1999	99-RC-64	-130.001333	45.012117	none	none
1999	99-RC-65	-130.001317	45.011983	none	none
1999	99-RC-66	-130.001333	45.011817	none	none
1999	99-RC-67	-130.002350	45.013467	none	none
1999	99-RC-68	-130.000967	45.013933	none	none
1999	99-RC-69	-130.001017	45.014033	none	none
1999	99-RC-70	-130.000317	45.012233	none	none
1999	99-RC-71	-130.000300	45.012400	none	none
1999	99-RC-72	-130.000233	45.012667	none	none
1999	99-RC-73	-130.000117	45.012583	none	none
1999	99-RC-74	-130.000283	45.012550	none	none

Year	rk samp#	Longitude	Latitude	location	description
1999	99-RC-75	-130.000200	45.012900	n/a	n/a
1999	99-RC-76	-130.000016	45.012833	n/a	n/a
1999	99-RC-77	-130.000117	45.013017	n/a	n/a
1999	99-RC-78	-129.016650	45.012933	n/a	n/a
1999	99-RC-79	-130.000083	45.012700	n/a	n/a
1999	99-RC-80	-130.000217	45.012783	n/a	n/a
1999	99-RC-81	-130.000383	45.012817	n/a	n/a
1999	99-RC-82	-130.000617	45.012717	n/a	n/a
1999	99-RC-83	-130.000917	45.014100	n/a	n/a
1999	99-RC-84	-130.001000	45.014117	n/a	n/a
1999	99-RC-85	-130.001000	45.014217	n/a	n/a
1999	99-RC-86	-130.000717	45.013117	n/a	n/a
1999	99-RC-87	-130.000717	45.013300	n/a	n/a
1999	99-RC-88	-130.000650	45.013517	n/a	n/a
1999	99-RC-89	-130.000400	45.013750	n/a	n/a
1999	99-RC-90	-130.000583	45.013833	n/a	n/a
1999	99-RC-91	-130.000467	45.013417	n/a	n/a
1999	99-RC-92	-130.000350	45.013367	n/a	n/a
1999	99-RC-93	-130.000283	45.013383	n/a	n/a
1999	99-RC-94	-129.015583	45.009567	n/a	n/a
1999	99-RC-95	-129.015750	45.008817	n/a	n/a
1999	99-RC-96	-129.015483	45.009933	n/a	n/a
1999	99-RC-97	-130.000617	45.011717	n/a	n/a
1999	99-RC-98	-130.000567	45.011933	n/a	n/a
1999	99-RC-99	-129.016033	46.001067	n/a	n/a
1999	99-RC-100	-129.016000	46.000933	n/a	n/a
1999	99-RC-101	-129.015867	46.001283	n/a	n/a
1999	99-RC-102	-130.000617	46.001283	n/a	n/a
1999	99-RC-103	-130.000983	46.001333	n/a	n/a
1999	99-RC-104	-130.001150	46.001083	n/a	n/a
1999	99-RC-105	-130.001033	45.014250	n/a	n/a
1999	99-RC-106	-130.000967	45.014367	n/a	n/a
1999	99-RC-107	-130.001033	45.013817	n/a	n/a
1999	99-RC-108	-130.001067	45.013617	n/a	n/a
1999	99-RC-109	-130.002383	45.013700	n/a	n/a
1999	99-RC-110	-130.002417	45.013883	n/a	n/a
1998	98-JDFRC-01	-129.997000	45.892167	South Rift	glass
1998	98-JDFRC-02	-129.975833	45.853500	SR	glass+seds
1998	98-JDFRC-03	-130.013000	45.828667	SR	glass
1998	98-JDFRC-04	-130.011667	45.832500	SR	glass
1998	98-JDFRC-05	-130.005333	45.832667	SR	glass
1998	98-JDFRC-06	-130.009667	45.836333	SR	glass
1998	98-JDFRC-07	-130.059667	45.786667	SR	seds+grungy glass
1998	98-JDFRC-08	-130.059333	45.797500	SR	seds+grungy glass
1998	98-JDFRC-09	-130.057500	45.801167	SR	seds+grungy glass
1998	98-JDFRC-10	-129.963333	45.961500	E. Flank	seds+glass
1998	98-JDFRC-11	-130.006167	45.850500	SR	glass+boulder!
1998	98-JDFRC-12	-130.008833	45.840000	SR	glass
1998	98-JDFRC-13	-130.026833	45.844000	SR	glass+seds
1998	98-JDFRC-14	-130.025000	45.940833	SW Flank	grungy glass
1998	98-JDFRC-15	-130.031833	45.894333	SR	glass
1998	98-JDFRC-16	-130.025833	45.792333	SR	grungy glass
1998	98-JDFRC-17	-130.028333	45.798333	SR	grungy glass
1998	98-JDFRC-18	-130.019333	45.808667	SR	grungy glass
1998	98-JDFRC-19	-130.041333	45.692000	SR	grungy glass
1998	98-JDFRC-20	-130.055000	45.671667	SR	seds only
1998	98-JDFRC-21	-130.081333	45.636667	SR	grungy glass

Year	rk samp#	Longitude	Latitude	location	description
1998	98-JDFRC-22	-130.046667	45.870667	SR	grungy glass
1998	98-JDFRC-23	-130.041667	45.880333	SR	glass
1998	98-JDFRC-24	-130.038000	45.852667	SR	grungy glass
1998	98-JDFRC-25	-130.046333	45.843333	SR	seds only
1998	98-JDFRC-26	-130.048500	45.834333	SR	glass
1998	98-JDFRC-27	-130.025833	45.834167	SR	grungy glass
1998	98-JDFRC-28	-130.025000	46.007500	N. Flank	glass
1998	98-JDFRC-29	-130.007500	45.994667	N. Flank	grungy glass
1998	98-JDFRC-30	-130.037500	45.821167	SR	grungy glass
1998	98-JDFRC-31	-130.027667	45.816667	SR	grungy glass
1998	98-JDFRC-32	-130.013000	45.813333	SR	glass
1998	98-JDFRC-33	-130.031500	45.843667	SR	grungy glass
1998	98-JDFRC-34	-130.047500	45.840333	SR	glass
1998	98-JDFRC-35	-130.011333	45.861167	SR	glass
1998	98-JDFRC-36	-129.963833	45.826333	SR	glass
1998	98-JDFRC-37	-129.924667	45.789667	Vance	seds only
1998	98-JDFRC-38	-130.037500	45.762500	SR	seds+glass
1998	98-JDFRC-39	-130.002833	45.860833	SR	glass
1998	98-JDFRC-40	-130.070000	45.840000	SR	seds+grungy glass
1998	98-JDFRC-41	-130.029000	45.889333	SR	seds+glass
1998	98-JDFRC-42	-129.996500	46.022667	N. Flank	glass
1998	98-JDFRC-43	-130.047500	45.831000	SR	glass+seds
1998	98-JDFRC-44	-130.050000	45.827500	SR	glass+seds
1998	98-JDFRC-45	-130.060167	45.805333	SR	grungy glass
1998	98-JDFRC-46	-130.030833	45.748333	N. Rift	glass
1998	98-JDFRC-47	-129.982833	46.048833	N. Rift	grungy glass
1998	98-JDFRC-48	-129.967833	46.066000	N. Rift	glass
1998	98-JDFRC-49	-129.963000	46.062333	N. Rift	glass

2.8 ENGINEERING

2.8.1 PMEL-EDD Accomplishments on RHB Vents 2001 - Chris Meinig

(Order of accomplishments does NOT reflect importance)

Extensive work was done in port to remove a Trackpoint II transducer and install and test an Edgetech PS-8000 transducer on the extensible mast of the RHB. The PS-8000 rangemeter electronics was installed in the CME office and cables were run to the ROV control room.

The 48-bottle RAS package was deployed and placed in Cloud Vent for a 2-day experiment. The RAS mooring was then released by ROPOS and recovered by the RHIB and dragged back to the BROWN while ROPOS remained in the water.

The NeMO Net 2001 RAS seafloor package was tested, deployed and positioned with ROPOS at Cloud Vent. One temperature sensor is coupled to the inlet nozzle (T1) and placed in the vent, an additional temp sensor (T2) is also placed in the vent, T3 is located in the H2S and pH chemical sensor plenum on the seafloor package. Nominal temperature in the worms was 9.8 deg C. Several temperatures were taken from the ship and from shore to make sure the RAS package was operating properly.

The NeMO Net surface buoy was deployed about 300m southwest of the RAS package on 7/28/01 at ~1630. Buoy electronics were monitored while the RAS was interrogated from the RHB. All tests checked out ok. Anchor position was surveyed from the surface. ARGOS beacon #21988, release# 023669,solar light Amber 1

flash every 4sec. Position of the buoy anchor was survey acoustically: 45 deg.55.8526, 129 deg. 59.9812

The NeMO Net 2000 camera was recovered after a successful 12-month deployment. The camera package had an incorporated acoustic release that was commanded from the BROWN and recovered.

Ten of eleven Benchmark Acoustic Extensometers were interrogated on the seafloor. Instruments#2,3& 4 responded but did not have any valid ranges and were placed in the elevator for recovery. Instrument#5 was flooded and was also recovered in the same elevator. One additional extensometer was deployed in the array.

An elevator with Extensometers #2,3 & 4 was deployed for a five-day period to determine if they could range over a 3m distance. Instruments were recovered and data was recovered from #3,4. Unfortunately #2 had flooded.

The hot fluid sampler was installed on three ROPOS dives incorporating pH and H2S sensors for the first time. Several minor problems with telemetry and power were troubleshot and solved.

MAPR/MTR mooring #T0158 was deployed on 7/28/01 in position with release#25945. Kevlar mooring had two MTRs at 170m & 130m and MAPRs at 100m,80,50,30&10.
Position surveyed acoustically: 45deg55.6924, 129deg59.1925.

The ROPOS elevator was upgraded with a 4 point nylon bridle, acoustic release and floatation. Elevator was dropped and recovered once.

Three TR-6000 acoustic beacons were deployed and recovered.

2.9 NeMO 2001 Water Column Operations - Ed Baker and Joe Resing

Complementary to the seafloor operations at NeMO, the *R/V Wecoma* was mapping and sampling hydrothermal plumes in the vicinity of Axial Volcano from July 16 to July 26. The 2001 cruise was the fifth in a series of response cruises that have documented vent-field-scale changes in hydrothermal activity following the January 1998 eruption. Water column operations have two principal components: annual plume mapping/sampling and the recovery/deployment of moored instruments. The goal of both sets of measurements is to quantify the rate of decline of hydrothermal discharge since the 1998 eruption, as well as to document changes in the chemical composition of the discharge.

Plume observations were conducted by occupying a grid of vertical casts and “tow-yo” lines. The primary instrument is a SeaBird CTD and 20-bottle rosette, including optical sensors, and the Vents In-situ Analyzer (VISA). VISA made continuous measurements of pH and dissolved Fe and Mn. Bottle samples were collected for He, pH, and other dissolved and particulate components of hydrothermal plumes. In 2001 we conducted 27 vertical casts and eight tow-yos over and around the summit of Axial Volcano, occupying approximately the same grid as in 1999 and 2000.

Mooring operations consisted of recovering five moorings and deploying four. Three of the recovered moorings were arrayed along the 1998 eruption zone, one was at the ASHES vent field, and one sampled non-plume-contaminated water to the east of the caldera. Instruments on the moorings included current meters, temperature sensors, optical sensors, and Osmosamplers. The Osmosamplers continuously draw a small volume of seawater into a capillary tube, storing a year-long sample of water that can be recovered and analyzed to provide a temporal record of changes in plume chemistry. Four moorings were deployed in 2001, three along the eruption zone and one immediately north of the caldera near the North Rift Zone.

2.9a **Mooring Operations at Axial - Summer 2001**

Longitude	Latitude	Mooring	Deployed/Recovered
-129.986733333	45.9232666667	00T54	Recovered ‘01
-129.986833333	45.942	00T55	Recovered ‘01
-130.013	45.9341666667	00T56	Recovered ‘01
-129.970833333	45.97	00T57	Recovered ‘01
-129.993383333	45.9120666667	00V114	Recovered ‘01
-129.996666667	45.9133333333	01V116	Deployed ‘01
-129.986666667	45.925	01T58	Deployed ‘01
-129.986666667	45.9416666667	01T59	Deployed ‘01
-130.016666667	45.9966666667	01V117	Deployed ‘01

2.9b **Vertical Casts at Axial - Summer 2001**

Longitude	Latitude	Cast
-129.988	45.923	A
-129.985	45.931	B
-129.983	45.94	C
-130.0110016	45.934	D
-130.016998	46.007999	E
-129.993	45.933	F
-129.994	45.923	G
-130.001998	45.917	H
-130.033005	45.917	I
-130.0650016	45.921	J
-130.072006	45.978	K
-130.128006	45.971	L
-130.149993	46.083	M
-130.100006	46.083	N
-130	46.083	O
-130.050003	46.083	P
-129.99	45.927	Q
-129.956	46.043	R
-129.95	45.978	S
-129.932	45.903	T
-129.968	45.864	V
-130.020996	45.868	W
-130.072006	45.884	X
-130.098006	45.913	Y
-130.009994	45.965	Z

2.9c **Towyos at Axial**

Longitude	Latitude	towyo
-130.025000	46.033333	AA1
-129.983333	45.944667	AA2
-129.980000	45.928667	AA3
-130.012500	45.833333	AA4
-129.933333	45.928333	BB1
-129.982500	45.936333	BB2
-130.183333	45.926333	BB3

Longitude	Latitude	towyo
-129.933333	45.916666	CC1
-130.056666	45.902000	CC2
-130.150000	45.878333	CC3
-130.050000	46.000000	DD1
-129.950000	45.821666	DD2
-129.933333	45.855000	EE1
-130.025833	45.876666	EE2
-130.055833	45.903333	EE3
-130.115000	45.016666	EE4
-130.085000	45.850000	FF1
-130.048333	45.881666	FF2
-129.908333	45.950000	FF3
-130.003333	46.023333	GG1
-129.015555	46.023333	GG2
-129.996666	46.050000	HH1
-129.955000	45.933333	HH2
-129.976666	45.850000	HH3

2.10 PUBLIC OUTREACH

2.10.1 NeMO 2001 Website and Public Outreach - Jeff Goodrich, Mike Goodrich, Bill Chadwick, Susan Merle, Andra Bobbitt, Bob Embley

The NeMO 2001 web site (http://www.pmel.noaa.gov/vents/nemo/index.html) offered daily updates on the cruise and allowed interested individuals to follow progress of the scientific expedition at Axial Volcano. The updates included a daily science report written by Bill Chadwick and a cruise summary by Chief Scientist Bob Embley. The web site featured a daily interview by "Teacher At Sea" participant Jeff Goodrich that highlighted an individual from the science party, the ROPOS team, or the ship's crew. It also featured a daily "Teacher At Sea Log" also written by Jeff.

Susan Merle coordinated the updates and included relevant digital images. They were sent from the ship to HMSC and were added to the web site on a daily basis by Andra Bobbitt. The updated information and pictures were also included in daily presentations for the general public at HMSC, twice daily, by the teacher on shore, Mike Goodrich. Feedback and questions from the general public were sent to the ship and answered by the scientific party. The questions were primarily from HMSC presentation audiences and family members of science party participants.

3.0 NAVIGATION OVERVIEW AND POSITION INFORMATION

3.1 Navigation During NeMO 2001 - Bill Chadwick, Susan Merle, Susan Hanneman, Sebastien Durand

As in years past, the primary navigational control was GPS and long-baseline transponder navigation. GPS positions at the highest accuracy available were recorded by the ship. During NeMO 2001, we did not experience the navigation problem we've had in previous years in which the cage fixes had low RMS errors, but the ROPOS fixes have high RMS. The reason for this turned out to be that we were using the CSSF-owned relay transponder (14.5/9.0 kHz) on ROPOS this year instead of the NOAA-owned relay (14.0/9.0 kHz) that we had used in previous years. It turned out that the NOAA relay transponder's turn-around delay was more than twice what it was supposed to be (7 millisec instead of 3 millisec), and this was the source of the discrepancy. Unfortunately, this means that many of our target and vent positions from previous years will not exactly match navigation fixes from this year and future years, but these newer positions should be considered more "correct" and have been updated in data tables where possible. The NOAA relay was repaired after the cruise.

There were problems with the CSSF-owned PS-8000 and its transducer, which flooded during the cruise. It took a number of dives to correct the various problems. When the navigation was good it was great, but for many of the dives we had little or no acoustic navigation. In those cases, the navigation was constructed from the nav log using any good fixes we had noted. That nav was supplemented with vent and sample positions, when we had them. Therefore, most of the nav for 2001 looks like a series of straight line transects between vent locations. CASM was the exception, where we had good navigation most of the time.

Navigation Information for ROPOS Dives R618 - R632

Dive #	Area	Comments	Navigation Quality
R618	S. Cleft	20 minutes on the bottom	No nav
R619	S. Cleft		Ship nav only
R620	S. Cleft	Ballast dive. No bottom time	No nav
R621	S. Cleft		Ship nav only
R622	'98 flow	Serial driver off 1 hour. Changed vessel offsets	Bad acoustic nav. Nav file supplemented with known locations and any log entries.
R623	BPR - S Pillow Mound	Spent a lot of time in transit in the water column between benchmarks.	No acoustic nav. Nav file created from known locations and any log entries.
R624	ASHES		No acoustic nav. Nav file created from known locations and any log entries.
		PS-8000 repairs after dive R624 and the navigation improved dramatically.	
R625	'98 flow		Good nav
R626	CASM	No nav 1501 - 2130 (added nav log fixes).	Good nav when we had it
R627	'98 flow		Good nav
R628	CASM	Cage motor on during most of the dive. Good nav when the motor was off for Imagenex survey.	Sporadic nav
R629	Mkr-33/Cloud		No acoustic nav. Nav file created from known locations and any log entries.
R630	Mkr-33, Coquille	Nav improved when opened the range gates and the cage motor was off.	Sporadic nav
R631	CASM	Dive ended due to no nav (could not to Imagenex)	Nav poor to none
R632	ASHES		No acoustic nav. Nav file created from known locations and any log entries

3.1.1 NeMO 2001 Final Calibrated Transponder Positions

South Cleft Net - expendable net still in place

XP	UTM X	UTM Y	Latitude	Longitude	Depth(m)
8.5	394569.87	4949335.07	44° 41.37830	130° 19.83128	1919.9
9.5	393718.81	4947296.1	44° 40.26972	130° 20.45012	1908.3
10.0	392492.04	4943450.03	44° 38.18189	130° 21.33007	1947.2
10.5	393070.28	4945529.36	44° 39.30990	130° 20.91876	1934.8
11.5	391107.96	49476546.57	44°40.44089	130° 22.43046	1919.4
12.5	391657.37	4941553.62	44°37.15031	130° 21.93730	2010.4

North Rift Net - expendable net still in place

XP	UTM X	UTM Y	Latitude	Longitude	Depth (m)
9.5	420814.65	5098603.9	46° 02.1857'	130° 01.3988'	1433.9
10.5	422722.92	5097596.31	46° 01.6548'	129° 59.9096'	1395.43
8.0	420055.52	5095969.44	46° 00.7580'	130° 01.9608'	1377.93
7.5	422074.85	5094971.24	46° 00.2330'	130° 00.3862'	1294.46

ASHES Net - expendable net still in place

XP	UTM X	UTM Y	Latitude	Longitude	Depth (m)
11.5	424283.25	5087181.51	45° 56.0418'	129° 58.6011'	1305.4
10.5	424221.58	5084426.79	45° 54.5540'	129° 58.6227'	1340.36
9.5	422490.35	5086188.55	45° 55.4937'	129° 59.9789'	1324.67
11.0	422556.72	5088014.47	45° 56.4800'	129° 59.9453'	1330.85

CASM Net - recoverable transponders picked up at the end of the cruise

XP	UTM X	UTM Y	Latitude	Longitude	Depth (m)
10.0	419912.27	5092940.10	45° 59.1213'	130° 02.0413'	1363.13
12.5	421238.52	5093386.71	45° 59.3717'	130° 01.0185'	1354.06
8.5	421117.54	5092226.98	45° 58.7447'	130° 01.1008'	1354.93

3.1.2 Vents, Markers and Benchmarks at Axial

Vents and Markers	Area/Vent	UTM X	UTM Y	Longitude	Latitude	lat	lat (min)	long	long (min)	Depth
Bag City - Mkr-36/21	nSRZ	423272	5085209	-129.989425	45.916167	45	54.97000	-129	59.36550	-1537
Blue Nose	98 lava flow - E side	423755	5088451	-129.983700	45.945440	45	56.72640	-129	59.02200	-1527
Casper (Coquille)	S caldera	422997	5085346	-129.992970	45.917370	45	55.04220	-129	59.57860	-1538
Castle ('01) big	98 lava flow - E side	424011	5086311	-129.980057	45.926168	45	55.57010	-129	58.80340	-1522
Castle - Mkr-N5 (01')	98 lava flow - E side	424032	5086301	-129.979792	45.926075	45	55.56450	-129	58.78750	-1522
Circ	98 lava flow	423887	5086283	-129.981650	45.925917	45	55.55500	-129	58.89900	-1525
Cloud - Mkr-N4	98 lava flow	423896	5087119	-129.981670	45.933420	45	56.00520	-129	58.90020	-1523
Cloud - Mkr-N6/21	98 lava flow	423901	5087116	-129.981600	45.933400	45	56.00400	-129	58.89600	-1524
Coquille Vent Field	nSRZ	422991	5085365	-129.993058	45.917530	45	55.05180	-129	59.58350	-1537
Crack	ASHES	421424	5087135	-130.013550	45.933300	45	55.99800	-130	0.81300	-1547
Crevice	nSRZ	423175	5084648	-129.990400	45.911100	45	54.66600	-129	59.42400	-1540
Daves	ASHES	421408	5087159	-130.013767	45.933517	45	56.01100	-130	0.82600	-1547
Dying	nSRZ	423084	5085286	-129.991850	45.916850	45	55.01100	-129	59.51100	-1536
Easy	98 lava flow	423676	5088443	-129.984717	45.945333	45	56.72000	-129	59.08300	-1535
FeCity	nSRZ	423291	5085361	-129.989190	45.917540	45	55.05240	-129	59.35140	-1536
FeHyde	ASHES	421406	5087100	-130.013783	45.932983	45	55.97900	-130	0.82700	-1547
Gollum	ASHES	421422	5087166	-130.013583	45.933583	45	56.01500	-130	0.81500	-1547

Vents and Markers	Area/Vent	UTM X	UTM Y	Longitude	Latitude	lat	lat (min)	long	long (min)	Depth
Hairdo	ASHES	421391	5087157	-130.013983	45.933500	45	56.01000	-130	0.83900	-1547
Hell	ASHES	421372	5087135	-130.014233	45.933300	45	55.99800	-130	0.85400	-1550
Inferno	ASHES	421397	5087162	-130.013900	45.933550	45	56.01300	-130	0.83400	-1547
Joystick - Mkr-42	nSRZ	423342	5085505	-129.988563	45.918838	45	55.13030	-129	59.31378	-1534
Magnesia - Mkr-67	98 lava flow	423661	5088545	-129.984933	45.946233	45	56.77400	-129	59.09600	-1532
Marshmallow	ASHES	421420	5087179	-130.013617	45.933700	45	56.02200	-130	0.81700	-1546
Medusa	ASHES	421395	5087141	-130.013933	45.933350	45	56.00100	-130	0.83600	-1547
Milky - Mkr-N2	98 lava flow	423673	5088424	-129.984753	45.945142	45	56.70852	-129	59.08518	-1533
Minisnow - Mkr-N9	98 lava flow	423711	5088141	-129.984217	45.942617	45	56.55700	-129	59.05300	-1524
Mkr-108 Vent	98 lava flow	423784	5086589	-129.983033	45.928650	45	55.71900	-129	58.98200	-1524
Mkr-113 Vent ('01)	nSRZ	423372	5085937	-129.988238	45.922728	45	55.36370	-129	59.29430	-1526
Mkr-33 Vent ('01)	98 lava flow	423855	5087092	-129.982190	45.933170	45	55.99060	-129	58.93180	-1524
Mkr-N1	98 lava flow	423718	5087828	-129.984083	45.939800	45	56.38800	-129	59.04500	-1522
Mkr-N3	98 lava flow	423637	5088278	-129.985200	45.943800	45	56.62800	-129	59.11200	-1529
Mkr-N41	98 lava flow	423922	5087428	-129.981383	45.936217	45	56.17300	-129	58.88300	-1521
Mkr-N44	98 lava flow	423658	5087792	-129.984833	45.939467	45	56.36800	-129	59.09000	-1522
Mkr-N7	98 lava flow	423886	5087774	-129.981900	45.939300	45	56.35800	-129	58.91400	-1520
Mushroom	ASHES	421405	5087168	-130.013800	45.933600	45	56.01600	-130	0.82800	-1547
Nascent - Mkr-M	98 lava flow	423905	5087387	-129.981597	45.935840	45	56.15040	-129	58.89582	-1520
OldFlow	98 lava flow - E side	423898	5087455	-129.981705	45.936447	45	56.18680	-129	58.90230	-1522
OldWorms	98 lava flow - E side	423785	5088418	-129.983308	45.945105	45	56.70630	-129	58.99850	-1526
Ouzo	98 lava flow	423680	5088497	-129.984683	45.945817	45	56.74900	-129	59.08100	-1529
Oxide	98 lava flow	423648	5088456	-129.985083	45.945450	45	56.72700	-129	59.10500	-1533
Phoenix	ASHES	421391	5087130	-130.013983	45.933250	45	55.99500	-130	0.83900	-1547
Pillar	nSRZ	423591	5085929	-129.985417	45.922700	45	55.36200	-129	59.12500	-1524
Roof	98 lava flow	423690	5088129	-129.984483	45.942500	45	56.55000	-129	59.06900	-1523
ROPOS	ASHES	421386	5087134	-130.014050	45.933283	45	55.99700	-130	0.84300	-1547
Snail - Mkr-N8	98 lava flow	423877	5087088	-129.981900	45.933200	45	55.99200	-129	58.91400	-1524
Snow	98 lava flow	423827	5086417	-129.982450	45.927117	45	55.62700	-129	58.94700	-1525
SnowBlower	98 lava flow	423719	5087835	-129.984067	45.939867	45	56.39200	-129	59.04400	-1522
SteveMound	ASHES	421348	5087129	-130.013417	45.933250	45	55.99500	-130	0.80500	-1547
Styx	ASHES	421412	5087132	-130.013700	45.933283	45	55.99700	-130	0.82200	-1547
ThePit	98 lava flow	423718	5087823	-129.984083	45.939750	45	56.38500	-129	59.04500	-1522
Tombstone	W of ASHES	421590	5086597	-130.011333	45.929483	45	55.76900	-130	0.68000	
Tunnicliffe	W of ASHES	421249	5087178	-130.015817	45.933667	45	56.02000	-130	0.94900	-1546
Virgin's Daughter	ASHES	421436	5087184	-130.013400	45.933750	45	56.02500	-130	0.80400	-1547
Virgin	ASHES	421430	5087174	-130.013483	45.933650	45	56.01900	-130	0.80900	-1547
Vixen (Coquille)	nSRZ	422995	5085336	-129.993000	45.917280	45	55.03680	-129	59.58020	-1538
White (Mkr-I)	ASHES	421419	5087183	-130.013633	45.933733	45	56.02400	-130	0.81800	-1545
91Vent	NRZ	421661	5098834	-130.012417	46.038600	46	2.31600	-130	0.74500	-1640
Bob	NRZ	421629	5098870	-130.012833	46.038917	46	2.33500	-130	0.77000	-1641
Shepherd Vent ('01)	CASM	420446	5093324	-130.027200	45.988868	45	59.33210	-130	1.63200	1580
Lamphere Chimneys	CASM	420496	5093375	-130.026562	45.989337	45	59.36020	-130	1.59370	-1576

Vents and Markers	Area/Vent	UTM X	UTM Y	Longitude	Latitude	lat	lat (min)	long	long (min)	Depth
T&S Spires ('01)	CASM	420449	5093355	-130.027168	45.989153	45	59.34920	-130	1.63010	-1583
AX-Bmrk-63 - Mkrs	Cald center	421717	5089568	-130.010170	45.955220	45	57.31320	-130	0.61020	-1534
AX-Bmrk-1	Magnesia	423663	5088544	-129.984900	45.946220	45	56.77320	-129	59.09400	-1532
AX-Bmrk-5	Mkr-33	423838	5087111	-129.982420	45.933350	45	56.00100	-129	58.94520	-1525
AX-Bmrk-4/Mkr-65	Bag City	423255	5085192	-129.989630	45.916010	45	54.96060	-129	59.37780	-1534
AX-Bmrk-66	South Anom	422089	5079332	-130.003710	45.863150	45	51.78900	-130	0.22260	-1723
BPR	Cald center	421717	5089568	-130.010170	45.955220	45	57.31320	-130	0.61020	-1534

3.1.3 Vents and Benchmarks at South Cleft

Vent/Benchmark	Area	Lat (deg)	Lat (min)	Long (deg)	Long (min)	UTM X	UTM Y	Depth (m)
Vent 1	S Cleft	44	39.52200	-130	21.85900	391834	4945943	2210
Plume	S Cleft	44	38.53600	-130	22.29500	391228	4944126	2232
CL- Bmrk-1	S Cleft	44	39.778	-130	21.177	392744	4946401	2197
CL- Bmrk-2	S Cleft	44	39.807	-130	21.27	392622	4946457	2215
CL- Bmrk-3	S Cleft	44	39.826	-130	21.357	392507	4946494	2213
CL- Bmrk-4	S Cleft	44	39.842	-130	21.442	392395	4946526	2214
CL- Bmrk-5	S Cleft	44	39.859	-130	21.508	392309	4946559	2213
CL- Bmrk-6	S Cleft	44	39.879	-130	21.587	392205	4946587	2212
CL- Bmrk-7	S Cleft	44	39.882	-130	21.657	392113	4946604	2213
CL- Bmrk-8	S Cleft	44	39.914	-130	21.729	392018	4946665	2211
CL- Bmrk-9	S Cleft	44	39.923	-130	21.825	391892	4946684	2215
CL- Bmrk-10	S Cleft	44	39.952	-130	21.915	391774	4946739	2216
CL- Bmrk-11	S Cleft	44	39.965	-130	22.004	391656	4946765	2216
CL- Bmrk-12	S Cleft	44	39.991	-130	22.125	391498	4946817	2197

4.0 NeMO 2001 ROPOS DIVE OVERVIEW

4.1 OPERATIONAL AREAS

Area I: Southern Juan de Fuca Ridge centered approximately at 44°40'N; 130°22'W extending out in a radius of about 10 n.m. for ROPOS dives.

- Arrived on station at South Cleft 7/15/2001 1200 UTC.
- ROPOS Dives R618 - R621 at South Cleft (R620 no bottom time).
- ROPOS on deck and transit to Axial 7/18/2001 0435 UTC.
- Arrive at Axial 7/18/2001 1100 UTC.

Area II: Axial Volcano and rift zones centered at about 45°56'N; 129°59'W extending in a radius of about 30 n.m. for ROPOS dives and rock coring.

- ROPOS Dives R622 - R632 at Axial.
- Departed Axial 7/31/2001 ~1000 UTC
- 18 hour transit to Victoria, BC.
- 15.65 days on site.

4.2 ROPOS DIVE STATISTICS - NeMO 2001

- ROPOS Dives: R618-R632: 15 dives, including 1 ballast dive with no bottom time.
- 195.58 hours of bottom time.
- 63 experiments were deployed.
- 50 experiments were recovered.
- 201 samples were collected
- 30 subsamples were collected
- **241 samples total**

Sample numbers include experiments recovered.
Subsamples sometimes went to more than one investigator, thus there are actually more subsamples than the 30 mentioned above.

4.3 ROPOS DIVE SUMMARIES - NeMO 2001

Dive	Area	on btm UTC	off btm UTC	btm time (hrs)	NeMO 2001 ROPOS Dive Summary	Nav info
R618	South Cleft (Bmrk-7)	7/15 JD196 1517	7/15 JD196 1538	0.35	On our first dive of the year we found extensometer and benchmark 7. The infrared (IR) connection to download the data was not functioning. There was a deckset problem with the nav. The dive was aborted due to air in tether.	No nav
R619	South Cleft (all the extensometers and benchmarks)	7/16 JD197 0236	7/17 JD198 0550	27.23	We visited all the extensometers at S.Cleft, performing infrared data readings and pressure sensor readings. Extensometer-10 ranges were off for part of the year. Extensometer-6 was only ranging to one neighbor - probably extensometer-7. Extensometer-5 had leaked and was full of biological material. Extensometer-4 was not talking. Extensometers 2-5 were placed in the elevator for repairs. Extensometer-1 was removed from the elevator and was placed in benchmark-1 (which had no extensometer for the last year). We picked up Extensometer-9 and moved it to benchmark-3 for better coverage across the cleft.	Ship nav only
R620	South Cleft	n/a	n/a	n/a	This dive turned out to be the ballast dive. ROPOS was too heavy and needed to adjust the ballast, so it returned to the ship. The ROV was in the water from 1603 to 1617. ROPOS was on deck for 3 hours. When the vehicle went back in the water the dive was renamed R621.	No nav
R621	South Cleft (Vent1, Plume Vent)	7/17 JD198 2215	7/18 JD199 0317	5.03	While at chimney-342 Vent 1, two hobos were deployed and two gastight samples were taken. We then moved on to Plume Vent where we deployed one hobo, recovered one hobo, sampled a sulfide structure and suction sampled orange mat.	Ship nav only
R622	98 flow (Mkr-33, Snail, Cloud, Mkr-N41, Nascent, OldWorms, Mkr-N3)	7/18 JD199 1913	7/19 JD200 1656	21.72	Our first dive on the '98 lava flow in 2001 involved stops at Mkr-33, Snail, Cloud, Mkr-N41, Nascent, Old Worms, and Mkr-N3. Fluid sampling (HFS) and suction sampling took place at all the vents visited. Two bacteria traps were deployed at Mkr-33, and two were deployed at Cloud. Three MTRs were recovered from Mkr-33, and three more were deployed. Two MTRs were recovered from Snail, and two more were deployed. MTRs were also recovered from Cloud (3), Nascent area (4) - one was lost due to a hole in the purse), Mkr-N3 (2), and OldWorms (1). 46 samples were collected on the dive!	Bad acoustic nav. Nav file supplemented with known locations and any log entries. Lots of time in the water column in transit between benchmarks.
R623	BPR to S Pillow Mound and back	7/20 JD201 1007	7/21 JD202 1028	24.32	Pressure sensor readings were taken at all the benchmarks in the caldera: BPR, Magnesia, Mkr-33, BagCity, S. Pillow Mound - then back again for a 2nd reading at BagCity and the BPR. Two markers (60 and 61) were deployed at the BPR. One marker was deployed at benchmark-5. Two larval settling arrays and four larval traps were deployed at Cloud/Mkr-N6 (short-term). Suction samples were taken at the caldera center, Mkr-33, Cloud, and BagCity. A tubeworm grab was taken at Mkr-33, where two bacteria traps were also recovered. The McLane pump was pumping in several areas of the caldera.	No acoustic nav. Nav file created from known locations and any log entries. Lots of transiting in water column between benchmarks.

Dive	Area	on btm UTC	off btm UTC	btm time (hrs)	NeMO 2001 ROPOS Dive Summary	Nav info
R624	ASHES (Styx, Gollum, Marshmallow, Virgin, Inferno, Crack, Hell, Phoenix, FeHyde, Tunnicliffe, ROPOS)	7/22 JD203 0112	7/22 JD203 2206	20.90	The dive started with deployment of H. Paul Johnson's flow/temperature meter at Crack Vent. HFS samples were taken at Styx, Gollum, Marshmallow, Virgin, Inferno, Crack and Hell. Suction samples were taken at Gollum, Phoenix, FeHyde and Tunnicliffe Vents. Sulfide worm observations took place near the flange pool at Hell (near Mkr-2 - deployed this dive), and at Phoenix. Two hobos were recovered at Virgin, and one at Hell. One larval settling array and four larval traps were deployed at ROPOS Vent. We also deployed four larval traps at Virgin. Two MTRs were deployed at Gollum, and one was recovered. One MTR was recovered at ROPOS. An osmosampler that didn't work was recovered from Hell Vent.	No acoustic nav. Nav file created from known locations and any log entries.
R625	98 flow (Cloud, Nascent, OldFlow, Mkr-N3)	7/23 JD204 0455	7/23 JD204 1815	13.33	The dive began with an Imagenex and video survey at Cloud. The McLane pump was running during the survey. The RAS sampler was deployed (short-term) at Cloud/Mkr-N6. Two bacteria traps were recovered from Cloud/Mkr-N4, and two were deployed at Cloud/Mkr-N6. Five suction samples were collected in the Nascent area (Mkr-M and N41) and one tubeworm grab. Another tubeworm grab was collected at OldFlow, as well as a suction sample. Also suction sampled at Mkr-N3.	Good nav after swapping out range meters. Relay on RAS 0455-0527. Transit 1552-1640.
R626	CASM (Imagenex surveys, T&S Spires, Shepherd)	7/24 JD205 0236	7/25 JD206 0327	24.85	Prior to the dive, three recoverable transponders were deployed and calibrated at CASM. For the first time ever we had acoustic navigation at CASM. Imagenex lines 1-22 were completed (the caldera floor portion of the survey). The McLane pump and plankton net sampled during the survey. After the Imagenex survey, and a bit of searching, T&S Spires and Shepherd Vent were located just in time for a live-video feed. Samples were collected at T&S including: three suction samples, two gastights, one sulfide and one rock. The dive was finished up with more Imagenex, this time at the top of the caldera and down the wall.	Good nav when we had it. Missing nav 1501-2130. Added nav log fixes to supplement nav file.
R627	98 flow and northern SRZ (Cloud, Castle, Mkr-113, FeCity, BagCity, Vixen, Casper)	7/25 JD206 1415	7/26 JD207 0758	17.72	The dive began with the release of the RAS at Cloud. An osmo was deployed at Cloud. HFS and suction sampling on nSRZ: Castle, Mkr-113, FeCity, BagCity, Coquille (Vixen and Casper). Vixen and Casper are two anhydrite structures located in the Coquille vent field, newly discovered on this dive. A hobo was deployed at Castle. A MTR was recovered from Castle and another was deployed. One MTR was deployed at Mkr-113. A MTR was also recovered at BagCity.	Good nav. Relay on RAS 0455-0527. Transit 1552-1640.
R628	southern NRZ and CASM (Imagenex survey, Shepherd, T&S Spires, Lamphere Chimneys)	7/26 JD207 1750	7/27 JD208 0450	11.00	Dive R628 began with geological traverses on the sNRZ - just north of the caldera wall, in the area surveyed earlier by Imagenex. Another Imagenex survey followed - up the wall to fill in the gaps. After the Imagenex survey, we proceeded to Shepherd Vent for suction sampling. Next we moved on to T&S Spires for more suctions and a sulfide grab. Lamphere Chimneys was located, where we sampled a sulfide. Accurate nav positions were acquired for all three of these vents at CASM, for the first time with acoustic navigation.	Sporadic nav. Cage motor on most the dive. Good nav when the motor was off for Imagenex survey.
R629	98 flow (Mkr-33, Cloud)	7/27 JD208 1653	7/27 JD208 2252	6.02	ROPOS removed the larval settling arrays and array biobox from the elevator and placed them on the seafloor, then transited to Cloud (Mkr-N6) where larval settlement array-E was deployed. Larval traps 5-8 were recovered but only 5&7 were good samples as 6&8 had fallen. After putting larval traps in the "cadillac" for surface elevator recovery, larval settlement arrays H and G were deployed 8-10 meters from Cloud. Larval settling array-K was recovered and put into the array biobox which was then placed into the elevator. Two bacterial traps were recovered and two were deployed at Cloud. The red osmo was deployed in Cloud vent. Larval settling arrays E and F were then positioned near Cloud and the long term osmo was recovered. ROPOS then went to Mkr-33 where two bacteria traps were recovered. The final completed task of the dive was the recovery of the iron osmo from Mkr-33.	No acoustic nav. Nav file created from known locations and any log entries.
R630	98 flow and nSRZ (Mrk-33, Cloud, Mkr-113, Casper, Vixen, Snail)	7/28 JD209 0414	7/28 JD209 1900	14.77	ROPOS deployed RAS for its one-year NeMO Net experiment at Cloud/Mkr-N6. Two bacteria traps were deployed at Mkr-33, as well as an osmosampler. Four suction samples for biology and particulates were taken at Mkr-33. Next task was a video survey of the lava pillars at the rumbleometer site. Two bacteria traps were recovered at Mkr-113. The plankton net was stowed on arrival at Casper and Vixen. Two gastight samples were taken at Vixen and two suction samples at Casper. Two hobos were deployed at Vixen, which was bubbling!! After finishing up at the Coquille vent field we returned to Mkr-33/Cloud to look for the missing osmo. We didn't find it.	Sporadic nav. Improved when opened range gates and the cage motor was off. Many transits in water column: 1205-1306 Cloud to Mkr-113; 1356-1450 Mkr-113 to Coquille; 1639-1815 Coquille to

Dive	Area	on btm UTC	off btm UTC	btm time (hrs)	NeMO 2001 ROPOS Dive Summary	Nav info
R631	CASM (Imagenex)	7/29 JD210 0324	7/29 JD210 0405	0.68	More Imagenex lines were attempted at CASM. We did make it up the wall (positioned at C11). When we got close to the caldera rim we lost navigation, possibly due to a deckset problem. The seas began to rise at the same time, so it was decided to pull up the sub and swap out the CSSF PS8000 with the NOAA PS8000.	Nav poor to none. Dive ended due to no nav.
R632	ASHES (Virgin, ROPOS, Gollum, Virgin'sDaughter, Medusa, Hell, Phoenix, Inferno, Crack)	7/31 JD212 0030	7/31 JD212 0810	7.67	Two larval traps were recovered from Virgin (10 and 11), and two from ROPOS (2 and 3). Four larval traps were capped and left on bottom (1, 2, 9, 12). One larval settling array was placed at each of the following vents: ROPOS, Gollum, Virgin, Virgin's Daughter. Limpets were suctioned for live-collection at ROPOS and Medusa. Other suction samples at Hell and Phoenix. Sulfide samples were taken at Hell, Phoenix and Inferno. Two gastights were taken at Virgin. Two bacteria traps were recovered at Gollum, and two more were deployed. A bacteria trap was also recovered from ROPOS. Two hobos were deployed at Virgin. The H.Paul Johnson flow/temp meter that was deployed in 2000 was recovered near Crack vent, a bit worse for the ware by the time it made it on board.	No acoustic nav. Nav file created from known locations and any log entries

5.0 ROPOS SAMPLES AND EXPERIMENTS

5.1 ROPOS SAMPLE STATISTICS: 1998 - 2001

1998 242
1999 278
2000 217
2001 207

944 Samples/Experiments collected 1998 - 2001

PLUS **263 Subsamples**

1207 SAMPLES/SUBSAMPLES/EXPERIMENTS RECOVERED

Sample numbers include experiments recovered.
Subsamples sometimes went to more than one investigator, thus there are actually more subsamples than the 263 mentioned above.

5.2 SAMPLE ABBREVIATIONS

Sample Type	Sample abbreviation
biology (misc)	Bio
bacteria trap	BT
extensometer	exten
gas (gtb and piston)	GAS
hot fluid sample	HFS
hobo temp probe (152 - 419 C)	hobo
Johnson Flow Meter	JFM
larval array	LA
larval tube	LT
McLane pump	MP
temp recorder (2 - 70 C)	MTR
larval net	net
niskin water samp	niskin
osmosampler etc.	osmo
Remote Access Sampler	RAS
rock	RK
rumbleometer	rumb

Sample Type	Sample abbreviation
sulfide (includes iron oxides)	SF
suction sample	SS
Submersible System Used to Assess Vented Emissions	SUAVE
time lapse camera	TLC
tubeworm grab	TWG
vemco temp recorder (0 - 50 C)	vemco
water from biobox	water
wood from benchmark	wood

5.3 NeMO SAMPLES 1998 - 2001 (most recent listed first)

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R632											**7/31/01**			
R632-LT-11-0001	LT	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1545	0105	Larval trap 11 has been capped and recovered. (Depl R624)	n/a	Metaxas	
R632-LT-10-0002	LT	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1545	0114	Larval trap 10 has been capped and recovered. (Depl R624)	n/a	Metaxas	
R632-LT-2-0003	LT	ASHES	ROPOS	n/a	421386	5087134	-130.014050	45.933283	1547	0248	LT#3 has been capped and recovered. (Depl R624)	n/a	Metaxas	
R632-LT-3-0004	LT	ASHES	ROPOS	n/a	421386	5087134	-130.014050	45.933283	1547	0328	LT#4 has been capped and recovered at ROPOS vent. (Depl R624)	n/a	Metaxas	
R632-SS-J2-0005	SS	ASHES	ROPOS	n/a	421386	5087134	-130.014050	45.933283	1547	0344	Suction sample into Jar#2 for fauna (limpets for live sample). Start 03:45. Stop 03:45. Finished at 03:48.	n/a	Bates	
R632-SS-J1-0006	SS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1546	0500	Start suction Jar#1 at 05:00 for sulfide worms. Stop 05:03.	n/a	Juniper	
R632-SS-J7-0007	SS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1546	0504	Start suction at 05:05 into Jar#7 for sulfide worms at same site. Stop 05:07.	n/a	Juniper	
R632-SF-0008	SF	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1546	0524	Collected sulfide sample in Biobox.	n/a	Juniper	
R632-SS-J6-0009	SS	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1548	0533	Suction for sulfide worms and fauna into Jar#6. Start 05:33. Stop 05:36.	n/a	Juniper	
R632-SF-0010	SF	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1548	0552	Sulfide sample into biobox.	n/a	Juniper	
R632-SS-J5-0011	SF	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1545	0604	Suction of sulfide chimney - started at 06:03.	n/a	Juniper	
R632-SF-0012	SF	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1545	0606	Large section of sulfide chimney that stuck to the side of suction sampler. Placed in biobox.	n/a	Juniper	
R632-SS-J4-0013	SS	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1548	0612	Limpet SS in Jar#4 - likely near Medusa (no NAV). Can see larval limo (between Crack an ROPOS) - hdg 140. UVIC biobox still at this site.	n/a	Bates	
R632-SS-J3-0014	SF	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1545	0628	Suctioning sulfide into jar#3.	n/a	Juniper	
R632-BT-50-0015	BT	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0646	Bacteria trap #50 being put into biobox. (Depl R545)	n/a	Moyer	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R632-BT-33-0016	BT	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0648	Bacteria trap #33 collected from Gollum. (Depl R471)	n/a	Moyer	
R632-GT-0017	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1545	0658	Port gastight fired at Virgin.	n/a	Evans	Butterfield/Lilley
R632-GT-0018	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1545	0701	Starboard gastight fired at Virgin.	n/a	Evans	Butterfield/Lilley
R632-BT-49-0019	BT	ASHES	ROPOS	n/a	421386	5087134	-130.014050	45.933283	1547	0727	Recovered bacterial trap #49 into starboard biobox. It is crusty and covered with limpets. (Depl R545)	n/a	Moyer	
R632-0020	JFM	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0744	We have ripped apart the Johnson flow meter. Recovering the flow meter for Paul Johnson.	n/a	P. Johnson	
R631											**7/29/01**			
R631-net-0001	net	CASM	n/a	n/a	420809	5093580	-130.005880	45.991230	1496	0415	Stowed plankton net in purse. Start 0340. End 0518. Made one pass up the wall from 1556 - 1495m. Start position: 420800/5093470	n/a	Tunnicliffe	
R630											**7/28/01**			
R630-SS-J7-0001	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0856	Suctioning white bacterial mat into Jar 7. Start 0858. Stop 0914.	n/a	Moyer	
R630-SS-J6-0002	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0914	Suctioning the same white bacterial mat into Jar 6. Start 0915. Stop 0922.	n/a	Moyer	
R630-SS-J1-0003	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0930	Suctioning particulates over fauna into Jar 1. Start 0932. Stop 0947. The temperature log is ANT01.	n/a	Page/Levelle	
R630-SS-J2-0004	SS	98 flow	Mkr-33 (8 m east)	33	423887	5087031	-129.981774	45.932635	1522	0949	Suctioning fauna into Jar#2 from far periphery (~8m out). Start 0956. Stop 1002.	n/a	Marcus	
R630-RK-005	RK	98 flow	n/a	n/a	423683	5086727	-129.984350	45.929880	1522	1141	Piece of lava pillar into the biobox; heading 312. Finished lava pillar measurements. (about 15 m from old rumbleometer site)	n/a	W.W.Chadwick	
R630-BT-4-0006	BT	98 flow	Mkr-113	113	423372	5085937	-129.988238	45.922728	1526	1345	Putting bactrap#4 into biobox. (Depl R461)	n/a	Moyer	
R630-BT-19-0007	BT	98 flow	Mkr-113	113	423372	5085937	-129.988238	45.922728	1526	1348	Recovering bactrap#19; putting it in the biobox. (Depl R464)	n/a	Moyer	
R630-net-0008	net	nSRZ	Casper	n/a	422997	5085346	-129.992970	45.917370	1445	1434	Closing the plankton net above Casper at Coquille vent field.	n/a	Metaxas/Tunnicliffe	
R630-SS-J5-0009	SS	nSRZ	Casper	n/a	422997	5085346	-129.992970	45.917370	1445	1516	Suctioning into jar #5. Start 15:17. Alien temp file Al630. Suctioning in the Provanna patch - pseudo 'far'. Stop to reposition sub. Stop suctioning 15:26.	Tav=0.5 above amb.	Bates/Tunnicliffe	
R630-SS-J4-0010	SS	nSRZ	Casper	n/a	422997	5085346	-129.992970	45.917370	1445	1537	Suction of limpets *Provanna* into jar #4. Amanda will look at video to estimate density. Alien temp file Al630.	Tmx=13 above amb.	Bates	
R630-GTB-0011	GAS	nSRZ	Vixen	n/a	422995	5085336	-129.993000	45.917280	1536	1553	Port side gas tight fired at 15:57. Positioned right in flow at Vixen.	n/a	Evans	Butterfield/Lilley
R630-GTB-0012	GAS	nSRZ	Vixen	n/a	422995	5085336	-129.993000	45.917280	1536	1557	Stbd gas tight fired at 18:59; right down in the hole. Positioned at Vixen; same as R630-11.	n/a	Evans	Butterfield/Lilley
R629											**7/27/01**			
R629-LT-7-0001	LT	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1811	Successfully capped larval trap #7. This trap was NOT tipped - a good sample.	n/a	Metaxas/Tunnicliffe	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R629-LT-5-0002	LT	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1813	Successfully capped larval trap #5. This trap was NOT tipped - a good sample.	n/a	Metaxas/Tunnicliffe	
R629-LT-6-0003	LT	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1819	Successfully capped larval trap #6. This trap was tipped - NOT a good sample.	n/a	Metaxas/Tunnicliffe	
R629-LT-8-0004	LT	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1822	Successfully capped larval trap #8. This trap was tipped - NOT a good sample.	n/a	Metaxas/Tunnicliffe	
R629-BT-57-0005	BT	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	2141	Recovered Bact trap #57 (label not visible) from Cloud pit. Stbd biobox. (Depl R622)	n/a	Moyer	
R629-osmo-0006	osmo	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	2214	Recovered osmo - long term (Deployed by MBARI 2000)	n/a	Wheat/Moyer	
R629-BT-55-0007	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2229	Recovered Bac Trap #55 into port biobox. (Depl R622)	n/a	Moyer	
R629-BT-56-0008	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2234	Picked up Bac Trap #56 (it is inverted) Placed in biobox. (Depl R622)	n/a	Moyer	
R629-osmo-0009	osmo	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2236	Recovered iron osmoanalyzer deployed by MBARI 2000.	n/a	Wheat/Moyer	
R629-LA-K-0010	LA	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1943	Recovered array K after one week at vent. (Depl R623)	n/a	Metaxas/Tunnicliffe	
R628											**7/26 - 7/27 2001**			
R628-SS-J5-0001	SS	CASM	n/a	n/a	420344	5093857	-130.028605	45.993655	1516	1802	Suction sediment on caldera floor - at base of wall E of CASM (near the start of Imgnx line T1). Start 18:03. End 16:12.	n/a	Leveille	
R628-RK-0002	RK	CASM	n/a	n/a	420615	5093552	-130.025053	45.990946	1530	2058	Piece of a putative dike along the caldera wall. Sample is 10 cm across. Triangular section sticking out. Brown in color.	n/a	Embley/Chadwick	
R628-SS-J6-0003	SS	CASM	Shepherd	n/a	420446	5093324	-130.027200	45.988868	1588	0312	Quantitative SS for limpets at the base of Shepherd. Start 03:20; Stop 03:34; T=1-3. Suctioning across the flow.	Tav=~1 above amb	Bates	
R628-SS-J7-0004	SS	CASM	Shepherd	n/a	420446	5093324	-130.027200	45.988868	1587	0336	Start 0337. Suctioning limpets? Into Jar #7. Alien temp file 7 hours off (i.e. 2037). Stop 03:42. Sample was edgy.	Tmx=5 above amb	Bates	
R628-SS-J4-0005	SS	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1582	0355	Start 03:56. Suction bacterial mat Jar #4 top of T&S. Stop 04:04.	n/a	Moyer	
R628-SS-J3-0006	SS	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0404	SS Jar #3 - bacterial mat. Start 04:06. Finish 04:10.	n/a	Moyer	
R628-SS-J2-0007	SS	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0415	SS Jar #2 at different T&S site than first two. Bacterial mat. Start 04:16.	n/a	Moyer	
R628-SS-J1-0008	SS	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0421	SS Jar #1. Start 04:21. Stop 04:28. Bacterial mat.	n/a	Moyer	
R628-SF-0009	SF	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0435	Sulfide sample taken from vent.	n/a	Leveille	
R628-SF-0010	SF	CASM	Lamphere Chimneys	n/a	420496	5093375	-130.026562	45.989337	1572	0452	Sulfide sample from active vent with anhydrite. Looks like a chocolate bunny.	n/a	Leveille	
R627											**7/25 - 7/26 2001**			
R627-RAS-0001	RAS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1522	Pulled the pin on the RAS at 15:29. (Depl R625). 46 samples collected.	n/a	Butterfield	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R627-MTR-3087-0002	MTR	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1529	MTR #3087 recovered on the RAS. (Depl R625).	n/a	Butterfield	
R627-GTB-0003	GAS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1735	Fired starboard gas tight bottle.	T=257.9	Evans	Butterfield/Lilley
R627-HFS-24-0004	GAS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1737	Gas piston #24 at anhydrite spire. Start 17:36. Stop pumping at 17:39. Volume=~200 ml.	Tav=259.1 Tmx=259.2	Evans	Butterfield/Lilley
R627-HFS-22-0005	HFS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1740	Piston #22 at anhydrite spire. Start 17:41. Stop pump at 17:44. Volume=350ml.	Tav=259.1 Tmx=259.2	Butterfield/Lilley/Lang/Huber/Mehta	
R627-HFS-19-0006	HFS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1746	Start bag #19 with a GFF filter at 17:46 (at anhydrite spire). Stop the pump at 17:49. Volume pumped=350ml.	Tav=259.3 Tmx=259.4	Butterfield/Lilley/Lang/Huber/Mehta	
R627-MTR-3196-0007	MTR	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1840	Recovered MTR #3196 from the base of Castle. (Depl R547)	n/a	Embley	
R627-HFS-18-0008	HFS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1524	2025	Fluid sample bag #18. Start 20:27. Stop 20:33. Vol=653 ml. H2S=202 uM. Ave pH=5.965. (in tubeworm bush)	Tav=20 Tmx=21.8	Butterfield	
R627-HFS-21-0009	HFS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1524	2033	Fluid sample FISH filter #21. Start 20:35 Stop 20:46. Vol=917 mls. H2S=202 uM; Ave pH=5.965. (in tubeworm bush)	Tav=21.7 Tmx=21.9	Huber/Baross	
R627-HFS-17-0010	HFS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1524	2046	Fluid sample in tubeworm bush. Filtered bag #17. Start 20:48 Stop 20:53. Vol=650 mls. H2S=202 uM; Ave pH=5.965.	Tav=21 Tmx=21.8	Butterfield	
R627-HFS-15-0011	HFS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1524	2054	Fluid sample. Sterivex #15. Start 20:54 Stop 21:03. Vol=1003 mls. H2S=202 uM; Ave pH=5.965 (in tubeworm bush)	Tav=20.1 Tmx=21.7	Huber/Baross	
R627-HFS-4-0012	GAS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1524	2104	Fluid sample in tubeworm bush: gas piston #4. Start 21:07 Stop 21:09. Vol=141ml. H2S=202 uM; Ave pH=5.965	Tav=19.7 Tmx=21.5	Evans	Butterfield/Lilley
R627-SS-6-0013	SS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1524	2114	Suction sample jar #6. White microbial mat.	n/a	Moyer	
R627-SS-5-0014	SS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1524	2135	Suction sample (bottle #5) of particulate matter from within the tubeworm bush.	n/a	Leveille	
R627-SS-FeO-7-0015	SS	nSRZ	Fe City	n/a	423291	5085361	-129.989190	45.917540	1535	0031	started SS Jar #7 at 00:32. Ended SS at 00:41. Suctioning white and orange mat for iron oxides.	n/a	Kennedy	
R627-HFS-10-0016	HFS	nSRZ	Fe City	n/a	423291	5085361	-129.989190	45.917540	1535	0117	HFS bottle #10 with GFF filter. 01:18 start. 01:24 end. Vol=1200ml. H2S 1 uM +/- 1.3; pH 7.094 (sample in filamentous white mat and Fe-oxides)	Tstart=9.3 Tav=9.6 Tmx=10.3	Butterfield	
R627-HFS-9-0017	HFS	nSRZ	Fe City	n/a	423291	5085361	-129.989190	45.917540	1535	0125	HFS bag #9 sampling in filamentous white mat and Fe-oxides. Start 01:26 Stio 01:20. Vol=670ml. H2S 1 uM; +/- 1.3; pH 7.094.	Tav=7.6 Tmx=9.2	Butterfield	
R627-HFS-5-0018	GAS	nSRZ	Fe City	n/a	423291	5085361	-129.989190	45.917540	1535	0132	Gas piston #5 sampling in filamentous white mat and Fe-oxides. Start 01:32 Stop 01:34. Vol= 134ml. H2S 1 uM; +/- 1.3; pH 7.094.	Tav=7.4 Tmx=7.7	Butterfield	
R627-HFS-1-0019	HFS	nSRZ	Fe City	n/a	423291	5085361	-129.989190	45.917540	1535	0134	HFS Sterivex #1; started sampling in filamentous white mat and Fe-oxides at 01:35. Stop 01:44. Vol=1003ml. H2S 1 uM +/- 1.3; pH 7.094	Tav=7.6 Tmx=8.6	Butterfield	
R627-SS-J1-0020	SS	nSRZ	Fe City	n/a	423291	5085361	-129.989190	45.917540	1535	0152	Suction sample for white filamentous bacterial mat. Start 01:52 and end 02:03.	n/a	Moyer	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R627-HFS-7-0021	HFS	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1535	0312	FISH filter #7 at site with large diameter flow from tubeworm bush. Start 03:13. Stop 03:23. Vol=1005ml. H2S=82 +-2; pH=6.45 +-.01	Tav=18.1 Tmx=19.3	Mehta	
R627-HFS-8-0022	HFS	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1535	0323	HFS Bag #8 (no filter) at site with large diameter flow from tubeworm bush. Start 03:24. Finished filtering 03:29. Vol=725 mLs. H2S=82 +-2; pH=6.45 +-.01.	Tav=18.6 Tmx=19.4	Butterfield	
R627-HFS-11-0023	HFS	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1535	0329	HFS Bag #11 with GFF filter at site with large diameter flow from tubeworm bush. Start 03:30. Stop 03:35. H2S=82 +-2; pH=6.45 +-.01. Vol=700 mLs	Tav=18.7 Tmx=19.1	Butterfield	
R627-HFS-13-0024	HFS	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1535	0340	HFS with Sterivex filter #13 at site with large diameter flow from tubeworm bush. Start 03:41. Stop 03:50. H2S=82 +-2; pH=6.45 +-.01; Vol=1005 mL.	Tav=17.2 Tmx=17.8	Butterfield	
R627-GTB-0025	GAS	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1535	0351	Firing port gas tight bottle at 03:52.	Tav=17	Evans	Butterfield/Lilley
R627-MTR-3197-0026	MTR	nSRZ	Bag City	36	423272	5085209	-129.989425	45.916167	1535	0411	Recovered MTR 3197 - encrusted in a tubeworm bush. (Depl R548). Couldn't find other MTR in area.	n/a	Embley	
R627-HFS-23-0027	HFS	Coquille	Vixen	n/a	422995	5085336	-129.993000	45.917280	1536	0524	HFS Gas Piston #23 at new anhydrite chimney on Coquille vent field. Start 05:25 Stop 05:38. Vol=200mL. Likely was overfilled.	Tav=312.3 Tmx=312.7	Butterfield	
R627-HFS-20-0028	HFS	Coquille	Vixen	n/a	422995	5085336	-129.993000	45.917280	1536	0530	HFS Gas Piston #20. Start=05:30 Stop 05:34. Vol=500mL. (same position as previous).	Tav=312.6 Tmx=312.7 T2=149	Butterfield	
R627-HFS-16-0029	HFS	Coquille	7	n/a	422995	5085336	-129.993000	45.917280	1536	0535	HFS Bag #16 no filter. Start 05:36. Stop 05:38. Vol=250 mLs. (same position as previous)	Tav=312.7 Tmx=312.9 T2=145	Butterfield	
R627-HFS-14-0030	HFS	Coquille	Casper	n/a	422997	5085346	-129.992970	45.917370	1536	0559	HFS sample bag #14 no filter. Start 0601 Stop 0607. Vol=700mL. H2S=39.6; pH=6.09. Sample taken at the base of Casper where temperatures are consistent.	Tav=14.9 Tmx=15.0 T2=10	Mehta	
R627-HFS-12-0031	HFS	Coquille	Casper	n/a	422997	5085346	-129.992970	45.917370	1537	0607	HFS Sterivex #12 at base of chimney. Start 06:08. Lost power to the ROV. Restart 07:18 Stop 07:23. (at similar site but with higher temp) H2S=39.6; pH=6.09.	Tav=43 Tmx=43.5	Huber/Baross	
R627-HFS-6-0032	HFS	Coquille	Casper	n/a	422997	5085346	-129.992970	45.917370	1537	0725	HFS FISH filter #6 at base of chimney. Start 07:25 Stop 07:34. Vol=1000ml. H2S=16.3; pH=5.39	Tav=43.3 Tmx=43.6	Huber/Baross	
R627-HFS-3-0033	HFS	Coquille	Casper	n/a	422997	5085346	-129.992970	45.917370	1536	0735	HFS RNA filter #3. Start 07:36 Stop 07:44. Vol=1077ml. H2S=163.0; pH=5.39	Tav=43.2 Tmx=43.4 T2=26.7	Mehta	
R626											**7/24/01**			
R626-McLane-0001	MP	CASM	n/a	n/a	420703	5093107	-130.023893	45.989598	1556	1245	McLane pump start 02:35; stop 12:35 (assuming pumped for 10hr). Pumped 5831.63L during Imagenex lines C1-C9. File saved. (stop location given)	n/a	Tunnicliffe/Metaxas	
R626-net-0002	net	CASM	n/a	n/a	420800	5093470	-130.022650	45.990225	1556	1450	Start 02:22. Stowed plankton net at 14:50. Sampled for 12hrs 28min. Net dropped at 15:00. Successfully collected from bottom and re-stowed in purse at 1530. (Location of end of survey given)	n/a	Tunnicliffe	
R626-RK-0003	RK	CASM	n/a	n/a	420817	5093545	-130.022450	45.990895	1565	1559	Basalt rock sample grabbed at 1613 - about 4.5 meters up the N caldera wall; approx. 0.5 km E of CASM fissure.	n/a	Kulp/Embley	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R626-GTB-0004	GAS	CASM	T&S Spire	n/a	420449	5093355	-130.027168	45.989153	1580	1806	Gas tight sample. Port side. Started at 17:58.	n/a	Evans	Butterfield/Lilley
R626-GTB-0005	GAS	CASM	T&S Spire	n/a	420449	5093355	-130.027168	45.989153	1580	1809	Took the second gas tight sample right after the first (~18:00). Starboard side.	n/a	Evans	Butterfield/Lilley
R626-SF-0006	SF	CASM	T&S Spire	n/a	420449	5093355	-130.027168	45.989153	1580	1821	Sulfide chimney grab with sulfide worms on it. Into port side of biobox.	n/a	Leveille	
R626-SS-J6-0007	SS	CASM	T&S Spire	n/a	420449	5093355	-130.027168	45.989153	1581	1906	Suction sample of sulfide worms. Start 1906; Stop 1917.	n/a	Juniper	
R626-SS-J2-0008	SS	CASM	T&S Spire	n/a	420449	5093355	-130.027168	45.989153	1583	1952	Suction sample of white filamentous microbial mat. stopped 20:00.	n/a	Moyer	
R626-SS-J3-0009	SS	CASM	T&S Spire	n/a	420449	5093355	-130.027168	45.989153	1583	2000	Suction sample of white filamentous microbial mat continued from J2 into J3. Stopped 20:09.	n/a	Moyer	
R625											**7/23/01**			
R625-McLane-0001	MP	98 flow	Cloud	n/a	423901	5087116	-129.981600	45.933400	1522	0652	McLane pump sample in Cloud vent area. 2-4 meters above bottom; 10 liters per minute for 120 minutes.	n/a	Metaxas/Tunnicliffe	
R625-BT-53-0002	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1525	0848	Bacterial trap #53 retrieved. Placed in portable biobox. (Depl R549 - 2000)	n/a	Moyer	
R625-BT-54-0003	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1524	0852	Bacterial trap #54 retrieved. Orange iron oxide stuff on it - Kennedy subsampled it. Into the portable biobox. (Depl R549 - 2000)	n/a	Moyer	Kennedy
R625-TWG-0004	TWG	98 flow	Nascent	M	423905	5087387	-129.981597	45.935840	1520	1211	Hdg 113; 0.75m from Mkr. Tubeworm grab with temp data from a SS. Temp file AL625. Before grab temp 2-3 degrees above ambient; Tmax=6 above ambient. After grab temp 1-3 above ambient.	Tav=2-3 above amb Tmx=6 above amb	Marcus	
R625-SS-J4-0005	SS	98 flow	Nascent	M	423905	5087387	-129.981597	45.935840	1520	1302	Start suction at 1255 for particulates and fauna from a worm bush with visible flow. Stop 13:05.	n/a	Levesque	
R625-SS-J3-0006	SS	98 flow	Nascent	M	423905	5087387	-129.981597	45.935840	1520	1321	At 13:25 begin suctioning limpets (fauna) etc. into jar #3. Temp logging file alR625_b. Located about 4m NE of Mkr-M. Stop 13:31.	n/a	Bates	
R625-SS-J2-0007	SS	98 flow	Nascent	M	423905	5087387	-129.981597	45.935840	1520	1337	Suction into jar#2 for limpets/fauna. ~1m away from last SS - on the periphery. Temp file alR625_c. Stop 13:43.	n/a	Bates	
R625-SS-J1-0008	SS	98 flow	near Nascent	n/a	423895	5087386	-129.981726	45.935829	1520	1355	SS for limpets/fauna into Jar#1 - far periphery ~10m from Mkr-M (hdg111); 6m from last suction sample. Temperature file is AL625_d.	T=amb	Tunnicliffe	
R625-SS-J5-0009	SS	98 flow	near Nascent	N41	423922	5087428	-129.981383	45.936217	1519	1428	SS into Jar#5 for particulates. Temp file is AL625_e.	n/a	Levesque	
R625-TWG-0010	TWG	98 flow - E edge	Old Flow	n/a	423898	5087455	-129.981705	45.936447	1519	1455	Tubeworm grab at Old Flow. Most associated fauna shaken off.	n/a	Marcus	
R625-SS-FeO-J7-0011	SS	98 flow - E edge	Old Flow	n/a	423898	5087455	-129.981705	45.936447	1519	1502	Intermittent suctioning of iron oxides around periphery of Old Flow. Start 15:03; stop 15:14. Re-start 15:32; stop 15:41.	n/a	Kennedy	
R625-SS-J6-0012	SS	98 flow	N3	N3	423637	5088278	-129.985200	45.943800	1529	1758	Start suction of bacterial mat into Jar#6 at 17:59. End SS 18:13. Temp file AL625_f.	T=4 above amb.	Moyer	
R624											**7/22/01**			

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R624-HFS-9-0001	HFS	ASHES	Styx	n/a	421412	5087132	-130.013700	45.933283	1546	0259	HFS Bag #9. Start 02:59. Stop 03:07. Vol=650mLs. H2Save=163 uM; pHavg=5.57. Sample in a clump of tubeworms and limpets in depression.	Tav=13.0 Tmx=14.4	Butterfield/Lilley/Lang/Huber/Mehta	
R624-HFS-13-0002	HFS	ASHES	Styx	n/a	421412	5087132	-130.013700	45.933283	1546	0308	HFS Sterivex #13. Start 3:09. Stop 3:20. Vol=1000mL. H2Savg=163 uM; pHavg=5.57. Sample in clump of tubeworms and limpets in a depression about 2m SW of larval limo.	Tav=11.9 Tmx=13.5	Huber/Mehta	
R624-HFS-10-0003	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0408	GFF Filter #10. Start 04:10; Stop 04:20. TOTAL CHN and Carbos HFS sample taken right in a bunch of tubeworms. H2S=101 +-8; pH=5.68 +-.022. vol=2015mL.	Tav=15.4 Tmx=17.5	Lang	
R624-HFS-8-0004	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1545	0421	HFS Bag #8. No filter. Start 04:22. H2S=101 +-8; pH=5.68 +- .022. Stop 04:29. vol=651 mL. Sampled in clump of tubeworms.	Tav=16 Tmx=17	Butterfield/Lang/Lilley/Huber/Mehta	
R624-HFS-6-0005	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0430	FISH filter #6. Start 04:30. H2S=101 +-8; pH=5.68 +- .022. Stop 04:42. vol=1007mL. Sampled in clump of tubeworms.	Tav=13.0 Tmx=16.2	Huber/Mehta	
R624-HFS-1-0006	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0442	HFS Sterivex #1 for DNA. Start 04:44; Stop 04:56. H2S=101 +-8; pH=5.68 +-.022. vol=1000 mL. Sampled in clump of tubeworms.	Tav=14.6 Tmx=16.3	Huber/Mehta	
R624-SS-6-0007	SS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0526	Suction #6 at this site for ~4 min (BIO - particulate and limpets). Will attempt to quantify the amount of material sucked by the video.	n/a	Tunnicliffe/Bates	Leveille
R624-SS-7-0008	SS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1547	0546	Suction #7 for Amanda at "Gollum "far" site. Good particulate sample.	n/a	Tunnicliffe/Bates	
R624-HFS-14-0009	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1546	0616	HFS sampling bag with no filter #14. Start 06:17. Stop 06:24. Vol=625mL.	Tav=188.7 Tmx=194.4	Butterfield/Huber/Lang/Mehta/Lilley	
R624-HFS-12-0010	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0626	Start sample #12 Sterivex filter at 06:26. Stopping 06:37. Vol=1002 mL.	Tav=191 Tmx=202.4	Mehta/Huber	
R624-HFS-7-0011	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0638	FISH filter #7. Start 06:39. Loss of coms with HFS at 0641; back online 0710. Continuing sample at 0712. Vol=1010ml.	Tav=209 Tmx=218	Huber/Mehta	
R624-HFS-4-0012	GAS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0727	Gas Piston #4. Start 0731. Stop 0733. Vol=138 mL. T2 is not working right and says 47.	Tav=221 Tmx=222	Evans	Butterfield/Lilley
R624-HFS-5-0013	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	0752	Gas Piston #5. Start 0753. Stop 0754. Vol=133mL.	Tav=299.7 Tmx=299.8	Evans	Butterfield/Lilley
R624-GTB-0014	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	0754	Port gastight. Start 0755. Stop 0756.	Tav=299.7 Tmx=299.8	Evans	Butterfield/Lilley
R624-HFS-18-0015	HFS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	0758	Bag #18 at Virgin. Start 0802. Vol=307mL.	Tav=299.8 Tmx=299.8	Butterfield/Lilley/Lang/Huber/Mehta	
R624-HFS-20-0016	HFS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	0803	Chemistry Piston #20 at Virgin. Start 0804. Stop 0808. Vol=431mL.	Tav=299.9 Tmx=299.9	Butterfield/Lilley/Lang/Huber/Mehta	
R624-HFS-23-0017	GAS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1544	0829	Gas Piston #23. Start 0830. End 0832. Vol=202mL.	Tav=246 Tmx=291	Evans	Butterfield/Lilley
R624-HFS-22-0018	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1544	0838	Chemistry piston #22. Start 0838; End 0840. Start again 0849; jerked from the vent. Stop 0854. Vol=600mL. Temps probably higher because pump is clogged.	Tav=262.9 Tmx=264.8	Butterfield/Lang/Lilley/Huber/Mehta	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R624-HFS-19-0019	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1545	0855	Bag #19 with filter. Start 0856. End 0901. Vol=475 mL. During this sample the clog broke loose so the temps are more accurate.	Tav=274 Tmx=293.9	Butterfield/ Lilley/Lang	
R624-GTB-0020	GAS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1545	0902	Starboard gastight. Start 0902. Stop 0903.	Tav=292.9 Tmx=293	Evans	Butterfield/Lilley
R624-hobo-128-0021	hobo	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1545	0917	Removed HOBO#121 from top of Hell. It was very crusty. MBARI moved this hobo from Inferno (summer 01) where it fell out of the vent.	n/a	Embley	
R624-Osmo-0022	OSMO	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0921	Retrieved the osmosampler (Depl R503). Pulled out T-handle and tubing came off. Appears to be hanging by a wire. Placed in larval limo. Osmo didn't work.	n/a	MBARI	
R624-HFS-11-0023	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0949	Sample Bag #11 with a filter. Start 0949; Stop 0956. Vol=565mL. H2Savg=108 +/- 1.5uM. pHavg=5.50 +/- .02.	Tav=35.3 Tmx=36.0	Butterfield/ Lilley/Lang	
R624-HFS-15-0024	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	1001	Sample in cement box at Johnson flow meter. Sterivex filter #15. Start 1003; Stop 1014. Vol=1L. H2Savg=108 +/- 1.5uM. pHavg=5.50 +/-.02.	Tav=32.7 Tmx =33.5	Huber/Mehta	
R624-HFS-21-0025	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	1015	Sample in cement box at johnson flow meter. FISH filter #21. Start 1015; Stop 1028. Vol=1006ml. H2Savg=108 +/- 1.5uM. pHavg=5.50 +/- .02	Tav=31.9 Tmx=32.4	Huber/Mehta	
R624-HFS-24-0026	GAS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1048	Gas Piston #24 at Hell. Start 1049; Stop 1051. Vol=145mL.	Tav=283.4 Tmx=284.4	Evans	Butterfield/Lilley
R624-HFS-17-0027	HFS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1052	Bag #17 with filter. Start 1052; Stop 1058. Vol=505mL.	Tav=283.7 Tmx=284.3	Butterfield/ Lilley/Evans	
R624-HFS-16-0028	HFS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1058	Bag #16. Start 10??; Stop 1105. Vol=520mL. This vent is half a meter north of where the osmo and hobo were.	Tav=283.0 Tmx=283.7	Butterfield/ Lilley/Lang /Huber/Mehta	
R624-SS-FeO-J1-0029	SS	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1544	1510	South of Phoenix vent - Suction iron oxides jar#1. Start 1511. Moved the fluid sampler intake out of the way for better access. Stop at 1526.	n/a	Kennedy	
R624-SS-J2-0030	SS	ASHES	Fe Hyde	n/a	421406	5087100	-130.013783	45.932983	1545	1534	Suction of FeO into jar#2. Stopped suctioning at 15:38. (421406/5087100 45 55.979' 130 0.827')	n/a	Kennedy	
R624-SS-FeO-J3-0031	SS	ASHES	Fe Hyde	n/a	421406	5087100	-130.013783	45.932983	1544	1544	Suction sampling iron oxides into jar#3. Start 15:44. Stop 15:48.	n/a	Kennedy	
R624-SS-FeO-J4-0032	SS	W Wall	Tunnicliffe	n/a	421249	5087178	-130.015817	45.933667	1544	1603	Suction iron oxides into jar#4. Start 16:04. Stopped at 16:08. (At the base of the caldera wall near Tunnicliffe vent . Location unknown - no nav)	n/a	Kennedy	
R624-hobo-127-0033	hobo	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1544	1650	Recovered hobo#127 (Depl R555).	n/a	Moyer	
R624-hobo-130-0034	hobo	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1544	1653	Recovering hobo#130 (Depl R555).	n/a	Embley	
R624-MTR-3026-0035	MTR	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1542	1851	Recovered MTR #3026 (Depl R545).	n/a	Embley	
R624-SS-J5-0036	SS	ASHES	Fe Hyde	n/a	421406	5087100	-130.013783	45.932983	1547	2107	Suction sample jar#5; Start 2107. Stop 2116. Orange mat/FeO.	n/a	Engebretson/Moyer	
R623											**7/20 - 7/21 2001**			

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R623-SS-J1-0001	SS	Mid Caldera	n/a	BPR	421717	5089568	-130.010170	45.955220	1536	1017	Suctioning background far-field sediment into Jar#1.	n/a	Leveille	
R623-McLane-0002	MP	98 flow	Mkr-33	bmrk-5	423855	5087092	-129.982190	45.933170	1522	1441	Start the McLane port pump at BM#5. Pump speed is 10L/minute. (15m NW of Mkr-33)	n/a	Tunnicliffe/Metaxas	
R623-TWG-0003	TWG	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1522	1533	Ridgeia samples into the port biobox - from Mkr-33 crack(~6 Ridgeia).	n/a	Levesque	
R623-BT-51-0004	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1522	1542	Recovered bac trap#51 (Depl R549).	n/a	Moyer/Engebretson	Bates
R623-BT-52-0005	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1522	1544	Recovered bac trap#52 (Depl R549).	n/a	Moyer	Bates
R623-SS-J4-0006	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1522	1555	Suctioning substrate for limpets. Start suction on top edge near crack ~6-10 cm from crack. End 16:03. Alien temp files: 623al_c;_ca and _cb.	T=from amb up to 3.4 degrees.	Bates	Marcus
R623-SS-J3-0007	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1522	1607	Suction about 3m from Mkr-33 crack. Directly back from last sample. (start in J8 - not a sample). Restart 1622 into Jar#3. Stop 1625. Alien temp file name is R623al_d;_da.	T=no data	Bates	Marcus
R623-TWG-0008	TWG	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1525	1729	Tubeworms into stbd biobox at 1742; adding a small grab to the sample. Successfully grabbed the healthy tubeworm clump at the base.	n/a	Marcus	
R623-SS-J5-0009	SS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1525	1803	Suction in hole made by TWG for particulates at 25% flow.	n/a	Levesque	
R623-McLane-0010	MP	98 flow and SPillow Mnd	Cloud; BagCity; SPillow Mnd	n/a	423272	5085209	-129.989425	45.916167	1472	2117	McLane stbd set to pump 60 min at 10L/min during transits. Cloud-BC: On 2117; Off 2220; vol=583L. BC-SPillowMnd: On 0036; Off 0305; Vol=1458 liters. SPillowMnd-BC: On 0435	n/a	Tunnicliffe/Metaxas	
R623-SS-J6-0011	SS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1535	0003	Suction slots of mat attached to tubeworms at NeMO Net '00 camera site.	n/a	Moyer	
R622											**7/18 - 7/19 2001**			
R622-HFS-4-0001	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2105	22:00 start sampling with fluid sampler: Gas piston #4. Vol=105mL. H2Savg=57. pHavg=5.76.	Tav=12.4 Tmx=13.9	Evans	Butterfield/Lilley
R622-HFS-22-0002	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2105	22:05 - 22:11 chemistry piston #22. vol=629mL. H2Savg=57. pHavg=5.76.	Tav=13 Tmx=14.2	Butterfield	
R622-HFS-19-0003	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2105	22:15-22:22 Sampling #19. Bag with filter. Vol=630mL. (left of old bac traps). H2Savg=57. pHavg=5.76.	Tav=12.4 Tmx=13.6	Butterfield	
R622-HFS-15-0004	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2219	22:23-22:35 Sterivex filter #15. vol=1L. H2Savg=57. pHavg=5.76.	Tav=11.8 Tmx=15.2	Huber/Baross	
R622-HFS-7-0005	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2233	22:36-22:46 FISH Filter #7. Vol=1 L. H2Savg=57. pHavg=5.76.	Tav=14.8 Tmx=18.8	Huber/Baross	
R622-GTB-2-0006	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2245	22:48 Fired port gas tight bottle.	T=14.9	Evans	Butterfield/Lilley
R622-MTR-3289-0007	MTR	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2310	Recovered MTR#3289 - south of crack at Mkr-33 (Depl R543).	n/a	Embley	
R622-MTR-3300-0008	MTR	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2257	Recovered MTR#3300 (Depl R543).	n/a	Embley	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R622-MTR-3292-0009	MTR	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2327	Recovered MTR#3292 (Depl R543).	n/a	Embley	
R622-SS-J5-0010	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2358	Suctioning for bacterial mat into jar#5. Stop 00:08.	n/a	Moyer	
R622-MTR-3087-0011	MTR	98 flow	Snail	N8	423877	5087088	-129.981900	45.933200	1523	0041	Recovered MTR#3087 (Depl R547).	n/a	Embley	
R622-MTR-3320-0012	MTR	98 flow	Snail	N8	423877	5087088	-129.981900	45.933200	1524	0043	Recovered MTR #320 from lower part of Snail vent (Depl R547).	n/a	Embley	
R622-HFS-5-0013	GAS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0135	HFS gas piston. Vol=182ml. H2Savg=12.1. pHavg=6.67.	Tav=9.6 Tmx=9.7	Evans	Butterfield/Lilley
R622-HFS-8-0014	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0143	HFS with Bag #8; no filter; same location as previous sample. Vol=640ml. H2Savg=12.1. pHavg=6.67.	Tav=9.6 Tmx=9.7	Butterfield	
R622-HFS-11-0015	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0155	HFS bag#11 with filter; Vol=680ml. H2Savg=12.1. pHavg=6.67.	Tav=9.6 Tmx=9.7	Butterfield	
R622-HFS-12-0016	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0205	HFS sterevex Vol.=1L. H2Savg=12.1. pHavg=6.67.	Tav=9.7 Tmx=9.7	Butterfield	
R622-HFS-23-0017	GAS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0217	HFS gas piston##23. Vol=160ml. H2Savg=12.1. pHavg=6.67.	Tav=9.7 Tmx=9.7	Evans	Butterfield/Lilley
R622-GTB-7-0018	GAS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0221	Sample GTB#7 on the starboard side.	n/a	Evans	Butterfield/Lilley
R622-SS-J6-0019	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0235	Suction sample into jar#6. Bacterial mat.	n/a	Moyer	
R622-SS-J2-0020	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0321	SS in Jar#2 at periphery fauna.	n/a	Tunnicliffe	
R622-MTR-3208-0021	MTR	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0416	Retrieving MTR#3208. (Depl R543).	n/a	Embley	
R622-MTR-4101-0022	MTR	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	0419	Retrieving MTR#4101. (Depl R543).	n/a	Embley	
R622-MTR-4001-0023	MTR	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1525	0423	Retrieving MTR#4001. (Depl R543).	n/a	Embley	
R622-HFS-9-0024	HFS	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1521	0540	HFS into bag#9 with NO filter. Vol=500ml. H2Savg=5.3 pHavg=6.61.	Tav=12.0	Butterfield/Lilley/Huber/Mehta/Evans	
R622-HFS-13-0025	HFS	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1521	0559	Doing HFS w/ sterivex filter#13. H2Savg=5.3 pHavg=6.61. Vol=1L.	Tav=12.0	Mehta/Huber	
R622-HFS-24-0026	GAS	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1521	0612	HFS #24. Gas piston. H2Savg=5.3 pHavg=6.61. Vol=100mL.	Tav=10.0 Tmx=10.3	Evans	Butterfield/Lilley
R622-MTR-3334-0027	MTR	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1521	0621	Recovered MTR#3334 that was ~1 meter into a hole at N41. (Depl R543). MTR rope and vent site contained white filamentous bacterial mat. Placed in the purse.	n/a	Embley	
R622-MTR-3211-0028	MTR	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1521	0651	Recovered MTR#3211 - just south of MTR#3334. MTR rope and vent site contained white filamentous bacterial mat. Placed in the purse. (Depl R548).	n/a	Embley	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R622-MTR-3309-0029	MTR	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1521	0700	Recovered MTR#3309 into the purse. (Depl R543). THIS SAMPLE WAS LOST - hole in purse!	n/a	Embley	
R622-HFS-16-0030	HFS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1526	0823	HFS sample bag #16 - no filter. Pump stopped in the middle of sampling. H2Savg=151.2 pHavg=5.67. Vol=650mL.	Tav=12.0 Tmx=12.2	Butterfield/ Lang/Lilley /Huber/Mehta	
R622-HFS-17-0031	HFS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1526	0837	HFS sample; bag#17 with filter; in same spot as before. H2Savg=151.2 pHavg=5.67. Vol=650mL.	Tav=12.0 Tmx=12.2	Butterfield/ Lang/Lilley	
R622-HFS-1-0032	HFS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1526	0845	HFS Sterivex filter#1. H2Savg=151.2 pHavg=5.67. Vol=1L.	Tav=12.1 Tmx=12.2	Mehta	
R622-MTR-4128-0033	MTR	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1526	0908	Recovered MTR#4128 and put it in purse. (Depl R547)	n/a	Embley	
R622-HFS-14-0034	HFS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1002	HFS with Bag#14 no filter. Sampled the vertical face of the underside of a broken lobate pillow lava somewhere near Mkr-N3. H2Savg=100 pHavg=5.8. Vol=650mL.	Tav=7.8	Butterfield/ Lilley/Lang /Huber/Mehta	
R622-HFS-10-0035	HFS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1011	HFS GFF filter#10 at the same site as previous sample. H2Savg=100 pHavg=5.8. Vol=1050mL.	Tav=8.6	Lang	
R622-HFS-18-0036	HFS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1530	1046	HFS Bag #18 without a filter at this site near Mkr-N3. H2Savg=127 pHavg=5.31. Vol=600mL.	Tav=12.5	Butterfield/ Lilley/Lang /Mehta/Huber	
R622-MTR-3045-0037	MTR	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1117	Recovered MTR#3045 (Depl R547).	n/a	Embley	
R622-MTR-3176-0038	MTR	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1121	Recovering MTR 3176 (Depl R547).	n/a	Embley	
R622-SS-J1-0039	SS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1155	SS of limpets into Jar#1. Limpets bathed by flow near Mkr-N3. Start 11:54. Stopped around 11:56.	n/a	Bates	
R622-SS-J3-0040	SS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1215	Start suction into Jar #3 at 12:15. Just a few inches away from prior sample on edge of flow. Stop~12:26. It will be difficult to get density data from this sample	n/a	Bates	
R622-SS-J4-0041	SS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1527	1247	Suctioning into Jar#4 on far periphery (Amphisamytha zone). Start 12:45. Stop 12:55.	n/a	Bates	
R622-SS-J7-0042	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1522	1434	Suctioning flow from crack for particulates - at low power.	n/a	Levesque	
R622-SS-J8-0043	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1522	1505	Suction of large fauna into flushing jar.	n/a	Levesque	
R622-HFS-20-0044	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1522	1514	Start piston sample #20 at 1515. Stop 1524. H2Savg=18.5 pHavg=5.54. Vol=800mL.	Tav=16.0	Butterfield	
R622-HFS-3-0045	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1525	Start RNA filter #3. Stop 15:35. Ropos pulled off site. Restarted 16:14. Stop at 16:20. H2Savg=18.5 pHavg=5.54. Vol=700mL.	Tav=17.0	Mehta	
R622-HFS-6-0046	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1621	FISH filter#6. Pump stopped 1623. Restart 1624. Pump keeps cutting out. Stop 1631. H2Savg=18.5 pHavg=5.54. Vol=1L.	Tav=17.3	Huber	
R621											**7/17 - 7/18 2001**			
R621-GTB-0001	GAS	S Cleft	Vent1	chmn-342	391834	4945943	-130.364317	44.658700	2211	2355	Firing port gas tight bottle next to Hobo#133.	T1=~240	Evans	Butterfield/Lilley

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R621-GTB-0002	GAS	S Cleft	Vent1	chmn-342	391834	4945943	-130.364317	44.658700	2211	2356	Fired starboard gas tight bottle -near hobo#133.	T1=230 Tmx=300	Evans	Butterfield/Lilley
R621-hobo-0003	hobo	S Cleft	Plume	chmn-137	391228	4944126	-130.371583	44.642266	2232	0201	Chimney has grown over probe. Wow. HOBO#137 was recovered at 0203.	n/a	WW Chadwick	
R621-SF-0004	SF	S Cleft	Plume	chmn-137	391228	4944126	-130.371583	44.642266	2233	0259	Fe-oxide coated sulfide sample.	n/a	Leveille	
R621-SS-J4-0005	SS	S Cleft	Plume	chmn-137	391228	4944126	-130.371583	44.642266	2233	0307	Suctioned orange microbial mat from Plume Vent into Jar#4.	n/a	Moyer	
R619											**7/16/01**			
R619-wood-0001	wood	S. Cleft	n/a	bmrk-9	391892	4946684	-130.363750	44.665383	2218	0650	Piece of wood left from benchmark 9 deployment.	n/a	Tunnicliffe	
R619-wood-0002	wood	S. Cleft	n/a	bmrk-2	392622	4946457	-130.363750	44.665383	2217	1925	Piece of wood left from benchmark 2 deployment.	n/a	Tunnicliffe	
R556											**7/16/00**			
R556-LT-2-0001	LT	98 flow	Mkr-33	33	423847	5087111	-129.982301	45.933349	1523	2129	21:39 official cap time for Larval Tube #2. (N of Mkr-33)	n/a	Metaxas	
R556-LT-1-0002	LT	98 flow	Mkr-33	33	423847	5087111	-129.982301	45.933349	1523	2149	21:49 - 7 function arm has put the top on Larval Tube #1. The cap is crooked. (N of Mkr-33)	n/a	Metaxas	
R556-SS-bio-J3-0003	SS	98 flow	Mkr-33	33	423850	5087101	-129.982250	45.933270	1523	2158	SS of fauna (BIO) near the bottom. start at 21:58 stop 22:05. (near Mkr-33)	n/a	Juniper/Marcus	
R556-LT-4-0004	LT	98 flow	Mkr-33	33	423847	5087111	-129.982301	45.933349	1523	2216	22:16 cap Larval Tube #4. Top not completely capped. Got closer to trap 4 - which tipped over and is lying on the bottom. (N of Mkr-33)	n/a	Metaxas	
R556-LT-3-0005	LT	98 flow	Mkr-33	33	423847	5087111	-129.982301	45.933349	1523	2230	The 7 function has capped the Larval Tube #3 at 22:30. Very deep on the cap. (N of Mkr-33)	n/a	Metaxas	
R556-SS-bio-J5-0006	SS	98 flow	Mkr-33	33	423850	5087101	-129.982250	45.933270	1523	2308	Suction of fauna; palm worms and limpets (BIO). start=~23:08 end=23:17. Not successful sample for palm worms; extra limpets and sulfide worms added. Sample near MTR#300. (near Mkr-33)	n/a	Juniper	Tunnicliffe
R555											**7/16/00**			
R555-LT-8-0001	LT	ASHES	between Crack and Daves	n/a	421417	5087156	-130.036480	45.933481	1545	1247	Cork pushed in a bit too far. Larval Tube #8 placed in larval limo. (between Crack and Daves)	n/a	Metaxas	
R555-LT-6-0002	LT	ASHES	between Crack and Daves	n/a	421417	5087156	-130.036480	45.933481	1545	1249	Larval Tube #6 placed in larval limo. (between Crack and Daves)	n/a	Metaxas	
R555-LT-7-0003	LT	ASHES	between Crack and Daves	n/a	421417	5087156	-130.036480	45.933481	1545	1307	Larval Tube #7 placed in larval limo. (between Crack and Daves)	n/a	Metaxas	
R555-LT-5-0004	LT	ASHES	between Crack and Daves	n/a	421417	5087156	-130.036480	45.933481	1545	1315	Larval Tube #5 placed in larval limo. All ready for trip to surface. (between Crack and Daves)	n/a	Metaxas	
R555-GTB-0005	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013480	45.933650	1545	1536	Gas Tight Bottle #2 fired over flow at Virgin.	n/a	Evans	Butterfield/Lilley
R555-GTB-0006	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013480	45.933650	1545	1537	Gas Tight Bottle #5 fired in the same place.	n/a	Evans	Butterfield/Lilley
R554											**7/15/00**			

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R554-McLane-0001	MP	SRZ	S pillow mound	n/a	422000	5079900	-130.004950	45.868249	1725	0518	McLane pump on 6 liters/min for 400L. Imagenex survey area. Time=5322 secs. Lowest voltage 27.7 volts DC. (position given is only 1 fix at middle of survey area)	n/a	Metaxas/Tunnicliffe	
R554-RK-0002	RK	SRZ	S pillow mound	n/a	422532	5080519	-129.998197	45.873880	1717	1808	Big rock of older pillow lava from the east side of the fissure sampled at the contact. In the stbd biobox.	n/a	J Chadwick	
R554-RK-0003	RK	SRZ	S pillow mound	n/a	422526	5080523	-129.998275	45.873915	1720	1817	New lava from the eastern side of the fissure. It's a flat piece of crust with drips on the bottom. Stbd biobox.	n/a	J Chadwick	
R554-RK-0004	RK	SRZ	S pillow mound	n/a	422365	5079931	-130.000253	45.868570	1723	2002	Piece of shiny newer lava with glass in jumbled collapse flow. (~50 meters NW of point D) Putting it in the purse. It's mammoth. (Bacterial subsample)	n/a	J Chadwick	Moyer
R554-RK-0005	RK	SRZ	S pillow mound	n/a	422263	5079699	-130.001530	45.866470	1728	2107	Lava - contact at western edge of depression (east side of high ridge).	n/a	J Chadwick	
R554-RK-0006	RK	SRZ	S pillow mound	n/a	422263	5079699	-130.001530	45.866470	1728	2109	New chunk of lava; lots of glass. Contact western edge of the depression - eastern edge of high ridge.	n/a	J Chadwick	
R553											**7/14/00**			
R553-HFS-8-0001	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013620	45.933700	1545	1446	HFS bag 8: start 14:46 end 14:32. Vol=500 mL.	T1=127 T2=74 Tmx=136.3	Butterfield	
R553-HFS-4-0002	GAS	ASHES	Marshmallow	n/a	421420	5087179	-130.013620	45.933700	1545	1452	HFS gas piston #4: start 14:53 end sampling at 14:54. Volume=110 mL.	T1=129.3 T2=71.9 Tmx=130.3	Evans	Butterfield/Lilley
R553-HFS-7-0003	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013620	45.933700	1545	1455	HFS FISH filter #7. start 14:55 end 15:06. volume=1 L.	T1=140 T2=80 Tmx=152.5	Huber	
R553-HFS-13-0004	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013620	45.933700	1545	1506	HFS 2 DNA filter #13: start 15:12 end 15:19. Vol=1 L.	T1=134 T2=75 Tmx=152	Huber	
R553-HFS-15-0005	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013620	45.933700	1545	1519	HFS XRF filter#15: start 15:20 end 15:25. Vol=500 mL.	T1=129 T2=72 Tmx=132.4	Gendron	
R553-HFS-2-0006	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013580	45.933580	1545	1544	HFS XRF filter #2: start time: 15:43 end 15:49. Vol=500 mL	T1=28.4 T2=19.3 Tmx=30.7	Gendron	
R553-McLane-0007	MP	ASHES	Gollum	n/a	421422	5087166	-130.013580	45.933580	1545	1552	McLane pump started 15:57 end 17:12. Vol=400 L.	n/a	Metaxas	
R553-HFS-3-0008	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013580	45.933580	1545	1612	HFS FISH filter #3: start 16:13 end: 16:22. Vol=1 L.	T1=25 T2=17 Tmx=26.8	Huber	
R553-HFS-20-0009	GAS	ASHES	Gollum	n/a	421422	5087166	-130.013580	45.933580	1545	1621	HFS gas piston #20: start 16:23 end 16:24. Vol=122 mL.	T1=34 T2=24 Tmx=25.9	Evans	Butterfield/Lilley
R553-HFS-22-0010	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013580	45.933580	1545	1624	HFS piston #22: start 16:25 end 16:30. Vol=560 mL.	T1=29 T2=19 Tmx=39.	Butterfield	
R553-HFS-12-0011	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013580	45.933580	1545	1630	HFS Sterivex filter #12: start 16:31 end 16:40. Vol=1 L.	T1=37 T2=24 Tmx=38.2.	Mehta	
R553-HFS-10-0012	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013580	45.933580	1545	1640	HFS 2 DNA filter #10: start 16:41 end 16:50. Vol=1 L.	T1=30 T2=20 Tmx=33.7.	Huber	
R553-HFS-6-0013	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013580	45.933580	1545	1650	HFS lipid filter #6: start 16:51 end 17:00. Vol:=1 L.	T1=31 T2=20 Tmx=32.7.	Huber	
R553-HFS-1-0014	HFS	ASHES	Virgin	n/a	421430	5087174	-130.013480	45.933650	1546	1737	HFS XRF filter #1: start 17:52 end 17:56. Vol=500 mL.	T1=299 T2=120 Tmx=300.6.	Gendron	
R553-GTB-0015	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013480	45.933650	1546	1746	Gas tight bottle #7 fired.	T=300	Evans	Butterfield/Lilley

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R553-HFS-24-0016	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013480	45.933650	1546	1748	HFS gas piston #24: start 17:49 end 17:50. Vol=140 mL.	T1=295 T2=122 Tmx=299.7	Evans	Butterfield/Lilley
R553-HFS-9-0017	HFS	ASHES	Virgin	n/a	421430	5087174	-130.013480	45.933650	1546	1757	HFS bag #9: start 17:57 end 18:01. Vol=375 mL.	T1=300 T2=116 Tmx=300.6.	Butterfield	
R553-HFS-16-0018	HFS	ASHES	Virgin	n/a	421430	5087174	-130.013480	45.933650	1546	1803	HFS bag #16: start 18:02 end 18:05. Vol=350 mL.	T1=297 T2=52 Tmx=297.6	Butterfield	
R553-HFS-14-0019	HFS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1545	1905	HFS bag #14: start 19:06 stop 19:10. Vol=500 mL.	T1=107 T2=60 Tmx=112.1	Butterfield/Huber	
R553-GTB-0020	GAS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1544	2035	Port gas tight bottle #6	n/a	Evans	Butterfield/Lilley
R553-HFS-5-0021	GAS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1544	2036	HFS gas piston #5: start 20:37 stop 20:38. vol=150 mL .	T1=298 T2=139 Tmx=300.8	Evans	Butterfield/Lilley
R553-HFS-11-0022	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1544	2039	HFS filter bag #11: start 20:39:40 stop 20:43. vol=478 mL .	T1=301 T2=140 Tmx=302.2	Butterfield/Huber	
R553-HFS-21-0023	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1544	2044	HFS XRF filter #21: start 20:45:09 stop 20:47. vol=250 mL .	T1=301 T2=137 Tmx=301.8.	Gendron	
R553-HFS-19-0024	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1544	2047	HFS bag #19: start 20:48:04 stop 20:52:09. vol 450 mL.	T1=301 T2=137 Tmx=301.7	Butterfield/Huber	
R553-HFS-17-0025	HFS	ASHES	Hell	n/a	421372	5087130	-130.014230	45.933300	1544	2141	HFS filter bag #17: start 21:41 stop 21:46. vol=500ml.	T1=70-105 T2=65 Tmx=112.7	Butterfield/Huber	
R553-HFS-18-0026	HFS	ASHES	Hell	n/a	421372	5087135	-130.014230	45.933300	1544	2202	HFS bag #18: start 22:03:43 stop 22:07:13. vol=500 mL.	T1=80-130 T2=66 Tmx=144	Butterfield/Huber	
R553-HFS-24-0027	GAS	ASHES	Hell	n/a	421372	5087135	-130.014230	45.933300	1544	2207	HFS gas piston #24. start 22:08 stop 22:09:17. vol=118 mL.	T1=113 T2=69 Tmx=129	Evans	Butterfield/Lilley
R553-SS-sf-J4-0028	SS	ASHES	Hell	n/a	421372	5087135	-130.014230	45.933300	1546	2309	Suction 200 micron mesh: base of sulfide spire (SULFIDE AND PARTICULATES) at the base of porkchop. Sulfide worm neighborhood. start 23:09 end 23:16.	n/a	Juniper	
R552											**7/13/00**			
R552-TWG-0001	TWG	SRZ	Mkr-113	113	423377	5085929	-129.988170	45.922660	1525	0033	Tube worm grab on edge of cleft. (subsample basalt chips RK)	n/a	Marcus	J Chadwick
R552-SS-bio-J8-0002	SS	SRZ	S of Coquille	n/a	422976	5085284	-129.993240	45.916810	1538	0708	Suction of clams (BIO) into Jar#8. Start 0707 Finish 0712. (Basalt chips subsamp for Chadwick. Oxidized basalt chips for Kennedy)	n/a	Juniper	J Chadwick/Kennedy
R552-RK-003	RK	SRZ	SW of FeCity	n/a	423246	5085343	-129.989769	45.917372	1538	0837	In port biobox. 10cm long - broke in 2 pieces right side on top of worms SW of B (near collapse at edge of lineated sheet flows seen in 1987).	n/a	J Chadwick	
R552-McLane-0004	MP	SRZ	S of BagCity	n/a	424300	5084850	-129.976102	45.913015	1550	1414	Starting McLane pump on Imagenex run. Pump stopped at 18:14. Vol=1624 liters. (position given is only 1 fix)	n/a	Tunnicliffe / Metaxas	
R552-net-0005	net	SRZ	S of BagCity	n/a	424300	5084850	-129.976102	45.913015	1550	1416	Plankton net tow during Imagenex survey. (position given is only 1 fix)	n/a	Tunnicliffe / Metaxas	
R552-RK-0006	RK	SRZ	n/a	n/a	424300	5084750	-129.976086	45.912152	1550	2002	Glassy basalt sample (rk) for J Chadwick. sample placed in stbd side lower left Bio box. (~1000 m SE of BagCity)	n/a	J Chadwick	
R552-RK-0007	RK	SRZ	n/a	n/a	424186	5085523	-129.977678	45.919096	1537	2131	Lava (Rk) placed in the right front of stbd bio box. sample is almost square. (~1000 m NE of BagCity)	n/a	J Chadwick	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R552-RK-0008	RK	SRZ	~1000 m SE of BagCity ?	n/a	424301	5084736	-129.976071	45.912026	1545	2312	Chunk of old lava from a patch which is sticking up out of the new lava. Fumbled with one sample and went back for more. Port bio box (no good fixes for sample).	n/a	J Chadwick	
R551											**7/11 - 7/12 2000**			
R551-HFS-6-0001	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	2128	filter-Lipids: start 21:29:02 stop 21:40:28 Vol=1 liter.	T1=27 T2=9.0 Tmx=31.5	Huber	
R551-HFS-10-0002	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2141	two filter DNA: start 21:41:25 stop 21:49:25. Vol=1 liter.	T1=27.0 T2=20 Tmx=3	Huber	
R551-HFS-4-0003	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2146	gas piston: start 21:03:47 stop 21:04:27. Vol=113 liters.	T1=27.0 T2=19.4 Tmx=28.4	Evans	Butterfield/Lilley
R551-HFS-12-0004	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2149	sterivex filter: start 21:49:58 stop 21:57:38. Vol=1 liter.	T1=26.0 T2=19.0 Tmx=31.1	Huber	
R551-HFS-8-0005	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2151	HFS bag: start 21:05:19 stop 21:11:07. Vol=700 mL.	T1=25.0 T2=19.0 Tmx=29.5	Butterfield	
R551-HFS-1-0006	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2153	HFS XRF filter: start 21:12:10 stop 21:17:55. vol = 500 mL.	T1=25.0 T2=18.0 Tmx=30.6.	Gendron	
R551-HFS-3-0007	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	2155	HFS FISH filter #3: start 21:18:44 stop 21:28:05. Vol=1 liter.	T1=24.0 T2=19.0 Tmx=28.9	Huber	
R551-HFS-9-0008	HFS	98 flow	Snail	N8	423877	5087088	-129.981900	45.933200	1525	2223	HFS bag 9: start 22:23:22 stop 22:29:24. vol =748 mL.	T1=15.5 T2=9.5 Tmx=17.2	Butterfield	
R551-HFS-15-0009	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1526	2241	Hfs 15 filter #15 for XRF: start 22:42 stop 22:46. Volume=500 mL.	Tmx=16 T1=15.9 T2=12.5	Gendron	Huber
R551-HFS-11-0010	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1526	2246	HFS bag #11 with filter: start 22:47:13 stop 22:52:59. volume=700 mL.	Tmx=15.9 T1=15.8 T2=12.7	Butterfield	Huber
R551-HFS-24-0011	GAS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	2252	HFS gas piston #24: start 22:54:13 stop 22:55:05. Volume=109 mL.	Tmx=15.9 T1=15.8 T2=12.6	Evans	Lilley/Butterfield
R551-GTB-5-0012	GAS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1526	2255	GAS Tight Bottle #5 stbd. time 2255.	n/a	Evans	Lilley/Butterfield
R551-SS-bio-J4-0013	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	2307	Suction Sample jar #4. 250 micron filter. Peripheral fauna (BIO). 5 meters east of Mkr-21. start time 2307 stop time 2314.	n/a	Tunnicliffe	J Q304Chadwick
R551-SS-mat-J1-0014	SS	98 flow	Mkr-113	113	423372	5085937	-129.988238	45.922728	1525	0144	suction sampler btl #1 . 250 microns white (BIO/MAT) stuff. start 0144 end 02:24.	n/a	Marcus	
R551-HFS-14-0015	HFS	98 flow	Mkr-113	113	423372	5085937	-129.988238	45.922728	1525	0235	HFS bag sample bag#14: start 02:35:36 end 02:43:56.Volume=700 mL.	Tmx=19.8 T1= 7.9 T2=12.0	Butterfield	
R551-GTB-2-0016	GAS	98 flow	Mkr-113	113	423372	5085937	-129.988238	45.922728	1525	0244	port gastight bottle #2. Time 0244.	T=19	Evans	Lilley/Butterfield
R551-SS-mat-J6-0017	SS	98 flow	Near Mkr-113	113	423372	5085937	-129.988238	45.922728	1525	0320	Suction into bottle #6 (MAT/BIO?). start 0326 finish 0345. Trying to get blue protozoan mat. (subsamp basalt chips RK)	n/a	Moyer/Juniper	J Chadwick
R551-SS-mat-J7-0018	SS	98 flow	Near Mkr-113	113	423372	5085937	-129.988238	45.922728	1525	0348	Suction jar#7 in same spot. Moving a couple meters away to get more blue mat. start 0348 stop 0408. (MAT - got some BIO too)	n/a	Moyer/Juniper	
R551-HFS-19-0019	HFS	nSRZ	Joystick	42	423341	5085505	-129.988560	45.918840	1537	0554	Begin fluid sample at 0554 into bag #19: Stopping 0601. vol=723 mL.	T1=3.9 T2=3.3 Tmx=4.0	Butterfield	Huber

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R551-SS_bio-J2-0020	SS	nSRZ	Joystick	42	423341	5085505	-129.988560	45.918840	1537	0626	Suction sample into J2. at start 0606 stop at 0625. Tried for a fish but couldn't get it. (BIO?)	n/a	Juniper	
R551-HFS-17-0021	HFS	nSRZ	FeCity	n/a	423300	5085364	-129.989190	45.917540	1535	0703	Fluid Sample Bag #17 with filter: Vol=670 mL. start 07:04:29 end 07:12:11.	T1=9.3 T2=6.8 Tmx=10.1.	Butterfield	Huber/Gendron
R551-HFS-20-0022	HFS	nSRZ	FeCity	n/a	423300	5085364	-129.989190	45.917540	1535	0712	HFS Gas Piston #20: start 07:13:03 end 07:14:25. Volume=144 mL.	T1=10 T2=7.6 Tmx=10.3.	Evans	
R551-SS-bio-J1-0023	SS	nSRZ	FeCity	n/a	423300	5085364	-129.989190	45.917540	1535	0712	Suction of nemertean worms (BIO) into Jar#1. Also getting FeO; basalt; and some other worms. start 07:17 stop 07:35.	n/a	Juniper	
R551-HFS-2-0024	HFS	nSRZ	BagCity	36	423271	5088209	-129.989430	45.916170	1535	0810	HFS XRF filter #2: start 08:16:51 stop 08:19:35. vol =500 mL.	T1=9 T2=14.8 Tmx=19.1.	Gendron	
R551-HFS-5-0025	GAS	nSRZ	BagCity	36	423271	5088209	-129.989430	45.916170	1535	0820	HFS gas piston #5: start 08:20:59 stop 08:21:57. vol=101 mL.	T1=19.1 T2=14.1 Tmx=19.3	Evans	Butterfield/ Lilley
R551-HFS-7-0026	HFS	nSRZ	BagCity	36	423271	5088209	-129.989430	45.916170	1535	0822	HFS FISH filter #7: start 8:22:45 stop 08:32:38. vol=1 liter.	T1=18.9 T2=14.5 Tmx=19.2.	Huber	
R551-HFS-13-0027	HFS	nSRZ	BagCity	36	423271	5088209	-129.989430	45.916170	1535	0833	HFS Filter set 2 DNAs #13: start 08:33:36 stop 08:42:32. vol=1 liter.	T1=18.9 T2=14.4 Tmx=19.2	Huber	
R551-HFS-18-0028	HFS	nSRZ	BagCity	36	423271	5088209	-129.989430	45.916170	1535	0840	HFS Bag #18: start 08:44:08 stop 08:50:15. vol=700 mL.	T1=18.9 T2=14.3 Tmx=19.2.	Butterfield	Larson/Huber/Mehta
R551-HFS-22-0029	HFS	nSRZ	BagCity	36	423271	5088209	-129.989430	45.916170	1535	0850	HFS piston #22: start 08:51:00 stop 08:4:42. vol=700 mL.	T1=18.7 T2=14.3 Tmx=19.0	Butterfield	Larson/Huber/Mehta
R551-McLane-0030	MP	nSRZ	BagCity	36	423271	5088209	-129.989430	45.916170	1531	0933	McLane pump stopped at 8:56:46. 403 liters pumped.	n/a	Metaxas/Tunnicliffe	
R551-HFS-16-0031	HFS	nSRZ	Coquille	n/a	422991	5085365	-129.993060	45.917530	1536	0950	HFS bag #16: start 9:50:25 end suction at 9:56:42. Volume=700 mL.	T1=31.0 T2=20.8 Tmx=32.0	Butterfield	
R551-HFS-21-0032	HFS	nSRZ	Coquille	n/a	422991	5085365	-129.993060	45.917530	1536	0957	HFS filter #21 for XRF analyses: 0957 start end suction 1001. Volume=500 mL.	T1=31.8 T2=21.3 Tmx=31.8	Gendron	
R551-HFS-23-0033	GAS	nSRZ	Coquille	n/a	422991	5085365	-129.993060	45.917530	1536	1003	HFS for gas piston #23: volume=112 mL. start at 10:02 end at 10:03.	T1=30.7 T2=20.9 Tmx=30.9	Evans	Butterfield/Lilley
R551-RK-0034	RK	nSRZ	Coquille	n/a	422991	5085365	-129.993060	45.917530	1533	1052	Picked up rock sample (Rk) from floor of glassy basalt.	n/a	J Chadwick	
R550											**7/11/00**			
R550-McLane-0001	MP	nSRZ	BagCity area	n/a	423271	5085209	-129.989430	45.916	1519	0228	2:23 McLane pump started @ 6 L/min during Imagenex Line BC16. Goal is a ~400 liter sample. (position given is only 1 fix)	n/a	Metaxas/Tunnicliffe	
R549											**7/10/00**			
R549-BT-44-0001	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0837	Bacterial Trap #44 from Mkr-33 into port side of biobox. (Depl R543)	n/a	Moyer	
R549-BT-46-0002	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	0842	Bacterial trap #46 into port side of biobox. (Depl R543)	n/a	Moyer	
R549-BT-48-003	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933	1523	1014	Bacterial trap #48 into port side of biobox from Cloud N4. (Depl R543)	n/a	Moyer	
R549-BT-47-004	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933	1523	1015	Bacterial trap #47 into port side of biobox from Cloud N4. (Depl R543)	n/a	Moyer	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R549-TWG-0005	TWG	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	1045	Tube Worm grab at Cloud Mkr-21 into starboard side of biobox	n/a	Marcus	
R549-SS-fl-J4-0006	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	1100	Suction Sample (FLUID) Jar #4. Start suction 11:00 for water sample. End suction at 11:05.	n/a	Butterfield	
R549-SS-fl/mat-J3-0007	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	1109	Suction Sample Jar #3. Start suction at 11:10 for water plus bacterial mat (FLUID/MAT) . End suction at 11:16.	n/a	Moyer	
R549-SS-bio-J1-0008	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	1119	Start suction (BIO) for Juniper at 11:17 for little animals. End suction at 11:21.	n/a	Juniper	Marcus
R549-SS-bio-J2-0009	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	1124	Start suction (BIO) at 11:25 for semi-peripheral fauna. End at 11:32. This site had a high abundance of scale worms.	n/a	Marcus/Tunnicliffe	
R549-McLane-0010	MP	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	1143	Start of McLane pump at 11:44 for (WATER) sample during video survey. Pump off 12:48.	n/a	Metaxas	
R549-Bio-0011	BIO	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933	1523	1258	Suction vent fish (BIO) off the seafloor. Can't unclog the line so will attempt to leave it in the line. At 13:24 line unclogged and fish put into jar#8.	n/a	Juniper	Tunnicliffe
R549-RK/bio-0012	BIO	98 flow	Snail	N8	423877	5087088	-129.981900	45.933	1524	1358	Picked up rock samples coated with organisms. (BIO and RK)	n/a	Marcus/Tunnicliffe	J Chadwick
R549-SS-FeO-J2-0013	SS	98 flow	Snail	n/a	423882	5087073	-129.981844	45.933	1524	1418	Suction sample of FeO. Start 14:20 end 14:26. (subsample basalt RK). Location - 10m S of Snail	n/a	Kennedy	J Chadwick
R549-SS-bio-J5-0014	SS	98 flow	Mkr-108	108	423784	5086589	-129.983033	45.928650	1524	1537	Suction sample of BIO (limpets worms) Started 15:36 Ended 15:42. (subsample basalt chips RK)	n/a	Marcus	J Chadwick
R549-SS-bio-J1-0015	SS	98 flow	Mkr-108	108	423784	5086589	-129.983033	45.928650	1524	1542	Suction sample: BIO. Started: 15:48 Ended: 15:51	n/a	Juniper	
R549-RK/bio-0016	BIO	98 flow	Mkr-108	108	423784	5086589	-129.983033	45.928650	1524	1554	ROCK with a blue mat. Some limpets and worms (BIO) too. Will carry up in arm.	n/a	Tunnicliffe/J Chadwick	
R549-McLane-0017	MP	98 flow	Cloud	n/a	423904	5087110	-129.981560	45.933	1524	1721	Vol=330 liters. Pumped fluid during video survey at Cloud. (position given is only 1 fix)	n/a	Tunnicliffe/Metaxas	
R548											**7/9 - 7/10 2000**			
R548-SS-FeO-J1-0001	SS	98 flow	Magnesia	67	423661	5088545	-129.984933	45.946233	1531	1229	Start 12:28 for FeO. Appears fluffy - looks like last years bacterial flock is now covered with FeO. End 12:31. (Rock chips subsample)	n/a	Fortin	J Chadwick
R548-TWG-0002	TWG	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	2143	Tube worm grab near the base of Mkr-36. In port biobox. (Microbial mat and basalt chip sub samples)	n/a	Tunnicliffe/Marcus	Moyer/J Chadwick
R548-MTR-3049-0003	MTR	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	2155	recovering MTR #3049 (depl '99)	n/a	Embley	
R548-SS-ptl-J2-0004	SS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1535	2211	Suction Jar#2 near base of where TWG was taken. Filter #4 - 1.0 uM (PARTICULATES) start 2211 end 2226.	n/a	Juniper	
R548-SS-mat-J3-0005	SS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1535	2227	Suction Jar#3 Same spot as previous sample for MICROBIAL MAT. Start 2226 end 2236.	n/a	Moyer	
R548-SS-bio-J4-0006	SS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	2245	Suction peripheral fauna around tubeworms (BIO). Start suction into jar#4 22:46 end 22:52.	n/a	Tunnicliffe/Marcus	
R548-SS-mat/rk-J5-0007	SS	nSRZ	FeCity	n/a	423291	5085361	-129.989190	45.917540	1535	0115	orange MICROBIAL MAT and BASALT CHIPS into jar#5. Start 0111 end 0130.	n/a	Juniper	J Chadwick

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R548-TWG-0008	TWG	nSRZ	Joystick	42	423342	5085505	-129.988563	45.918838	1538	0206	tube worm grab delivered to stbd biobox. Scale worm new species in grab - 1 vestimentiferan (sp?)	n/a	Marcos	Juniper
R548-RK-0009	RK	nSRZ	Joystick	42	423342	5085505	-129.988563	45.918838	1538	0219	Wormy basalt glass grab to stbd Biobox (Rock and Bio)	n/a	J Chadwick	Tunnicliffe
R548-SS-bio-J6-0010	SS	nSRZ	Joystick	42	423342	5085505	-129.988563	45.918838	1538	0226	suction the limpet among the tubeworms (BIO) into jar#6. Start 0226 end 0236.	n/a	Marcus	J Chadwick
R548-SS-bio-J7-0011	SS	nSRZ	Joystick	42	423342	5085505	-129.988563	45.918838	1538	0236	suction bottle#7 peripheral fauna and mat in and around tubeworms (BIO and MAT)	n/a	Juniper	
R548-RK-0012	RK	nSRZ	Joystick	42	423342	5085505	-129.988563	45.918838	1538	0248	Basalt into stbd bio box	n/a	J Chadwick	
R548-McLane-0013	MP	nSRZ	BagCity area	n/a	423272	5085209	-129.989425	45.916167	n/a	0500	McLane pump. 118 liters fluid. Start BagCity turned off intermittently. Stop Joystick. Sampled BagCity; FeCity; Joystick areas. (position given is only 1 fix)	n/a	Metaxas/Tunnicliffe	
R547											**7/8- 7/9 2000**			
R547-HFS-4-0001	GAS	98 flow - E edge	OldWorms	n/a	423785	5088418	-129.983308	45.945105	1525	0746	Fluid sampler: gas piston Start 07:50 Stop 07:51. Vol filtered 150 mL.	T1=7.5 T2=5.9 Tmx=8	Evans	Butterfield/Lilley
R547-HFS-8-0002	HFS	98 flow - E edge	OldWorms	n/a	423785	5088418	-129.983308	45.945105	1525	0753	Sample unfiltered fluid (bag). Start 07:54:14; Stop 07:57. Restart 07:57:43; Stop 08:00:25. Vol=700ml. White floc in crack.	T1=6.1 T2=5.4 Tmx=8.1	Butterfield/Huber/Mehta/Larson	
R547-HFS-9-0003	HFS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1527	0853	Fluid sampler: unfiltered water (bag 9). Start time: 08:53; Stop time: 09:00. Vol=698ml.	T1=17.0 T2=13.0 Tmx=20.2	Butterfield/Huber/Mehta/ Larson	
R547-HFS-24-0004	GAS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	0900	Fluid sampler: gas piston. Start 09:01 Stop 09:04. Vol 150ml.	T1=18.0 T2=136.0 Tmx=20.2.	Evans	Butterfield/Lilley
R547-HFS-1-0005	HFS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	0905	Fluid sampler: XRF filter. Start 09:06 Stop 09:10. Vol filtered: 500ml.	T1=16.0 T2=2.0 Tmx=18.8	Gendron	
R547-HFS-11-0006	HFS	98 flow - E edge	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	1115	HFS-11 bag filter for chemistry and microbiology. Start 11:16. (A couple meters from N41). End 11:24. Vol=698ml.	T1=12.3 T2=9.0 Tmx=13.2	Gendron/Butterfield/Huber/Larson	
R547-HFS-5-0007	GAS	98 flow - E edge	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	1126	Gas piston#5. Start 11:26. Stop 11:29. Volume=230 mL.	T1=12.0 T2=9.0 Tmx=12.8	Evans	Butterfield/Lilley
R547-SS-ptl-J1-0008	SS	98 flow - E edge	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	1221	Start 12:21. Suction near Mkr-N41 for PARTICULATES only . End 12:33.	T=18-20	Juniper	
R547-SS-ptl-J2-0009	SS	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1245	Suction approx. 0.5m S of NeMO '99 camera for PARTICULATES at active vent. Start 12:44 end 12:59.	n/a	Juniper	
R547-HFS-2-0010	HFS	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1306	13:06-starting HFS in valve 2. filter for XRF. End 13:13. Vol=600ml.	T1=14.4 T2=10.4 Tmx=14.8	Gendron	
R547-HFS-14-0011	HFS	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1314	Start 13:14 for HFS bag#14. End 13:22. Volume=700ml.	T1=14.6 T2=10.1 Tmx=14.7	Butterfield/Huber/Mehta/Larson	
R547-SS-mat-7-0012	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1515	Suction MICROBIAL MAT and BIO (limpets worms) Jar#7. Start 15:21. End 15:32.	n/a	Moyer	J Chadwick
R547-HFS-3-0013	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1545	Fluid sampler: FISH filter. Start 15:47:49 End 15:56:45. Vol filtered=1 liter.	T1=28.0 T2=20.0 Tmx=34.7	Huber	
R547-HFS-6-0014	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1557	Fluid sampler: Lipid filter. Start 15:57 End 16:06. Vol filtered=1 L.	T1=28 T2=20 Tmx=37.9	Huber	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R547-HFS-10-0015	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1606	Fluid sampler: 2 filter DNA. Start 16:07 End 16:16. Vol filtered:=1 L.	T1=25.0 T2=18.5 Tmx=36.8	Huber	
R547-HFS-12-0016	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1616	Fluid sampler: sterivex DNA filter. Start 16:16 End 16:25. Vol=1 L.	T1=28.0 T2=20.0 Tmx=35.2	Mehta	
R547-HFS-15-0017	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1626	Fluid sampler: XRF filter. Start 16:26 End 16:32. Vol filtered=700 mL.	T1=28.0 T2=20.0 Tmx=38.5	Gendron	
R547-HFS-16-0018	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1633	Fluid sampler: unfiltered water (bag). Start 16:33 End 16:40. Vol=700 mL.	T1=25.0 T2=20.0 Tmx=33.4	Butterfield/ Huber/Mehta/Larson	
R547-HFS-20-0019	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1640	Fluid sampler: gas piston. Start 16:45 End 16:47. Vol=150ml	T1=30.0 T2=15.0 Tmx=38.8	Evans	Butterfield/Lilley
R547-HFS-22-0020	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1523	1647	Fluid sampler: piston. Start16:48 End 16:53. Vol=852ml.	T1=27.0 T2=15.0 Tmx=39.0	Butterfield/ Huber/Mehta/Larson	
R547-HFS-19-0021	HFS	98 flow	Snail	N8	423877	5087088	-129.981900	45.933200	1523	1742	Fluid sampler: bag unfiltered water. Start 17:44 End 17:48. Vol=651 mL.	T1=11.8 T2=78.0 Tmx=11.8	Butterfield/ Huber/Mehta/Larson	
R547-SS-bio-J3-0022	SS	98 flow	Snail	N8	423877	5087088	-129.981900	45.933200	1523	1756	Suction sample into Jar 3: BIO. Start time: 17:57 End time: 18:03	n/a	Juniper	
R547-SS-bio-J5-0023	SS	98 flow	Snail	N8	423877	5087088	-129.981900	45.933200	1523	1803	Suction sample into Jar 5: BIO. Start time: 18:06 End time: 18:13	n/a	Marcus	J Chadwick
R547-HFS-7-0024	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	1932	HFS FISH filter #7. Begin 19:32:29; End 19:41:01. Vol=1000 mL.	T1=15.9 T2=11.3 Tmx =15.9	Butterfield ?	
R547-McLane-0025	MP	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	1933	McLane pump 5.7 L/min initial flow rate. Begin time 1933 end time 2022.	n/a	Tunnicliffe /Metaxas	
R547-HFS-13-0026	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1525	1942	HFS 13 for DNA (two filters). Begin 19:42:24 End 19:51:20. Vol=1000 mL.	T1=15.9 T2=11.3 Tmx=15.9	Huber	
R547-HFS-18-0027	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	1952	HFS bag sample. Begin 19:52:16 End 19:59:04. Vol=700 mL.	T1=15.7 T2=11.2 Tmx=15.9	Butterfield/ Huber	
R547-HFS-21-0028	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	2001	XRF filter Begin 20:00:45 End 20:04:21. Vol=400 mL.	T1=15.8 T2=11.5 Tmx=15.9	Gendron	
R547-HFS-23-0029	GAS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	2006	Gas piston 23. Begin 20:05:28 end 20:07:46. Vol=250 mL.	T1 =15.8 T2=11.4 Tmx=15.9	Evans	Butterfield/Lilley
R547-GTB-0030	GAS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	2006	20:05:05 Starboard Gas Tight Bottle #7 (GTB)	n/a	Evans	Butterfield/Lilley
R547-SS-bio-J4-0031	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	2054	Suction scale worms (BIO). 20:55 begin suction. End 21:06. Also basalt chips (Rk)	n/a	Marcus/J Chadwick	Juniper
R547-SS-ptl-J6-0032	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	2124	Suction sampling for PARTICULATES at about 1/3 pump. Begin 21:24 End 21:33.	n/a	Juniper	
R547-HFS-17-0033	HFS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1520	2310	Anhydrite bag sample with filter #17. Begin 23:10:04 End 23:12:20. Vol=250ml.	T1=272.2 T2=150.0 Tmx=272.6	Butterfield	
R547-GTB-0034	GAS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1520	2312	port gastight bottle #6. Anhydrite.	T=272.6	Evans	Butterfield/Lilley
R547-SS-Rk-J8-0035	SS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1520	2320	Anhydrite base minerals to flushing bottle. (Basalt subsample)	n/a	Fortin	Butterfield/J Chadwick
R547-SF-0036	SF	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1520	2342	SULFIDE chimney sample from very near anhydrite.	n/a	Fortin	Juniper/Tunnicliffe

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R547-Rk-0037	RK	98 flow - E edge	NE of Castle	n/a	423974	5086299	-129.980530	45.926	1521	0007	Old basalt chunk (Rk).	n/a	J Chadwick	Fortin/Tunnicliffe
R546											**7/6 - 7/7 2000**			
R546-SS-sed-J3-0001	SS	SRZ	S Pillow Mound	bmrk-66	422089	5079332	-130.003710	45.863150	1723	2203	2212 Suction Jar 3 PELAGIC SEDIMENT at Bmrk-66 - Fissure.	n/a	Juniper/Tunnicliffe	
R546-SS-rk-J2-0002	SS	SRZ	S Pillow Mound	bmrk-66	422089	5079332	-130.003710	45.863150	1723	2203	2217 Suction sample flush into jar 2 basalt chips (Rk) at Bmrk-66 Fissure.	n/a	J Chadwick	
R546-net-0003	net	SRZ	S Pillow Mound	bmrk-66	422089	5079332	-130.003710	45.863150	1722	1341	Back on bottom at Bmrk-66. Stow plankton net in port biobox. (position given is only 1 fix)	n/a	Tunnicliffe/Metaxas	
R546-McLane-004	MP	SRZ	S Pillow Mound	bmrk-66	422089	5079332	-130.003710	45.863150	1723	1416	McLane pump. Volume=? Pumping at 7 liters/minute. (position given is only 1 fix)	n/a	Tunnicliffe/Metaxas	
R545											**7/6/00**			
R545-BT-45-0001	BT	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0624	0625 RECOVERING bacteria trap 45 put into port side of biobox. (Depl R503)	n/a	Moyer	
R545-SS-bio-J4-0002	SS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0643	Start suction of provaniid snails (BIO) at 0646 into Jar#4. Stop 0652. (Basalt chips sub sample)	n/a	Tunnicliffe	Chadwick
R545-VEMCO-0003	vemco	ASHES	Near Crack	n/a	421424	5087135	-130.013550	45.933	1545	0730	0730 - VEMCO into port biobox- it's not really in flow but surrounded by shimmery flow. (Depl on Alvin dive 3245 in 1998)	n/a	Embley	
R545-BT-27-0004	BT	ASHES	ROPOS	n/a	421386	5087134	-130.014050	45.933283	1547	0851	0852 Bacterial trap #27 port biobox. The traps are very covered in gunk. When we lifted it up two little octopi swam out from under it! (Depl R466)	n/a	Moyer	
R545-BT-28-0005	BT	ASHES	ROPOS	n/a	421386	5087134	-130.014050	45.933283	1547	0901	0902 Recovered bacterial trap #28 or a chunk of basalt? with worms limpets anemones on it. Starboard biobox (BIO RK subsamples) (Depl R466)	n/a	Moyer	Tunnicliffe/J Chadwick
R545-SS-mat-J7-0006	SS	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1547	0923	0924 start suction of BACTERIAL MAT into Jar#7. Ended 0930.	n/a	Moyer	
R545-SS-FeO-J1-0007	SS	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1547	0935	0937 Suction IRON OXIDE (FeO) into Jar#1 It's just a little beehive mound standing by itself; looks like it is laminated. end 0940.	n/a	Fortin	
R545-SS-FeO-J6-0008	SS	ASHES	Fe-Hyde	n/a	421406	5087100	-130.013783	45.932983	1547	1007	1008 Slurp IRON OXIDE (FeO) into jar#6. Start 1021. Stop 1022.	n/a	Moyer/Fortin	
R545-SS-FeO-J2-0009	SS	ASHES	Fe-Hyde	n/a	421406	5087100	-130.013783	45.932983	1547	1036	1037 - Slurp IRON OXIDES (FeO) into jar#2. Started 1040. End 1041.	n/a	Fortin	
R545-SF-0010	SF	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1547	1056	10:59 - oxidized SULFIDE sample.	n/a	Fortin	
R545-SS-mat-J5-0011	SS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1547	1103	Suction orange MICROBIAL MAT at base of Hell vent. Start 11:09 end 11:12.	n/a	Moyer	
R545-SS-FeO-J3-0012	SS	ASHES	Wall of Caldera	n/a	421226	5087206	-130.016120	45.934	1546	1217	Going to take of IRON OXIDE (FeO) at wall of Caldera. Suction began at 12:25 and ended at 12:35.	n/a	Fortin	Moyer
R545-GTB-0013	GAS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.934	1547	1402	14:03 - start of GTB sampling at bottom of Mushroom vent. 14:03.5 end.	n/a	Evans	Lilley/Butterfield
R545-hobo-130-0014	hobo	ASHES	Virgin	n/a	421430	5087174	-130.013480	45.934	1545	1425	RECOVERY of HOBO #130. Vent has been active at least since 1986. (Depl R503)	n/a	Embley	
R545-McLane-0015	MP	ASHES	ASHES	n/a	421430	5087174	-130.013480	45.934	1545	1520	McLane Pump sucked 2714 liters of fluid this dive. (position given is only 1 fix)	n/a	Tunnicliffe/Metaxas	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R544											**7/5/00**			
R544-SS-fl-J1-0001	SS	ASHES	Hell	Hell 1	421372	5087135	-130.014233	45.933300	1544	0908	Suction WATER and PARTICULATES over Hell at a little ledge we're calling Hell 1 into Jar#1. Start 0917 Stop 0926	n/a	Juniper	
R544-SS-bio-J2-0002	SS	ASHES	Hell	Hell 1	421372	5087135	-130.014233	45.933300	1544	0924	Suction worms (BIO) at Hell 1 into Jar2. Suction began at 0927 ends 0934.	n/a	Juniper	
R544-RK-0003	RK	ASHES	Hell	Hell 2	421372	5087135	-130.014233	45.933300	1544	0943	Piece/rubble of a flange with worms etc. from Hell 2; into port biobox. taken at 0945.	n/a	Juniper	
R544-SS-fl-J3-0004	SS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1105	11:09- sample (SUSPENDED PARTICULATES) into jar 3. (New porkchop 1 or 2?) time 1059 - 1105	n/a	Juniper	
R544-SS-bio-J4-0005	SS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1114	11:19 thru 11:20? - sample (SULFIDE WORMS - BIO) From another focused site of venting at New Porkchop 1 and 3.	n/a	Juniper	
R544-SS-bio-J5-0006	SS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1117	11:22-11:29 New Prkchop2. Suction Sample (SULFIDE WORM - BIO).	n/a	Juniper	
R544-SF-0007	SF	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1136	11:38- arm has picked up piece of vent chimney (SULFIDE). New Porkchop - at the top.	n/a	Juniper	
R544-SS-bio-J6-0008	SS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	1311	13:13-13:21 Suction Sample (SULFIDE WORM - BIO) into jar #6 where spider probe was taken. Mushroom 2	n/a	Juniper	
R544-BT-29-0009	BT	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	1324	13:30-RECOVER bacterial trap#29 which are heavily encrusted with organisms. (Depl R471)	n/a	Moyer	
R544-BT-30-0010	BT	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	1326	13:32-RECOVER 2 of 3 bacterial traps. (Depl R471)	n/a	Moyer	
R544-BT-31-0011	BT	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	1335	13:34-RECOVER bacterial trap 3 of 3. 13:36 frame grab. bacterial traps with loads 'o organisms encrusted. (Depl R471)	n/a	Moyer	
R544-GTB-0012	GAS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	1340	13:43-took two gas tight bottles (GTB) at spider probe location.	n/a	Evans	Butterfield/Lilley
R544-GTB-0013	GAS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	1340	13:43-took two gas tight bottles (GTB) at spider probe location.	n/a	Evans	Butterfield/Lilley
R544-SS-bio-J7-0014	SS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	1411	14:13-14:21 Suction Sample (SULFIDE WORM - BIO) in location of spider probe data.	n/a	Juniper	
R543											**7/4/00**			
R543-osmo-0001	osmo	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0600	Green and copper osmosampler (green tape) into elevator. Probably the "gas-osmo". (Depl R483)	n/a	Moyer for Wheat	
R543-osmo-0002	osmo	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0622	Bioosmosampler placed in elevator. The "bio" osmo. (Depl R491)	n/a	Moyer for Wheat	
R543-osmo-0003	osmo	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0651	Put osmoanalyzer into elevator. (Depl R495)	n/a	Moyer for Wheat	
R543-SS-fl-J6-0004	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0716	0721 Slow suction on bottle #6 (202 uM). At the big crack pumping for FLUID.	T=10-11	Huber/Mehta	
R543-SS-bio-J5-0005	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0730	0733 Sucking into Bottle #5 (202 uM). BIO sample. Sucking in the crack where there are lots of limpets; mat; worms; etc.	n/a	Moyer	Marcus

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R543-BT-41-0006	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0757	0759 Picking up Bacterial Trap #41 and putting into port biobox. (Depl R484)	n/a	Moyer	Marcus/Juniper
R543-BT-42-0007	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0758	0800 Placing Bacterial Trap #42 into port side of biobox. (Depl R484)	n/a	Moyer	Marcus/Juniper
R543-SS-bio-J3-0008	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0803	0806 Sucking into Jar #3 (225 uM). BIO: worms; limpets; etc	n/a	Marcus	
R543-SS-bio-01-0009	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0811	0813 Suction sample into Jar #1 (200 uM) for more critters (BIO)	n/a	Juniper	
R543-GTB-0010	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0824	0825 Triggered port side gas tight (#2) in same area where worms were suctioned and MTR's were deployed.	n/a	Evans	Butterfield/Lilley
R543-TWG-0011	TWG	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	0855	0857 Tube worm grab into portable biobox A.	n/a	Marcus	
R543-GTB-0012	GAS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1526	1016	1018 Firing starboard gas tight bottle at Mkr-N6 (the pit).	n/a	Evans	Butterfield/Lilley
R543-SS-fl-J7-0013	SS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1526	1020	1023 Starting to pump into Jar #7 for FLUID over Mkr-N6 (the pit).	n/a	Huber/Mehta	
R543-Vemco-1108-0014	vemco	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1526	1047	Mkr-21 with MTR/VEMCO attached to it recovered. VEMCO#1108 recovered (Depl R491). (marker stayed in place). (	n/a	Embley	
R543-MTR-3157-0015	MTR	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1527	1107	11:10-MTR #3157 recovered by ripping apart rope (attached to Vemco). FeSulfide slime sub-sample. (Depl R491)	n/a	Embley	Fortin
R543-SS-mat-J4-0016	SS	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1525	1136	11:38-Suction sample bacterial floc (MAT). Some bio probably in there too. (ROCK subsample)	n/a	Moyer	J Chadwick
R543-MTR-3175-0017	MTR	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1250	12:51-Recovery of MTR 3175 and putting it into biobox. (Depl R491)	n/a	Embley	
R543-TWG-0018	TWG	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1255	12:58-Tube worm grab at Nascent placed in portabox.	n/a	Tunnicliffe/Marcus	Juniper
R543-TWG-0019	TWG	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	1355	13:57-Tube worm grab at Mkr-N41.	n/a	Tunnicliffe/Marcus	Juniper
R543-MTR-3041-0020	MTR	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1519	1406	14:09-Recovery of MTR-3041 at marker N41. (Depl R491)	n/a	Embley	
R543-TLC-0021	TLC	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1520	1449	14:51- retrieving Time Lapse Camera after one year deployment. BIO - animals on frame to Juniper. (Depl R501)	n/a	Tunnicliffe	Juniper
R542											7/3/00			
R542-BIO-0001	wood	S Cleft	n/a	bmrk-2	392622	4946457	-130.36	44.665	2215	0817	0819 chunk of wood that has been sitting under Bmrk-2 for a year. Into biobox.	n/a	Tunnicliffe	Embley
R542-hobo-33-0002	hobo	S Cleft	Vent1	chmn-284	391831	4945927	-130.364350	44.658560	2209	1214	Hobo probe #133 recovered and placed in the box (Depl Clft'98). FeOxide scrapings subsample.	n/a	WW Chadwick	Fortin
R542-hobo134-0003	hobo	S Cleft	Vent1	chmn-284	391831	4945927	-130.364350	44.658560	2208	1230	HOBO probe #134 recovered and placed into container (Depl Clft'99).	n/a	WW Chadwick	
R542-SF-0004	SF	S Cleft	Vent1	chmn-342	391827	4945923	-130.364388	44.659	2210	1327	Sulfide from Chimney 342 (Vent 1).	n/a	WW Chadwick	
R542-GTB-0005	GAS	S Cleft	Vent1	chmn-342	391827	4945923	-130.364388	44.659	2210	1351	Both gas tight bottles fired in same location as HOBO probe #129 deployment.	n/a	Evans	Butterfield/Lilley

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R542-GTB-0006	GAS	S Cleft	Vent1	chmn-342	391827	4945923	-130.364388	44.659	2210	1353	Both gas tight bottles fired in same location as HOBO probe #129 deployment.	n/a	Evans	Butterfield/Lilley
R542-TWG-0007	TWG	S Cleft	Vent1	chmn-342	391827	4945923	-130.364388	44.659	2210	1419	Tube worm grab at Chimney 342. FeOxide subsamples.	n/a	Tunnicliffe/Marcus	Fortin/Metaxas
R503											**7/13/99**			
R503-BT-0001	BT	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0015	Recovered 2 bactraps (##?) (Depl 1998 R471) - still one there (no sample #2 - mistake-it is R502-0022)		Moyer	
R503-hobo-0003	hobo	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	0032	Recovered HOBO 129 deployed on Alvin Dive 3245 in 1998		Embley	
R502											**7/12/99**			
R502-HFS-5-dfl-0001	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0241	Gas piston #5	Tmx=22.5	Evans	Butterfield/Lilley
R502-HFS-6-dfl-0002	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0316	0.2um filter for FISH - pump shut down for 15min in middle of sampling - Vol=1020ml	T1=9 T2=16 Tmx=22	Huber	
R502-HFS-7_dlf-0003	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0327	Sterivex DNA filter #7- Vol=1450ml	Tmx=20.2 T2=16	Moyer	
R502-HFS-13-dfl-0004	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0328	3 micron + sterivex filters for DNA. Vol=1029mL	Tmx=23.5	Huber	
R502-HFS-15-dfl-0005	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0349	0.45 micron lipid filter #15 for DNA Vol=1426 mL	Tmx=24	Huber	
R502-HFS-22-dfl-0006	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0356	Gas piston #22 - Vol=640ml	Tmx=22.3	Butterfield/Huber/Graham	
R502-SS-j4_bio-0007	SS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0400	Slurp sample for palm worms et al - also for fluid	n/a	Juniper/Levesque	
R502-MTR-0008	MTR	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0430	Recover MTR (Depl R471)	n/a	Embley	
R502-HFS-24-htfl-0009	GAS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0435	Gas piston#24.	Tmx=74.3	Evans	Butterfield/Lilley
R502-HFS-21-htfl-0010	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0445	Lipid filter #21 - Vol=1200 mL	Tmx=74.4	Huber	
R502-HFS-12-htfl-0011	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0455	3 micron + sterivex filters for DNA - 1000 mL	Tmx+75.8	Huber	
R502-HFS-9-htfl-0012	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0509	Bag with POC filter #9 - 599 mL	Tmx =73.6	Butterfield	
R502-HFS-4-htfl-0013	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0510	Piston sample #4 - 601 mL	Tmx=71.8	Butterfield/Huber/Graham	
R502-HFS-1-htfl-0014	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	0515	FISH filter #1 - 1000 mL	Tmx=80.7	Huber	
R502-SS-j3_bio-0015	SS	ASHES	Marshmallow	I	421420	5087179	-130.013617	45.933700	1547	0527	Suction sample of fauna (tubes and snails) - fluid	n/a	Marcus	
R502-GTB-7-htfl-0016	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	0600	Stbd. gastight	Tmx=306	Evans	Butterfield/Lilley
R502-HFS-18-htfl-0017	HFS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	0602	Bag #18 with filter	Tmx=309 T2=145	Butterfield/Graham	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R502-HFS-14-htfl-0018	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	0654	Bag #14 with 0.45 filter - Vol=406 mL	Tmx=289.9	Butterfield/Graham	
R502-HFS-16-htfl-0019	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	0659	Unfiltered bag #16 - Vol=500 mL	Tmx=293	Butterfield/Graham/Huber	
R502-GTB-2-htfl-0020	GAS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	0708	Port gas tight #2	n/a	Evans	Butterfield/Lilley
R502-HFS-2-htfl-0021	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	0710	0.45 micron filter #2 for XRF - Vol=476 mL	Tmx=289.6	Gendron	
R502-hobo-htfl-0022	hobo	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	0734	Retrieved HOBO 137 deployed on Alvin dive 3245 in '98 - scrapings for Scott	n/a	Embley	Scott
R502-HFS-20-htfl-0023	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0809	Piston #20 - Vol=628 mL	Tmx=89.7	Butterfield/Huber/Graham	
R502-HFS-10-htfl-0024	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0816	Filter #10 for lipids - Vol=1100 mL	Tmx=90	Huber	
R502-niskin-0025	niskin	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0842	Niskin bottle. 1 meter above Hell	n/a	Gendron	
R502-HFS-3-htfl-0026	HFS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0904	0.45 micron filter #3 for XRF - Vol=300 mL	Tmx=294.7	Gendron	
R502-HFS-17-htfl-0027	HFS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0907	Unfiltered bag #17 - Vol=575 mL	Tmx=294.3	Huber	
R502-HFS-19-htfl-0028	HFS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0911	Bag with 0.45 filter. Vol=574 mL	Tmx=293.1	Butterfield/Graham	
R502-HFS-23-htfl-0029	GAS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0916	Gas piston #23 - Tmax=291.9 - 156 mL	n/a	Evans	Butterfield/Lilley
R502-SS-j1-bio-0030	SS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1000	Sulfide worms - (scale worms and copepods?)	n/a	Juniper/Levesque	
R502-SS-j2-bio-0031	SS	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1544	1039	Sulfide worms - palm worms - tube worms	n/a	Juniper/Levesque	
R502-SS-4-bio-0032	SS	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1546	1056	Three anemones - rock - clams	n/a	Juniper/Levesque	
R502-SS-1-FeO-0033	SS	ASHES	n/a	n/a	421395	5087128	-130.0139	45.9332	1545	1131	Fe Oxide from mounds - (15 m south of Medusa) - BAD NAV	n/a	Scott	
R502-SS-4-sf-0034	SS	ASHES	n/a	n/a	421395	5087128	-130.0139	45.9332	1545	1155	Greyish white mat - small chunks of anhydrite Fe. (15 m south of Medusa)	n/a	Scott	Perfit
R502-HFS-11-dfl-0035	HFS	ASHES	n/a	n/a	421287	5087152	-130.0153	45.9334	1543	1315	Bag #11 with filter - no valve; - Tmax=6.2 - 601 mL (west wall)	n/a	Huber	
R502-SS-2-FeO-dfl-0036	SS	ASHES	n/a	n/a	421287	5087152	-130.0153	45.9334	1543	1323	Iron oxides and bacteria (west wall)	n/a	Scott	
R502-SS-3-FeO-dfl-0037	SS	ASHES	n/a	n/a	421287	5087152	-130.0153	45.9334	1543	1336	Same sample as previous - bottle was contaminated by previous sample (west wall)	n/a	Scott	
R502-hobo-0038	hobo	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1408	Collected hobo deployed 1998 on osmo?	n/a	Moyer	
R501											**7/10 - 7/11 1999**			

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R501-SS-1-mat-0001	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2340	Bacterial mat from venting crack. Piece of basalt subsamp that jammed the carousel	n/a	Moyer/Lynch	Scott
R501-SS-j3-RK-0002	RK	nSRZ	n/a	n/a	423050	5085709	-129.9924	45.9206	1533	0537	Slurp of glass from intermediate? age top of pillow	n/a	Perfit	Scott
R501-SS-j7-RK-0003	RK	nSRZ	n/a	n/a	423126	5085715	-129.9914	45.9207	1530	0555	Younger of two flows at contact - small tube/toe in lobates - couldn't do a grab so have to slurp	n/a	Perfit	
R501-RK-0004	RK	nSRZ	n/a	n/a	423238	5085670	-129.9899	45.9203	1531	0632	Intermediate flow? - near the collapse in some broken lobes - blocky chunk with good layer of glass	n/a	Perfit	
R501-RK-0005	RK	nSRZ	n/a	n/a	423411	5085680	-129.9877	45.9204	1530	0701	Sample from crust of hollowed lobe - stubby with thin glass and angular edges - age hard to tell - 98 flow? from new flow	n/a	Perfit	
R501-SS-j8-RK-0006	RK	nSRZ	n/a	n/a	423492	5085695	-129.9867	45.9206	1530	0725	Glass from lineated sheet flow. intermediate age (?)	n/a	Perfit	
R501-RK-0007	RK	nSRZ	n/a	n/a	423865	5085668	-129.9818	45.9204	1531	0815	Slab of rock from shallow collapse jumbled area	n/a	Perfit	
R501-RK-0008	RK	nSRZ	n/a	n/a	424183	5085645	-129.9777	45.9202	1533	0948	Chunk of lava from old flow - small; glassy	n/a	Perfit	
R501-SS-4-RK-0009	RK	nSRZ	n/a	n/a	424188	5085637	-129.9777	45.9201	1533	1008	Little pieces of basalt glass from newer flow	n/a	Perfit	
R501-RK-0010	RK	nSRZ	n/a	n/a	423831	5086069	-129.9823	45.9240	1529	1129	Big plates (2) of mat covered ropey sheets	n/a	Perfit	
R501-SS-j4-mat-0011	SS	nSRZ	n/a	n/a	423837	5086063	-129.9823	45.9239	1529	1135	Mat on rocks - same spot as last rock sample	n/a	Juniper	
R501-RK-0012	RK	nSRZ	n/a	n/a	423427	5086072	-129.9876	45.9240	1521	1233	Lava from chaotic collapse area- older with sponges	n/a	Perfit	
R501-RK-0013	RK	nSRZ	n/a	n/a	423348	5086075	-129.9886	45.9240	1524	1245	Contact area - black glassy newer lava - black striped corer	n/a	Perfit	
R501-RK-0014	RK	nSRZ	n/a	n/a	423348	5086075	-129.9886	45.9240	1523	1305	Contact area - more sediment and brittle stars - yellow striped corer	n/a	Perfit	
R501-niskin-0015	niskin	nSRZ	n/a	n/a	423348	5086075	-129.9886	45.9240	1524	1318	Niskin sample at contact	n/a	Juniper	
R501-RK-0016	RK	nSRZ	n/a	n/a	423065	5086078	-129.9922	45.9240	1524	1345	Older? lava with sponges and more sediments - purple core	n/a	Perfit	
R501-TWG-0017	TWG	nSRZ	Crevice	n/a	423177	5084629	-129.9905	45.9109	1538	1557	Tube worm grab within hole near crevice -diffuse venting.	n/a	Tsurumi	
R500											**7/10/99**			
R500-HFS-9_dfl-0001	HFS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0047	Bag #9 with POC filter - isothermal flow under tube worms - Vol=600 mL	T1=9.5 T2=7.5 Tmx=9.7	Butterfield	
R500-HFS-17-dfl-0002	HFS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0059	Bag #17 unfiltered - no valve - 700 mL	Tmx=9.8	Butterfield/ Huber/Graham	
R500-HFS-23-dfl-0003	GAS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0106	Gas piston #23	Tmx=9.8	Evans	Butterfield/Lilley
R500-SS-j3_dfl-0004	SS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0128	64 micron mesh - Larval collection over old tube worm bush	n/a	Tunnicliffe	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R500-SS-j1-bio-0005	SS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0150	100 micron mesh - Small animal and biofilm sample in old tube worm bush	n/a	Levesque/ Charpentier	
R500-SS-j2_bio-0006	SS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0220	Clams and other fauna	n/a	Levesque/ Charpentier	Perfit
R500-HFS-19-dfl-0007	HFS	98 flow - E edge	n/a	n/a	423904	5087423	-129.9816	45.9362	1521	0548	Bag #19 with 0.45 uM XRF filter (will analyze small particles on filter with STEM) - Vol=602 mL	Tmx=4.8 Tinlet=4.5 Toutlet=4.1	Butterfield/ Gendron/ Graham/Scott	
R500-GTB-6-dfl-0008	GAS	98 flow - E edge	n/a	n/a	423904	5087423	-129.9816	45.9362	1518	0607	Port gastight #6	Tmx=5	Evans	Butterfield/Lilley
R500-HFS-16-dfl-0009	HFS	98 flow - E edge	near N41	n/a	423911	5087391	-129.9815	45.9359	1521	0622	Bag #16 unfiltered - no valve - Vol=600 mL (15m S of N41)	Tmx=25.9	Butterfield/ Huber/Graham	
R500-GTB-7-dfl-0010	GAS	98 flow - E edge	near N41	n/a	423911	5087391	-129.9815	45.9359	1521	0630	Stbd gastight #7 (15m S of N41)	Tmx=26	Evans	Butterfield/Lilley
R500-HFS-11-dfl-0011	HFS	98 flow - E edge	near N41	n/a	423911	5087391	-129.9815	45.9359	1521	0643	Bag #11 with 0.45 uM filter - no valve - 620 mL (15m S of N41)	Tmx=22.7 Texit=14	Butterfield	
R500-HFS-10-dfl-0012	HFS	98 flow - E edge	near N41	n/a	423911	5087391	-129.9815	45.9359	1521	0650	Filter #10 for lipids - Vol=1 liter. (15m S of N41)	Tmx=24.4	Huber	
R500-HFS-13-dfl-0013	HFS	98 flow - E edge	near N41	n/a	423911	5087391	-129.9815	45.9359	1521	0700	Filter #13 - 3 uM and sterivex for DNA - vol=1200ml. (15m S of N41)	Tmx=24.2	Huber	
R500-HFS-4-dfl-0014	HFS	98 flow	n/a	n/a	423918	5087310	-129.9814	45.9352	1520	0805	Piston #4 - 600 mL	Tmx=11.3	Butterfield/ Huber/Graham	
R500-HFS-6-dfl-0015	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	0926	Filter #6 - 0.2 uM for FISH - 1 liter	Tmx=19.9	Huber	
R500-HFS-12-dfl-0016	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	0936	Filter #12 - 3 uM sterivex for DNA - 1005 mL	Tmx=20	Huber	
R500-HFS-15-dfl-0017	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	0947	Filter #15 for lipids - 1002 mL	Tmx=19.9	Huber	
R500-HFS-20-dfl-0018	HFS	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	0958	Piston #20 - 675 mL	Tmx=19.9	Butterfield/ Huber/Graham	
R500-niskin-dfl-0019	niskin	98 flow	Cloud	N6/21	423901	5087116	-129.981600	45.933400	1524	1022	Niskin bottle over the hole at Mkr-N6	n/a	Gendron	
R500-HFS-1_dfl-0020	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1224	Filter #1 for FISH - 1 liter	Tmx=75.5 T2=43	Huber	
R500-HFS-2_dfl-0021	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1234	Filter #2 for XRF - 500 mL	Tmx=77.5	Gendron	
R500-HFS-7_dfl-0022	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1240	Filter #7 - sterivex for DNA.	Tmx=75.7 T1=66 T2=43	Moyer	
R500-HFS-21-dfl-0023	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1258	Filter #21 for lipids - 1200 mL	Tmx=73.2	Huber	
R500-HFS-22-dfl-0024	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1309	piston #22 for water chemistry - 623 mL	Tmx=74.6	Butterfield/ Huber/Graham	
R500-HFS-14-dfl-0025	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1316	Bag #14 with filter - 525 mL	Tmx=73.5	Butterfield/ Graham	
R499											7/9/99			

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R499-HFS-3_dfl-0001	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	1708	Filter #3 for XRF - 500 mL	Tmx=7.3	Gendron	
R499-HFS-4-dfl-0002	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	1713	Piston #4 - 600 mL	Tmx=7.4	Butterfield/Huber/Graham	
R499-HFS-5-dfl-0003	GAS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	1720	Gas piston #5 - 125 mL	Tmx=7.1	Evans	Butterfield/Lilley
R499-HFS-18-dfl-0004	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	1726	Bag #18 - 613 mL	Tmx=7.3	Butterfield/Graham	
R499-niskin-dfl-0005	niskin	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	1818	Niskin diffuse flow	n/a	Gendron	
R499-HFS-24-dfl-0006	GAS	98 flow - E edge	Old Worms		423785	5088418	-129.983308	45.945105	1524	2020	Gas piston #24 - area of lush growth and good flow - about 150 mL	Tmx=7.8	Evans	Butterfield/Lilley
R498											**7/8 - 7/9 1999**			
R498-Exten-0004	exten	NRZ	n/a	n/a	420732	5096799	-130.0241	46.0202	1597	2342	Recover '98 extensometer E4	n/a	WW Chadwick	
R498-Exten-0002	exten	NRZ	n/a	n/a	421026	5096739	-130.0203	46.0110	1592	0027	Recover '98 extensometer E2	n/a	WW Chadwick	
R498-Exten-0003	exten	NRZ	n/a	n/a	420956	5096745	-130.0212	46.0197	1593	0100	Recover '98 extensometer E3	n/a	WW Chadwick	
R498-Exten-0001	exten	NRZ	n/a	n/a	421203	5096708	-130.0180	46.0194	1591	0145	Recover '98 extensometer E1	n/a	WW Chadwick	
R497											7/8/99			
R497-SS-j3-dfl-0001	SS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	0724	Water sample over palm worms; about 15 m east of fissure - log file 2 (no nav)	T=11-16	Butterfield/Huber/Graham	
R497-SF-0002	SF	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	0932	Little piece of sulfide spire. (no nav)	n/a	Scott	Levesque
R497-SF&Bio-0003	SF	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	0939	Top of sulfide chimney and crab. (no nav)	n/a	Scott	Juniper
R497-SS-j4-dfl-0004	SS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1009	Water sample - log file 3 at Vemco and Maya's tube worm sample site. (no nav)	Tav=21 Tmx=25	Butterfield/Huber/Graham	
R497-GTB-0005	GAS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1022	Gastight -portside. (no nav)	n/a	Evans	Butterfield/Lilley
R497-SF-0006	SF	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1025	Sulfide sample where port gas tight was taken; broke up a lot. (no nav)	n/a	Scott	
R497-vemco-0007	vemco	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1032	VEMCO 98-1113-214 placed in stbd side biobox. (no nav)	n/a	Embley	
R497-SS-j1_bio-0008	SS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1040	Particles over tube worms -log file 4-resumed 10:58 inside tubeworm clump. (no nav)	Tmx=10	Juniper/Levesque	
R497-TWG-0009	TWG	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1050	Tube worm grab (no nav)	n/a	Tsurumi	
R497-SS-1_mat-0010	SS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1122	Suction of mat (no nav)	Tmx=6.1	Moyer	
R497-GTB-0011	GAS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1144	Gas tight bottle near top of chimney. (no nav)	Tspike=28	Evans	Butterfield/Lilley

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R497-SF-0012	SF	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1148	Sulfide sample - lots of tube worms attached. (no nav)	n/a	Scott/Perfit/Levesque	
R497-SS-2-dfl-0013	SS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1213	Fluid sample over lush tubes worms. (no nav)	Tav=26 Tmx=38.5	Butterfield/Huber/Graham	
R497-SS-j2_bio-0014	SS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1230	100 micron mesh over lush tube worms for larvae (suspended particles) - 16 minutes. (no nav)	n/a	Juniper/Levesque	
R497-SS-3-bio-0015	SS	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1253	Small animals and other material from within community of lush tubeworms. (no nav)	n/a	Levesque/Juniper/Marcus/Tsurumi	
R497-hobo-0016	hobo	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1312	Recovery of hobo- Depl R480 '98. (no nav)	n/a	Embley	
R497-niskin-dfl-0017	niskin	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1336	Niskin about 6 inches from top of spire - diffuse flow (no nav)	n/a	Gendron	
R497-SF-0018	SF	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1208	Decimeter piece of sulfide chimney caught in ROPOS - found on recovery. (no nav)	n/a	Scott	
R497-SF-0019	SF	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1312	Sulfide scraped off hobo . Ppt is ~1 mm thick; 50 mm long; OD of probe after sulfide removed is 7 mm; 1 cm of oxide adjacent to sulfide. (no nav)	n/a	Scott	
R497-RK-0020	RK	NRZ	n/a	n/a	420900	5096755	-130.0219	46.0198	1596	1803	Lobate flow top from NRZ in area of extensometers	n/a	Perfit	
R497-SF-dfl-0021	SF	CASM	T&S	n/a	420449	5093355	-130.027168	45.989153	1580	1032	Scraping from Vemco near tubeworm grab R497-10 - appears to be mostly anhydrite. (no nav)	n/a	Scott	
R496											7/7/99			
R496-BT-20-0001	BT	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	0759	Bacteria trap #20 recovered (deployed in 98 - R464)	n/a	Moyer	
R496-BT-21-0002	BT	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	0759	Bacteria Trap #21 recovered (deployed in 98 - R464)	n/a	Moyer	
R496-TWG-0003	TWG	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	0808	Tube worm grab - (total of 3 grabs)	n/a	Marcus	Perfit
R496-Rumble-0004	rumb	98 flow	n/a	n/a	423711	5086763	-129.9840	45.9302	1525	0605	Recovered rumbleometer stuck in the 98 lava flow - Perfit grabbed rock chips from flow.	n/a	Fox	Perfit
R495											7/5/99			
R495-HFS-17-dfl-0001	HFS	98 flow	Mkr-108b	108b	423772	5086608	-129.9832	45.9288	1525	0809	Unfiltered bag #17 - diffuse venting at base of pillar - 500 mL	Tmx=13.6	Butterfield/Huber/Graham	
R495-HFS-5_dfl-0002	GAS	98 flow	Mkr-108b	108b	423772	5086608	-129.9832	45.9288	1525	0816	Gas piston - 125 mL	Tav=13.2	Evans	Butterfield/Lilley
R495-HFS-10-dfl-0003	HFS	98 flow	Mkr-108b	108b	423772	5086608	-129.9832	45.9288	1525	0818	filtered bag for xrf - 0.45 uM - 600 mL	Tmx=13.3	Gendron	
R495-SS-j1-sed-0004	SS	98 flow	near Mkr-108	n/a	423759	5086555	-129.9834	45.9283	1525	0850	Sediment sample of diatom mat near Mkr 108	n/a	Tunnicliffe	
R495-SS-j4-sed-0005	SS	98 flow	near Mkr-108	n/a	423759	5086555	-129.9834	45.9283	1525	0858	Sediment sample of diatom mat near Mkr 108	n/a	Juniper	
R495-HFS-4-htfl-0006	HFS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1016	Piston #4 - 460 mL	T1=274 T2=175 Tmx=275	Butterfield/Huber/Graham	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R495-HFS-2_htfl-0007	HFS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1022	Filtered bag for xrf - 0.45 uM - 507 mL	Tmx=255	Gendron	
R495-HFS-18-htfl-0008	HFS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1031	Filtered bag -0.45 uM - about 375 mL	Tmx=262	Butterfield/Graham	
R495-GTB-htfl-0009	GAS	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1031	Gastight	Tmx=245	Evans	Butterfield/Lilley
R495-niskin-htfl-0010	niskin	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1052	Niskin bottle for xrf	n/a	Gendron	
R495-SF-0011	SF	98 flow - E edge	Castle	n/a	424011	5086311	-129.980057	45.926168	1519	1100	Sulfide chimney spire placed in purse - SAMPLE LOST (purse tore)	n/a	Scott	
R495-FeO-0012	SF	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1519	1126	FeO from top of Flattop placed in purse - SAMPLE LOST (purse tore)	n/a	Scott	
R495-HFS-11-dfl-0013	HFS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1303	Filter bag 11	T2=11.8 Tmx=22.6	Butterfield/Graham	
R495-GTB-dfl-0014	GAS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1313	Gastight	n/a	Evans	Butterfield/Lilley
R495-HFS-16-dfl_R495-15	HFS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1315	Unfiltered bag	T=27	Butterfield/Huber	
R495-SS-1_mat-0016	SS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1329	Sucking mat and bag creatures?	n/a	Moyer	
R495-SS-2_mat-0017	SS	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1332	Sucking mat bag creatures? Hose broke on sampler	n/a	Moyer	
R495-vemco-0018	vemco	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1351	Recovered VEMCO-MTR and tube worms attached	n/a	Embley/Marcus	
R495-HFS-22-dfl-0019	HFS	nSRZ	Joystick	n/a	423342	5085505	-129.988563	45.918838	1532	1503	Piston - 630 mL	Tmx=9.6	Huber/Butterfield/Graham	
R495-HFS-14-dfl-0020	HFS	nSRZ	Joystick	n/a	423342	5085505	-129.988563	45.918838	1532	1511	Bag with filter .45um - collecting sulfur - 643 mL	Tmx=8.7	Butterfield/Graham	
R495-HFS-12-dfl-0021	HFS	nSRZ	Joystick	n/a	423342	5085505	-129.988563	45.918838	1518	1518	3 micron/sterivex filter for DNA - 1500 mL	T=8.5	Huber	
R495-HFS-6_dfl-0022	HFS	nSRZ	Joystick	n/a	423342	5085505	-129.988563	45.918838	1518	1535	0.2 micron filter/FISH -1000 mL	Tmx=9	Huber	
R495-HFS-24-dfl-0023	GAS	nSRZ	Joystick	n/a	423342	5085505	-129.988563	45.918838	1518	1546	Gas piston - 100 mL	Tmx=9.9	Evans	Butterfield/Lilley
R495-HFS-15-dfl-0024	HFS	nSRZ	Joystick	n/a	423342	5085505	-129.988563	45.918838	1518	1549	0.45 micron filter for lipids - 820 mL	Tmx=9.8	Huber	
R495-HFS-3_dfl-0025	HFS	nSRZ	Joystick	n/a	423342	5085505	-129.988563	45.918838	1518	1601	0.45 micron filter of XRF - 570 mL	Tmx=10.1	Gendron	
R495-HFS-19-dfl-0026	HFS	nSRZ	Coquilles		422991	5085365	-129.993058	45.917530	1537	1712	Bag with filter 0.45 microns - 650 mL	Tmx=20.7	Butterfield/Graham	
R495-HFS-20- dfl-0027	HFS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	1817	Piston - 683 mL	T1=22 Tav=22.6 Tmx=23.2	Butterfield/Graham	
R495-HFS-23-dfl-0028	GAS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	1823	Gas piston - 128 mL	Tmx=23.4	Evans	Butterfield/Lilley

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R495-HFS-21-dfl-0029	HFS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	1828	0.45 micron filter for XRF - 500 mL	Tmx=23.3	Gendron	
R495-HFS-13-dfl-0030	HFS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	1830	3 micron/sterivex filter for DNA - 1000 mL	Tmx=23.4	Huber	
R495-HFS-9_dfl-0031	HFS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	1840	Bag with POC filter - 533 mL	Tmx=23.5	Butterfield/ Gendron	
R495-HFS-7_dfl-0032	HFS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	1845	0.45 micron filter for lipids - 1000 mL	Tmx=23.2	Huber	
R495-HFS-1_dfl-0033	HFS	nSRZ	BagCity	36	423272	5085209	-129.989425	45.916167	1534	1856	0.2 uM FISH filter - 1000 mL	Tmx=23.4	Huber	
R495-RK-0034	RK	nSRZ	Crevice	n/a	423175	5084648	-129.990400	45.911100	1538	2135	New flow lobate lava from little collapse - SAMPLE LOST (purse tore)	n/a	Perfit	
R495-SS-j3-FeO-0035	SS	nSRZ	Crevice	n/a	423175	5084648	-129.990400	45.911100	1538	2200	Sediment which is partly composed of some sort of iron oxide - probably basalt glass too	n/a	Scott	Perfit
R495-SS-j2-bio-0036	SS	nSRZ	Crevice	n/a	423175	5084648	-129.990400	45.911100	1538	2216	Small patch of dead tube worms shaken for any other small organisms - FeO among tubes	n/a	Tsurumi	Perfit
R495-SS-04_fl-0037	SS	nSRZ	n/a	n/a	423107	5083994	-129.9913	45.9052	1539	2230	Background water collected while ROPOS coming up - depth 1300m - location is just a guess	n/a	Juniper/Levesque/Charpentier	
R494											7/4/99			
R494-RK-0001	RK	nSRZ	n/a	n/a	422042	5078796	-130.0042	45.8583	1723	0430	Old folded sheets - rock corer (purple)-ship@stern pos	n/a	Perfit	
R494-SS-j2-0002	SS	nSRZ	n/a	n/a	422042	5078796	-130.0042	45.8583	1723	0500	Thin yellowish pelagic or hydrothermal sed on top of lobate; brittle stars; background water; Sample top of lobate near seafan. ship@stern pos	n/a	Juniper	
R494-RK-0003	RK	nSRZ	n/a	n/a	422087	5079221	-130.0037	45.8621	1721	0550	Piece of thick sheet flow slab at fissure - about 10cm wide - reddish staining. ship@stern pos	n/a	Perfit	
R494-RK-0004	RK	nSRZ	n/a	n/a	422056	5079244	-130.0041	45.8624	1724	0615	Rock from bottom of fissure - glassy new flow - end of lava tube - 7 fncn. ship@stern pos	n/a	Perfit	
R494-RK-0005	RK	nSRZ	n/a	n/a	422056	5079244	-130.0041	45.8624	1724	0625	Second rock sample from same spot - glassy new flow -7 fncn. ship@stern pos	n/a	Embley	Perfit
R494-RK-0006	RK	nSRZ	n/a	n/a	422056	5079244	-130.0041	45.8624	1724	0630	Third rock - old slab - small piece of glassy top of sheet flow; rock corer. ship@stern pos	n/a	Perfit	
R494-Bio_4-0007	Bio	nSRZ	n/a	n/a	422455	5080891	-129.9992	45.8772	1702	1051	Crab leg. ship@stern pos	n/a	Juniper	
R494-RK-0008	RK	nSRZ	n/a	n/a	422727	5080994	-129.9958	45.8782	1705	1129	Small piece of new flow at east contact. ship@stern pos	n/a	Perfit	
R494-RK-0009	RK	nSRZ	n/a	n/a	422965	5082238	-129.9929	45.8894	1642	1420	Sample from jumbled new lava - rock corer (black stripes). ship@stern pos	n/a	Perfit	
R493											**7/4/99**			
R493-RK-0001	RK	nSRZ	n/a	n/a	422880	5084908	-129.9944	45.9134	1541	0738	Few pieces of old lava at contact - rock corer -ContactW5	n/a	Perfit	
R493-RK-0002	RK	nSRZ	n/a	n/a	422899	5084917	-129.9942	45.9135	1540	0757	piece of drip structure - new lava flow - 7 function arm	n/a	Perfit	
R492											**7/2/99**			

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R492-SS-j1-bio- -0001	SS	nSRZ	Joystick	42	423661	5088545	-129.984933	45.946233	1534	1351	Tube worms - bag creatures - nemertean? - and other fauna on a rock	n/a	Marcus	
R492-RK-0002	RK	nSRZ	Joystick	42	423661	5088545	-129.984933	45.946233	1534	1450	Orange oxidized rock - few meters SW of Mkr-42 - rock corer	n/a	Perfit	
R492-SS-6_mat-0003	SS	nSRZ	Joystick	42	423661	5088545	-129.984933	45.946233	1534	1504	Bacterial mat and bag creatures	n/a	Moyer	
R492-SS-8_mat-0004	SS	nSRZ	Joystick	42	423661	5088545	-129.984933	45.946233	1534	1524	Suction of white filamentous material off rock	n/a	Moyer	
R492-SS-7_bio-0005	SS	nSRZ	Coquilles	n/a	422991	5085365	-129.993058	45.917530	1537	1648	Clams - holothurians - background fauna	n/a	Levesque	
R492-TWG-0006	TWG	nSRZ	Coquilles	n/a	422991	5085365	-129.993058	45.917530	1537	1728	Tube worm bush containing lots of other organisms	n/a	Levesque	
R492-SS-j4_bio-0007	SS	nSRZ	Coquilles	n/a	422991	5085365	-129.993058	45.917530	1536	1746	Sample in middle of tube worm bush for small animals	n/a	Levesque	
R492-RK-0008	RK	nSRZ	near Dying	n/a	423080	5085277	-129.9919	45.9168	1535	1836	New lobate flow sample at contact - 7 function arm	n/a	Perfit	
R492-RK-0009	RK	nSRZ	near Dying	n/a	423080	5085277	-129.9919	45.9168	1535	1843	Old flow sample at same contact point - rock corer	n/a	Perfit	
R492-TWG-0010	TWG	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1534	1949	Tube worm grab	n/a	Marcus	McHugh
R492-GTB-2-dfl-0011	GAS	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1535	2013	Gastight at site where tube worms were sampled	n/a	Evans	Butterfield/Lilley
R492-SS-j3_dfl-0012	SS	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1535	2017	Suction diffuse flow - same site	T=22	Butterfield	Huber
R492-SS-4_FeO-0013	SS	nSRZ	Bag City	n/a	423272	5085209	-129.989425	45.916167	1535	2030	Iron oxides (red) sample in flush bottle	n/a	Scott	
R492-RK-0014	RK	nSRZ	Bag City area	n/a	423281	5085209	-129.9893	45.9162	1539	2128	Lava rubble on old flow in area of old and new lava - over 200m SE of Bag City -rock corer	n/a	Perfit	
R491											**6/30/99**			
R491-osmo-0001	osmo	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0443	Feosmoanalyzer#1 to elevator - depl R483	n/a	Chapin	
R491-BT-40-0002	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0454	Bacteria Trap - Depl R484	n/a	Moyer	
R491-BT-43-0003	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0455	Bacteria Trap - Depl R484	n/a	Moyer	
R491-osmo-0004	osmo	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0519	Feosmoanalyzer#2 to elevator - depl R483	n/a	Chapin	
R491-SS-j1_bio-0005	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0601	3 meters from Mkr-33 crack - limpets snails and mat	n/a	Levesque	Marcus
R491-GTB-6-dfl-0006	GAS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	0656	Gastight in hole - very vigorous flow - previously measured	T=20.3	Evans	Butterfield/Lilley
R491-SS-1_mat-0007	SS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	0717	microbial mat	n/a	Moyer	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R491-BT-36-0008	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	0742	Bacteria Trap - Depl R484	n/a	Moyer	
R491-BT-37-0009	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	0748	Bacteria Trap - Depl R484	n/a	Moyer	
R491-BT-39-0010	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	0751	Bacteria Trap - Depl R484	n/a	Moyer	
R491-BT-38-0011	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	0754	Bacteria Trap - Depl R484	n/a	Moyer	
R491-GTB-7 - dfl-0012	GAS	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1008	Gastight fired near MTR	n/a	Evans	Butterfield/Lilley
R491-SS-j3_bio-0013	SS	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1013	Over tube worm bush - gastropods and other little animals	n/a	Tunnicliffe	
R491-SS-j4-bio-0014	SS	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1048	Gastropods and other small animals near MTR	n/a	Juniper/Levesque	Marcus
R491-MTR-4180-0015	MTR	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1112	MTR - depl R478	n/a	Embley	
R491-TWG-0016	TWG	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1116	Four tube worm grabs in diffuse flow	n/a	Levesque/Marcus	
R491-MTR-4126-dfl-0017	MTR	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	1246	MTR Depl R474	n/a	Embley	
R491-TWG-0018	TWG	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	1255	Tube worm grab in diffuse flow	n/a	Marcus	
R491-SS-j2-FeO-0019a	SS	98 flow	n/a	n/a	423899	5087414	-129.9816	45.9344	1519	1341	FeO sample + white tentacled bacteria	n/a	Scott	
R491-SS-j2-FeO-0019b	SS	98 flow	n/a	n/a	423899	5087414	-129.9816	45.9344	1519	1400	FeO and white tentacled bacterial mat - switched jar2 to jar4	n/a	Scott	
R491-TWG-0020	TWG	98 flow	Old Flow	n/a	423898	5087455	-129.981705	45.936447	1520	1434	Tube worm grab in diffuse flow - worms look dead or at least not very healthy	n/a	Tsurumi	
R491-RK-0021	RK	98 flow	Old Flow	n/a	423898	5087455	-129.981705	45.936447	1520	1515	Shell of hollow lobate rock with about 10cm crust - in area of diffuse flow on old lava	n/a	Perfit	Scott
R491-RK-0022	RK	98 flow	n/a	n/a	423902	5087224	-129.9816	45.9344	1518	1611	New lava flow sample from roof structure about 100m from Mkr-33 in area of diffuse venting	n/a	Perfit	
R491-TWG-0023	TWG	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0510	Tube worm grab in diffuse flow on old lava - also sampled small rock	n/a	Levesque	
R491-TWG-0024	TWG	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0530	Tube worm grab in diffuse flow on old lava	n/a	Tsurumi	
R491-RK-0025	RK	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	0540	Rock sample in diffuse flow on sedimented old lava - a couple of rocks	n/a	Perfit	
R491-SS-2_mat-0026	SS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	0818	White and orange mat (bacteria land sulfur)	n/a	Moyer	Huber
R491-SS-3_mat-0027	SS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	0831	White and orange mat (bacterial and sulfur)	n/a	Moyer	
R491-SS-4_FeO-0028	SS	98 flow	n/a	n/a	423902	5087224	-129.9816	45.9344	1519	0921	Sampled earlier at Oxide - in flushing bottle	n/a	Scott	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R488											**6/271999**			
R488-HFS-14-dfl-0001	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0628	Bag with filter. Vol= 655 mL	T=65-70 Tmx=70.4	Butterfield	Graham
R488-HFS-6_dfl-0002	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0635	Filter#6 - 1 liter	Tmx=73.2	Huber	
R488-HFS-15-dfl-0003	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0650	Lipid filter#15 at 0.45um - 1.5 liters	Tmx=78	Huber	
R488-GTB-7-dfl-0004	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0706	Stbd gas Tight	T=68.8	Evans	Butterfield/Lilley
R488-SS-J1_bio-0005	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0715	Palm worms - rock	n/a	Juniper/Levesque	Perfit/Marcus
R488-SS-3-mat-0006	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0753	Jar#3 - bacterial mat in the crack; rock subsamp	n/a	Moyer	Perfit/Marcus/Huber
R488-SS-J4_bio-0007	SS	98 flow	Snail	N8	423877	5087088	-129.981900	45.933200	1523	0839	Jar#4 - snails.	Tmx=13	Marcus	Levesque
R488-HFS-7-dfl-0008	HFS	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	0944	Bag#17 no filter - 700 mL - DIDN'T WORK	Tmx=18.7	Butterfield/Huber/Graham	
R488-HFS-22-dfl-0009	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1019	Piston#22 - 615 mL	Tmx=20.3	Butterfield/Huber/Graham	Levesque
R488-HFS-24-dfl-0010	GAS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1025	Gas piston#24 - 130 mL	Tmx=20.3	Evans	Butterfield/Lilley
R488-HFS-3_dfl-0011	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1028	Bottle#3 filter - 672 mL	Tmx=20.2	Gendron	
R488-GTB-2-dfl-0012	GAS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1039	Port gas tight	T=20.3	Evans	Butterfield/Lilley
R488-HFS-7_dfl-0013	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1042	Filter#7 for sulfur	Tmx=20.4	Butterfield	
R488-SS-J3-dfl-0014	SS	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	1122	Jar#3 - fauna - snails; mat; scale worms	n/a	Levesque/Marcus	
R488-SS-1_dfl-0015	SS	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	1132	Jar#1 - bacterial mat and rock	n/a	Moyer	Perfit/Marcus
R488-SS-4-dfl-0016	SS	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	1225	Flushing bottle - worms and other fauna	n/a	Marcus/Levesque/Tsurumi	Perfit
R488-SS-2_dfl-0017	SS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1248	Jar#2 - particulates	n/a	Levesque	
R488-HFS-11-dfl-0018	HFS	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1355	Bag with filter - at MTR 4108.	Tav=10-11 Tmx=15.5	Butterfield	
R488-HFS-18-dfl-0019	HFS	98 flow	MiniSnow	N9	423711	5088141	-129.984217	45.942617	1522	1543	Bottle#18 - varying temp. 720 mL	Tmx=4	Butterfield	
R488-HFS-20-dfl-0020	HFS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1616	Piston#20 - 650 mL	Tmx=16	Butterfield/Huber/Graham	
R488-HFS-2_dfl-0021	HFS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1626	Filter#2 for XRF - 800 mL	Tmx=17.3	Gendron	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R488-HFS-5_dfl-0022	GAS	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	1637	Gas Piston #5 - 112 mL	Tmx=16.5	Evans	Butterfield/Lilley
R488-HFS-19-dfl-0023	HFS	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	1736	Bag#19 with filter. 700 mL	Tmx=3.4	Butterfield/Graham	
R488-HFS-16-dfl-0024	HFS	98 flow	Ouzo	n/a	423680	5088497	-129.984683	45.945817	1526	1837	Bag without filter. T=3.8 degrees before sample. vol=189 mL - DIDN'T WORK	Tmx=3.5	Butterfield	
R488-HFS-23-dfl-0025	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	1952	Piston#23 - full piston; oops	Tav=4 Tmx=5.6	Butterfield/Evans/Huber/Graham	
R488-HFS-12-dfl-0026	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	2002	DNA filter set. 1020 mL	Tmx=5.1	Huber	
R488-HFS-9_dfl-0027	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	2012	Bag#9 with POC filter. 681 mL	Tmx=4.3	Butterfield	
R488-HFS-1_dfl-0028	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	2019	Filter#1 for FISH - 1005 mL	Tmx=5.1	Huber	
R488-HFS-10-dfl-0029	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	2030	Filter for sulfur - 820 mL	T=4.8	Butterfield	
R488-HFS-21-dfl-0030	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	2041	Filter#21 0.45 micron lipids filter - 1542 mL	Tmx=5.0	Huber	
R488-HFS-4_dfl-0031	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	2056	Piston#4	Tmx=4	Butterfield/Huber	
R488-HFS-13-dfl-0032	HFS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	2104	DNA filter set#13 - 1789 mL	Tmx=4.9	Huber	
R488-SS-j2_dfl-0033	SS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	2126	Jar#2 - floc	n/a	Juniper/Levesque	
R487											**7/26/99**			
R487-HFS-12-plume-0001	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1476	1718	Plume particles visible - DNA - 1502 mL	n/a	Butterfield/Huber	
R487-HFS-15-plume-0002	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1476	1734	Depth 1476m - Plume particles visible - Lipids -1050 mL	n/a	Butterfield/Huber	
R487-HFS-17-plume-0003	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1476	1745	Bag sample - no filter - plume particles visible - micro & chem - 650 mL	n/a	Butterfield/Huber/Graham	
R487-HFS-19-plume-0004	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1476	1752	Bag sample-with filter -plume particles visible - micro & chem - 675 mL	n/a	Butterfield/Graham	
R487-HFS-16-plume-0005	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1476	1759	Bag sample without filter - 598 mL	n/a	Butterfield/Huber/Gendron/Juniper	
R487-HFS-3-plume-0006	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1476	1807	Filter for Sulfur - 1300 mL	n/a	Butterfield	
R487-GTB-plume-0007	GAS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1474	1847	port gastight #6 - 160 mL	n/a	Evans	Butterfield/Lilley
R487-HFS-23-plume-0008	GAS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1474	1849	gas piston - 170 mL	n/a	Evans	Butterfield/Lilley
R487-HFS-20-plume-0009	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1474	1853	piston - 730 mL	n/a	Butterfield/Huber/Graham/Juniper	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R487-HFS-21-plume-0010	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1474	1901	filter sulfur - 730 mL	n/a	Butterfield/Huber	
R487-HFS-22-plume-0011	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1474	1911	piston - 730ml	n/a	Butterfield/Huber/Graham/Juniper	
R487-HFS-18-plume-0012	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1474	1918	Bag sample with filter - 600ml	n/a	Butterfield	
R487-HFS-7-plume-0013	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1476	1925	Filter for XRF - 411 mL	n/a	Butterfield/Gendron	
R487-HFS-2-plume-0014	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1476	1929	Filter for XRF - 423ml	n/a	Butterfield/Gendron	
R487-HFS-11-plume-0015	HFS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1474	1937	Bag with filter - integrated sample. Vol=1338 mL	n/a	Gendron/Graham	
R485											7/25/99			
R485-HFS-2_dfl-0001	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1117	Filtered diffuse flow for XRF - 566ml	T1=55 T2=37-49	Butterfield	Gendron
R485-HFS-23-dfl-0002	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1123	Gas piston of diffuse flow for gases - - 113ml	T1=53 T2=42-50	Evans	Butterfield/Lilley
R485-HFS-12-dfl-0003	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1126	Filtered diffuse flow for DNA - 1223ml	T1=49 T2=37 Tmx=54.6	Huber	
R485-HFS-14-dfl-0004	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1135	Bag with filter of diffuse flow. 1110ml	Tmx=48.8	Butterfield	Graham
R485-HFS-17-dfl-0005	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1143	Bag sample without filter.	Tmx=48.8	Butterfield	Huber/Graham/Levesque
R484											**6/24/99**			
R484-SS-mat-0001	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1155	Bacterial mat - rock	n/a	Moyer	Feely/Huber/Perfit
R484-Bio-0002	Bio	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1234	Crab	n/a	Juniper	
R484-BT-0003	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	1414	Bacterial trap #14. (Depl R462)	n/a	Moyer	
R484-MTR-0004	MTR	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	1425	MTR #0942. (Depl R461)	n/a	Embley	
R484-BT-0005	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	1430	Bacterial trap #15. (Depl R462)	n/a	Moyer	
R484-TLC-0006	TLC	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1813	Time Lapse Camera recovered. (Depl R478; 1998)	n/a	Tunnicliffe	
R483											**6/23/99**			
R483-SS-j1_dfl-0001	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1257	Fluid over tube worms - for about 1h	n/a	Tunnicliffe/Marcus	
R483-SS-j2_bio-0002	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1423	Polynoids - gastros - rock	n/a	Juniper/Levesque	Perfit
R483-BT-0003	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1515	Recovered Bacteria trap #9 (Depl R462) - rock subsamp	n/a	Moyer	Tunnicliffe/Marcus/Perfit

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R483-SS-j3_bio-0004	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1543	suction stopped - maybe nothing in sample - rock subsamp	n/a	Juniper/Levesque	Perfit
R483-BT-0005	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1548	Bacteria trap #12 retrieved (Depl R462) - rock subsamp	n/a	Moyer	Tunnicliffe/Marcus/Perfit
R483-TWG-0006	TWG	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1610	Tube worm grab	n/a	Marcus	McHugh/Levesque
R483-GTB-0007	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1638	Gas tight bottles #6 fired	n/a	Evans	Butterfield/Lilley
R483-GTB-0008	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1638	GTB #7 fired	n/a	Evans	Butterfield/Lilley
R483-MTR-0009	MTR	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1650	Recovered MTR#4130. (Depl R461)	n/a	Embley	
R483-osmo-0010	osmo	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1803	1998 osmosampler recovered. (Depl R477)	n/a	Chapin	
R480											**9/19/98**			
R480-SUAVE-0001	SUAVE	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0603	suave-1 at base of large sulfide chimney in CASM fissure.	Tmx=41.9 Tav=37	Massoth	
R480-GTB-0002	GAS	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0604	Gas tight- port side #2 same place as SUAVE	n/a	Evans	Butterfield/Lilley
R480-SF-0003	SF	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0628	Grab of active chimney on top of T & S Spires. Several small pieces.	n/a	Scott	Juniper/Kaye
R480-SF-0004	SF	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0703	Chimney - not active. Huge piece that almost filled the port side of the biobox	n/a	Scott	Juniper/Kaye
R480-SUAVE-0005	SUAVE	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0729	SUAVE of the tube worms at T&S Spires	Tmx=20.3 Tav=16	Massoth	
R480-GTB-0006	GAS	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0732	Gas Tight #6 on the starboard side	n/a	Evans	Butterfield/Lilley
R480-TWG-0007	TWG	CASM	T&S Spires	n/a	420449	5093355	-130.027168	45.989153	1583	0739	Tube worm grab. Rock subsamp	n/a	Tunnicliffe	Scott
R479											**9/16/98**			
R479-SS-FeO-0001	SS	ASHES	n/a	n/a	421634	5086592	-130.010757	45.928430	1545	0838	Suction Sampler jar 18 of iron oxide little chimneys with white bacterial mat	n/a	Scott/Juniper	
R479-HFS-0002	HFS	ASHES	n/a	n/a	421590	5086597	-130.011326	45.928470	1546	0928	HFS Bag sample #7 with a filter. S of ASHES.	Tav =19	Butterfield	Guenther/Gendron/McLaughlin
R479-HFS-0003	HFS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1131	Piston #10. 1139 Probe tip drifted out of hot fluid. 1142 Replaced in hot water.	Tmx =51	Butterfield	Kaye/Guenther/Huber/McLaughlin
R479-HFS-0004	HFS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1150	Filter #16. Porkchop-same place as above. vol=~1L. 8cycles	Tav=30	Huber	
R479-HFS-0005	HFS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1202	Sample Bag/Filter combo #6. Porkchop. temp varying greatly.	Tav?	Butterfield	Guenther
R479-HFS-0006	HFS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1305	Piston #13; Top of Hell. T=42 on the back probe. Sample fluid smoking out of red chalcopyrite. Appears cloudy.	Tmx=270	Butterfield	Kaye/Guenther/Huber/McLaughlin

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R479-HFS-0007	HFS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1315	Filter #17; same place as above. about 400mL. 3 cycles. At 1353 filtered an additional 100mL (one cycle)	Tmx=270	Huber	
R479-HFS-0008	HFS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1340	Sample Bag/Filter combo #23. another chimney on Hell. hdg 085.	Tmx=294 T2=58	Butterfield	Kaye/Guenther/Huber/Gendron
R479-GTB-0009	GAS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1340	Gastight sample; portside GTB #5. same location as previous.	Tmx=293	Evans	Butterfield/Lilley
R479-HFS-0010	HFS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	1439	Piston #11. hdg 246. near top facing SW	Tmx=291 T2=22	Butterfield	Kaye/Guenther/Huber/McLaughlin
R479-GTB-0011	GAS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	1542	Gas tight bottle; starboard side GTB #7.	Tmx=258	Evans	Butterfield/Lilley
R479-HFS-0012	HFS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	1542	Piston #12.	Tmx=261	Butterfield	
R479-0020	potato	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	1604	Mr. Potatohead. Cooked at Hell first;;then cooked some more at Virgin. umm	n/a	Tunnicliffe	
R479-HFS-0013	HFS	ASHES	Virgin	n/a	421430	5087174	-130.013483	45.933650	1547	1613	Filter Set # 18; background seawater in ASHES	n/a	Huber	
R479-HFS-0014	HFS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	1631	Bag #4 with filter.	Tmx=179	Butterfield	Guenther/McLaughlin/Gendron
R479-SS-0015	SS	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1546	1707	Suction Sample Bottle #4. Diffuse flow from rock.	n/a	Kaye/Huber/Butterfield	
R479-SS-0016	SS	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1546	1723	Suction Sample Bottle #2 of sulfide; palm worms; mat. And begin suctioning bottle #7.	n/a	Juniper	Kaye
R479-SS-0017	SS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1808	Suction Sample Bottles #3 of sulfide worms at Porkchop of Hell.	n/a	Juniper	Tunnicliffe
R479-SS-0018	SS	ASHES	n/a	n/a	421267	5087140	-130.015580	45.933319	1545	1808	Suction Sample Bottle #7 and flushing bottle of clams near Caldera Wall. FAILED SAMPLE	n/a	Tunnicliffe	
R479-SS-0019	SS	ASHES	n/a	n/a	421257	5087167	-130.015714	45.933561	1546	1808	Suction Sample Bottle #1 near Caldera Wall; diffuse flow in crevice	n/a	Kaye/Huber/	
R478											**9/15/98**			
R478-SUAVE-0001	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1627	suave-1 near MTR	Tmx=17	Massoth	
R478-SUAVE-0002	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1659	suave-2 near osmosampler	Tmx=42.2	Massoth	
R478-GTB-0003	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1710	Starboard gas tight bottle #6	n/a	Evans	Butterfield/Lilley
R478-SUAVE-0004	SUAVE	98 flow	n/a	n/a	423836	5087092	-129.982440	45.933177	1524	1736	suave-3 20 m SW of Mkr-33 at crack venting floc	Tmx=13	Massoth	
R478-SUAVE-0005	SUAVE	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	1813	suave-4 at edge of Cloud Vent (~5m NW of Cloud)	Tmx=18.7	Massoth	
R478-SUAVE-0006	SUAVE	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1917	suave-5 at tube worm clump	Tmx=23.5	Massoth	
R478-GTB-0007	GAS	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1923	Gastight bottle #2 (port) tripped at\ Nascent Vent	n/a	Evans	Butterfield/Lilley

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R478-TWG-0008	TWG	98 flow	Nascent	n/a	423905	5087387	-129.981597	45.935840	1520	1942	Tube worm grab to starboard biobox.	n/a	Tunnicliffe	
R478-SUAVE-0009	SUAVE	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	2009	suave-6 at Mkr-N41 where tubeworms were collected on previous dive.	Tmx=22.7	Massoth	
R478-SUAVE-0010	SUAVE	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	2036	suave-7 at hole next to old tube worm clump just North of Mkr-N41.	Tmx=9.5	Massoth	
R478-TWG-0011	TWG	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	2052	Tube worm grab (next fo SUAVE hole) to port bio box	n/a	Tunnicliffe	
R478-SUAVE-0012	SUAVE	98 flow	Mkr-N7	N7	423886	5087774	-129.981900	45.939300	1520	2149	suave-8 at big tube worm site.	Tmx=16.3 Tav=16.1	Massoth	
R478-TWG-0013	TWG	98 flow	Mkr-N7	N7	423886	5087774	-129.981900	45.939300	1520	2209	Tube worm grab at suave-8 site. in port claw.	n/a	Tunnicliffe	
R477											**9/14/98**			
R477-BT-0001	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0514	Recover bacteria trap#10 (Depl R462)	n/a	Moyer	
R477-BT-0002	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0514	Recover bacteria trap#11 (Depl R462)	n/a	Moyer	
R477-BT-0003	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0514	Recover bacteria trap#5 (Depl R461)	n/a	Moyer	
R477-BT-0004	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0514	Recover bacteria trap#6 (Depl R461)	n/a	Moyer	
R477-osmo-0005	osmo	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0544	Recover osmosampler with hobo-short term (Depl R462)	n/a	Wheat	
R476											**9/13/98**			
R476-SS-0001	SS	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	1537	White bacterial mat; suction sampling in jar # 5; close to Milky Vent	n/a	Juniper	
R476-RK-0002	RK	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	1552	Rock sample. 7-function arm; in port side of biobox	n/a	J Chadwick	
R476-TWG-0003	TWG	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	1628	Old tube worms with extensive filamentous bacteria growing on the tubes; starboard biobox; Hdg 111	n/a	Tsurumi	
R476-SS-0004	SS	98 flow - E edge	Old Worms	n/a	423785	5088418	-129.983308	45.945105	1528	1638	Low flow water sample at Old Worms; suction sampler (jar # 4); Hdg 108. Slurping at low speed for 6 min.	n/a	Butterfield	Huber/Kaye/McLaughlin/Guenther
R476-RK-0005	RK	98 flow	n/a	n/a	423670	5088477	-129.984801	45.945622	1527	1703	Flat piece of mat-covered basalt; N of Milky/Easy Vents; 7-function arm into port biobox; Hdg 342	n/a	J Chadwick	
R476-SS-0006	SS	98 flow	n/a	n/a	423670	5088477	-129.984801	45.945622	1527	1717	Suction sample of orange mat; jar#6; slurped for 13 min; same location as previous samp.	n/a	Moyer	Juniper
R476-SS-0007	SS	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	1810	Suction sample of water; slowly pumping into jar#3	n/a	Butterfield	Huber/Kaye/McLaughlin/Guenther
R476-GTB-0008	GTB	98 flow	Magnesia	n/a	423661	5088545	-129.984933	45.946233	1530	1817	Gas tight sample bottle#5; port side; Hdg 255	n/a	Evans	Butterfield/Lilley
R476-SS-0009	SS	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	1537	Fauna into flushing bottle	n/a	Tunnicliffe	
R474											**9/12/98**			

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R474-SS-0001	SS	98 flow	n/a	n/a	423703	5087066	-129.984151	45.932928	1520	0823	Slurp Bottle #5. fecal trails; some yellow mat	n/a	Juniper	
R474-SS-0002	SS	98 flow	n/a	n/a	424177	5087075	-129.978039	45.933062	1524	0933	Slurp Jar #3; background sediment	n/a	Juniper	
R474-SS-0003	SS	98 flow	Mkr-N41	N41	423922	5087428	-129.981383	45.936217	1520	1111	Slurp jar#7; baby tubeworms; mat near Mkr-N41. Flushed tubeworms from smpl tube into flushing jar. Returned to jar7 to sample mat.	n/a	Juniper/Tsurumi	
R474-SS-0004	SS	98 flow	Mkr-N44	N44	423658	5087792	-129.984833	45.939467	1522	1234	Slurp jar#4. Slurp 10-12 cm patch of yellow/orange mat at newly deployed Mkr-N44.	n/a	Juniper	
R474-SS-0005	SS	98 flow	n/a	n/a	423837	5088089	-129.982585	45.942149	1521	1320	Slurp jar#8. Slurping red material on new lava.	n/a	Juniper	
R474-BT-0006	BT	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	1435	Found Moyer's glass trap #16. stbd biobox (Depl R463)	n/a	Moyer	
R474-BT-0007	BT	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	1515	Recovered glass trap #18. Placing it in starboard side of the biobox (Depl R463)	n/a	Moyer	
R474-BIO-0008	BIO	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	1515	Polynoid (1) that swam into port side biobox.	n/a	Marcus	
R473											**9/10 - 9/11 1998**			
R473-HFS-0001	HFS	98 flow	Easy	n/a	423676	5088443	-129.984717	45.945333	1532	1805	Fluid Sample bag #2 with filter. filter lost during dive.	Tav=10	Butterfield	
R473-HFS-0002	HFS	98 flow	Easy	n/a	423676	5088443	-129.984717	45.945333	1532	1815	Fluid Sample Filter #1 Sterivex filter only	Tav=10	Moyer	
R473-HFS-0003	HFS	98 flow	Easy	n/a	423676	5088443	-129.984717	45.945333	1532	1841	Fluid Sample Piston #10	Tav=10	Butterfield	Huber/Kaye/McLaughlin
R473-HFS-0004	HFS	98 flow	Easy	n/a	423676	5088443	-129.984717	45.945333	1532	1900	Fluid Sample at Easy Vent; Filter Set #16 (3 um and .22 um Sterivex)	Tav=10	Huber	
R473-HFS-0005	GAS	98 flow	Easy	n/a	423676	5088443	-129.984717	45.945333	1532	1912	Fluid Sample Gas Piston #8	Tav=10	Evans	Butterfield/Lilley
R473-SS-0006	SS	98 flow	Easy	n/a	423676	5088443	-129.984717	45.945333	1532	1932	Suction jar #6 with 64 um mesh; polynoids and white mat.	Tmx=6	Tunnicliffe/Marcus/Juniper	
R473-SS-0007	SS	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	2026	Suction Jar #1 with 20 um mesh; white bacterial mat.	n/a	Moyer	
R473-HFS-0008	HFS	98 flow	Roof	n/a	423690	5088129	-129.984483	45.942500	1523	2153	Fluid samp Bag#4 with filter (filter bag 4 to Gendron). Water from crack.	Tmx=14.6 T1=10.7	Butterfield/Guenther	Gendron
R473-GTB-0009	GAS	98 flow	Roof	n/a	423690	5088129	-129.984483	45.942500	1523	2201	Gas tight bottle #6 at Roof Vent	Tmx=14.6 T1=10.7	Evans	Butterfield/Lilley
R473-HFS-0010	HFS	98 flow	Roof	n/a	423690	5088129	-129.984483	45.942500	1523	2203	Fluid Sample Bag #3 without filter	Tmx=14.6 T1=10.7	Butterfield/Kaye/Huber	McLaughlin
R473-SS-0011	SS	98 flow	The Pit	n/a	423718	5087823	-129.984083	45.939750	1521	2340	Suction of floc from the Pit (near Snowblower) into bottle#5	Tav=5.7	Moyer	
R473-HfS-0012	HFS	98 flow	The Pit	n/a	423718	5087823	-129.984083	45.939750	1521	2347	Fluid Sample; Bag #5 with filter; ~700ml (filter 3b to Gendron)	Tmx=11.3	Butterfield	McLaughlin/Guenther/Gendron
R473-HFS-0013	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0256	HFS water sample; piston #11.	Tmx=37 T1=10.7	Butterfield	McLaughlin/Kaye/Huber

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R473-HFS-0014	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0317	HFS filter sample set #17	Tmx=52 T2=22	Huber	
R473-HFS-0015	HFS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0317	HFS filter sample set #17 (filter lost) ~700ml	Tav=40	Butterfield	
R473-SS-0016	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0429	Suction sample of bag creatures and white mat ~1 m NE of Mkr-33. bottle#18	n/a	Juniper	
R473-SS-0017	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0448	Suction white mat from within the Mkr-33 Vent.	n/a	Moyer	
R473-SS-0018	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0513	Suction sample of scale worms and polychaetes; bottle#7	Marcus	Juniper	
R473-HFS-0019	HFS	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	0627	HFS water sample. Bag with filter#23 (filter B7 to Gendron	T1=20	Butterfield	McLaughlin/Gendron
R473-SS-0020	SS	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	0633	Suction sample vent fluid; jar#4.	T1=20	Moyer	
R473-SS-0021	SS	98 flow	Mkr-108	108	423784	5086589	-129.983033	45.928650	1520	0755	Suction jar#8 at base of pillar; biology - particularly worms (collected 14 worms)		Tunnicliffe /Marcus/	Juniper
R473-HFS-0022	HFS	98 flow	Mkr-108	108	423784	5086589	-129.983033	45.928650	1520	0840	HFS sample Piston 12	Tav=12	Butterfield	McLaughlin/Huber/Kaye
R473-HFS-0023	HFS	98 flow	Mkr-108	108	423784	5086589	-129.983033	45.928650	1520	0855	HFS bag with filter#6. (filter lost)	Tav=12	Butterfield	
R473-HFS-0024	HFS	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1512	1038	HFS sampler; Piston sample #13 (Flattop).	Tmx=274 Tav=260	Butterfield	Huber/Kaye
R473-HFS-0025	GAS	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1512	1050	HFS gas piston#9. (same site as previous sample)	Tmx=274 Tav=260	Evans	Butterfield/Lilley
R473-HFS-0026	HFS	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1512	1053	HFS bag#7. (same site as previous sample)	Tmx=274 Tav=260	Butterfield	Huber/Kaye/Guenther
R473-HFS-0027	HFS	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1512	1053	HFS filter#18. (same site as previous sample)	Tmx=274 Tav=260	Huber	
R473-niskin-0028	niskin	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1512	1129	Niskin about 3 meters above venting.	n/a	Gendron	Roe/Guenther
R473-SF-0029	SF	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1512	1131	Mature sulfide spire; in Pacman claw	n/a	Scott	Kaye
R473-GTB-0030	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0311	Gas tight bottle#7 at Mkr-33 (sample number not in time order)	Tav=34	Evans	Butterfield/Lilley
R472											**9/9/98**			
R472-SS-0001	SS	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1546	1349	Suction Jar #1; particulate organic matter; palm and sulfide worms nearby.	n/a	Juniper	
R472-SS-0002	SS	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1546	1411	Suction Jar #2; sulfide worms	n/a	Juniper	
R472-BIO-0003	BIO	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1546	1424	Using pacman to grab animal and rock sample. Port biobox	n/a	Tunnicliffe	Juniper/Kaye/J Chadwick
R472-SS-0004	SS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	1441	Suction Jar#3; sulfide worms at base of Inferno.	n/a	Juniper	Tunnicliffe

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R472-SS-0005	SS	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1517	Suction Jar #4; sulfide worms at southwest base of Hell Vent	n/a	Juniper	
R472-BIO-0006	BIO	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1606	Worms and flange from Hell into stbd biobox	n/a	Juniper	Tunnicliffe/Moyer/Kaye
R472-SS-0007	SS	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1544	1636	Suction Jar#5; sulfide worms.	n/a	Juniper	Tunnicliffe
R472-SS-0008	SS	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1544	1652	Suction Jar#6; background seawater near Phoenix; about 1 m off floor.	n/a	Kaye/Huber	
R472-SS-0009	SS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1707	Suction Jar#7; diffuse flow from clump of tube worms just north of Hell.	n/a	Kaye/Huber	Butterfield
R472-GTB-0010	GAS	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1732	Gas tight bottle#5; stbd side at same site as previous samp.	n/a	Evans	Butterfield/Lilley
R472-FeO-0011	SF	ASHES	Hell	n/a	421348	5087129	-130.013417	45.933250	1545	1759	Pacman grab of iron oxide mound at Steve Mound (near Crack Vent)	n/a	Scott	
R472-FeO-0012	SS	ASHES	n/a	n/a	421421	5087149	-130.013595	45.933418	1543	1857	Suction #8; orange yellow mat; oxide mounds just S of Gollum (202 Nytex)	n/a	Moyer	Scott
R472-niskin-0013	niskin	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1948	5 liter right side Niskin bottle. 5 meters above Hell.	n/a	Gendron/McLaughlin	Roe/Guenther
R471											**9/9/98**			
R471-SS-0001	SS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0258	Suction water into jar#1	n/a	Juniper	
R471-SS-0002	SS	ASHES	Gollum	21	421422	5087166	-130.013583	45.933583	1546	0318	Suction water into jar#2 (filtered for stable isotope analysis)	n/a	Juniper	
R471-TWG-0003	TWG	ASHES	Gollum	21	421422	5087166	-130.013583	45.933583	1546	0359	Tubeworm clump into port biobox	n/a	Tsurumi/Marcus	Juniper/JChadwick
R471-SS-0004	SS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0456	Suction sample of white mat on rock ~1 m from BT deployment. jar#8. subsmp chips of basalt glass.	n/a	Moyer	J Chadwick/Tunniclife
R471-GTB-0005	GAS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	0524	Gastight sampler # 6.	n/a	Evans	Butterfield/Lilley
R471-TWG-0006	TWG	ASHES	White	I	421419	5087183	-130.013633	45.933733	1545	0616	Tube worms at mkr I ~1 m west of White Vent.	n/a	Marcus/Tsurumi	
R471-GTB-0007	GAS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	0650	Gastight #7 in vigerous flow at top of vent. Small chimney to left is "flaming".	n/a	Evans	Butterfield/Lilley
R471-niskin-0008	niskin	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0733	Niskin sample on port side about 5 m above Hell Vent (z=1536)	n/a	Gendron	Butterfield
R469											**9/7 - 9/8 1998**			
R469-HFS-0001	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	1831	Fluid Sampler Piston#13; diffuse flow -aborted first time. Successful at 19:10.	T1=67 T2=35	Butterfield	Kaye
R469-SUAVE-0002	SUAVE	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	1834	suave-1 at fluid sampler site	T=65	Massoth	
R469-HFS-0003	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	1836	Fluid Sampler Piston #12; diffuse flow-aborted.	n/a	Butterfield	Kaye
R469-HFS-0004	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	1849	Fluid sampler Bag #7; diffuse flow.	T1=67 T2=35	Butterfield	Kaye

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R469-HFS-0005	HFS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	1900	Fluid sampler #16 Filters only; diffuse flow.	T1=67 T2=35	Huber	
R469-GTB-0006	GAS	ASHES	Marshmallow	n/a	421420	5087179	-130.013617	45.933700	1547	1916	Starboard gas tight bottle #5; diffuse flow.	T1=67 T2=35	Evans	Butterfield/Lilley
R469-HFS-0007	HFS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	2116	Fluid sampler piston#11; Bubbler#2 diffuse flow; W face of Mushroom.	T1=70 T2=32	Butterfield	Kaye
R469-HFS-0008	HFS	ASHES	Mushroom	n/a	421405	5087168	-130.013800	45.933600	1548	2132	Fluid Sampler #17; filter set; Bubbler#2 diffuse flow; W face of Mushroom.	T1=50 T2=17	Huber	
R469-HFS-0009	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	2232	Fluid Sampler Bag #6 (filtered) in the worms. Vol=~500ml	T1=7.5 T2=6.1	Butterfield	
R469-HFS-0010	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	2245	Fluid Sampler #18. Bio- Filter set. Vol=~850ml	T1=7 T2=6.2	Huber	
R469-HFS-0011	GAS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	2254	Fluid Sampler #9; Gas piston.	T1=7	Evans	Butterfield/Lilley
R469-HFS-0012	HFS	ASHES	Styx	n/a	421412	5087132	-130.013700	45.933283	1546	2352	Fluid sampler bag #2. Vol=350ml	Tmx=23 T2=9	Butterfield	
R469-HFS-0013	HFS	ASHES	Styx	n/a	421412	5087132	-130.013700	45.933283	1546	0001	Fluid piston sampler #10.	Tmx=23 T2=9	Butterfield	Kaye
R469-GTB-0014	GAS	ASHES	Styx	n/a	421412	5087132	-130.013700	45.933283	1546	0013	Port side gas tight.	T=14		
R469-HFS-0015	HFS	ASHES	Daves	n/a	421408	5087159	-130.013767	45.933517	1546	0033	Fluid sample bag #23. (strong current here)	T=16 Tmx=35.8	Butterfield	
R469-HFS-0016	HFS	ASHES	Daves	n/a	421408	5087159	-130.013767	45.933517	1546	0048	Fluid sample bag #24.	T=16 Tmx=35.8	Butterfield	
R469-HFS-0017	HFS	ASHES	Daves	n/a	421408	5087159	-130.013767	45.933517	1546	0051	Fluid sample bag #3 .	T=16 Tmx=35.8	Butterfield	Kaye
R469-HFS-0018	HFS	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1546	0115	Fluid sample bag with filter #4. Probe behind worms. Tmax=6.9 at base of tubeworms.	T=12.5 - 19	Butterfield	
R469-HFS-0019	HFS	ASHES	Medusa	n/a	421395	5087141	-130.013933	45.933350	1546	0132	Fluid sample bag#5 at Medusa Vent	T=12.5 - 19	Butterfield	
R469-FeO-0020	SF	ASHES	FeHyde	n/a	421406	5087100	-130.013783	45.932983	1544	0155	Iron oxyhydroxide from Fe-Hyde site on the south fringe of ASHES.	n/a	Juniper/Scott	
R468											**9/6/98**			
R468-HFS-0001	HFS	ASHES	Gollum	n/a	421422	5087166	-130.013583	45.933583	1546	0252	(hfs-1)Fluid sampler piston #10.	T1=21 T2=13	Butterfield	Kaye
R468-HFS-0002	GAS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0334	(hfs-2)Fluid sampler piston #8 for gas.	T1=35 T2=21	Evans	Butterfield/Lilley
R468-SUAVE-0003	SUAVE	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0342	suave+L980-1; same place as previous samp. H2S 500uM; Mn 62uM; Fe 12uM.	Tmx=77 Tav=70	Massoth	
R468-HFS-0004	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0344	(hfs-3) Filter #16 only; no water sampled. Vol=~1L	T1=45 T2=25	Huber	
R468-GTB-0005	GAS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0350	GTB #7 (stbd side)	T=40 Tmx=73	Evans	Butterfield/Lilley

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R468-HFS-0006	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0401	(hfs-4)Fluid sampler bag sample #7. High-T samp. No filter. Vol=~115mL.	Tmx=170	Butterfield	Kaye
R468-GTB-0007	GAS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0403	gas tight bottle #6.	Tmx=170	Evans	Butterfield/Lilley
R468-HFS-0008	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0405	(hfs-4)Fluid sampler piston#12	Tmx=70 Tav=28	Butterfield	Kaye
R468-HFS-0009	HFS	ASHES	Crack	n/a	421424	5087135	-130.013550	45.933300	1547	0405	(hfs-5) Fluid sampler piston#13. vol=350mL	T1=135	Butterfield	
R468-HFS-0010	HFS	ASHES	n/a	n/a	421397	5087127	-130.013901	45.933217	1547	0436	(hfs-6) Bag #3. Background water sample without filter between Phoenix and Hell Vents.	T=2.5	Kaye/Huber	
R468-niskin-0011	niskin	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0444	Niskin sample taken ~1 m above vent in active plume.	n/a	Gendron	
R468-SF-0012	SF	ASHES	ROPOS	n/a	421386	5087134	-130.014050	45.933283	1547	0458	Stump and base of active vent. Collected most of spire that had fallen over. (~20 cm high)	n/a	Jonnasson	Scott
R467											**9/5 - 9/6 1998**			
R467-RK-0001	RK	NRZ	n/a	n/a	421330	5096637	-130.016330	46.018790	1592	1629	Old basalts for dating - from elevator drop site.	n/a	J Chadwick	
R467-SUAVE-0002	SUAVE	NRZ	n/a	n/a	421602	5098870	-130.013184	46.038916	1636	0357	suave-1. no visible flow. Some bac mats; a few scraggly tubeworms; some gastropods. First vent seen. Mn=3uM.	n/a	Massoth	
R467-SUAVE-0003	SUAVE	NRZ	Bob	n/a	421629	5098870	-130.012833	46.038917	1639	0500	suave-2 at low flow vent with orange and white bac mats; tubeworms; lots of gastropods; and some polynoids. H2S=124uM; Mn=5uM; Fe=2uM.	Tmx=4.4 Tav=4	Massoth/Tunnicliffe	
R467-TWG-0004	TWG	NRZ	Bob	n/a	421629	5098870	-130.012833	46.038917	1639	0517	Biosample of tubeworms and bac mat at suave-2 site. (RK subsmp)	Tmx=4.4 Tav=4	Tunnicliffe/Moyer	J Chadwick
R466											**9/4/98**			
R466-BIO-0001	BIO	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0323	Sulfide worms and sulfide from top of spire.	n/a	Juniper	Kaye
R466-SUAVE-0002	SUAVE	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0614	suave-1 at top of clump of tubeworms 1 m N of Hell- diffuse flow.	Tmx=5	Massoth/Tunnicliffe	
R466-TWG-0003	TWG	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0624	Entire clump of tubeworms and associated biota.	Tmx=5	Tunnicliffe / Marcus	Kaye/Levesque
R466-SUAVE-0004	SUAVE	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	0635	suave-2 scan of hole left by sampling tubeworm bush. H2S=~1uM; Mn=4uM; Fe=below detection.	Tmx=6	Massoth	
R466-SUAVE-0005	SUAVE	ASHES	Phoenix	n/a	421391	5087130	-130.013983	45.933250	1544	0718	suave-3 where bactraps were deployed at Phoenix. H2S=120uM; Mn=7.5uM; Fe=5uM.	Tmx=16	Massoth/Moyer	
R466-SUAVE-0006	SUAVE	ASHES	ROPOS	n/a	421386	5087134	-130.014050	45.933283	1547	0752	suave-4 where bactraps were deployed at ROPOS. H2S=340uM; Mn=40uM; Fe=80uM.	T=29	Massoth/Moyer	
R466-SUAVE-0007	SUAVE	ASHES	Hairdo	n/a	421391	5087157	-130.013983	45.933500	1546	0752	suave-5 in worms at the top of Hairdo. H2S=138uM; Mn=12.5uM; Fe=8uM.	T=14 Tav=12.5	Massoth/Tunnicliffe	
R466-TWG-0008	TWG	ASHES	Hairdo	n/a	421391	5087157	-130.013983	45.933500	1546	0842	Biosample of a clump of worms with "millions of organisms".	T=14.8 Tav=12.5	Tunnicliffe/Marcus	Kaye/Levesque
R466-SUAVE-0009	SUAVE	ASHES	Hairdo	n/a	421391	5087157	-130.013983	45.933500	1546	0900	suave-6 at base of Hairdo after the TWG was removed. H2S=200uM; Mn=15uM; Fe=10uM	T=14.8 Tav=13.5	Massoth/Juniper	
R466-SUAVE-0010	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1000	suave-7 at the base of Phoenix (below the worms). Site#1. H2S=290uM; Mn=22uM; Fe=68uM	Tmx=20 Tav=16	Massoth/Juniper	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R466-SUAVE-0011	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1024	suave-8 at the sulfide worms. Site#1 (higher). H2S=1170uM; Mn=38uM; Fe=75uM	Tmx=15 Tav=11	Massoth/Juniper	
R466-SUAVE-0012	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1044	suave-9 slightly higher up on the same piece of sulfide as above. (at "frisky boys" worm site. Site #1. H2S=360uM; Mn=15uM; Fe=62uM	Tmx=6 Tav=4	Massoth/Juniper	
R466-SUAVE-0013	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1057	suave-10 at the base of on sulfide worms - slightly higher up in community 2. H2S=360uM; Mn=17uM; Fe=67uM	Tmx=8 Tav=4.5	Massoth/Juniper	
R466-SUAVE-0014	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1155	suave-11 at base of site 2 . In area of no fauna (community 0). H2S=52uM; Mn=1uM; Fe=8uM	Tmx=4.2 Tav=3	Massoth/Juniper	
R466-SUAVE-0015	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1205	suave-12. On two sulfide worms at base of Phoenix. Site #2. H2S=67uM; Mn=4uM; Fe=17uM	Tmx=6.1 Tav=4	Massoth/Juniper	
R466-SUAVE-0016	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1246	suave-13 of sulfide worms at base of Phoenix. Site #3. H2S=380uM; Mn=25uM; Fe=70uM	Tmx=80 Tav=65	Massoth/Juniper	
R466-SUAVE-0017	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1303	suave-14 of sulfide worms at base of Phoenix. Site #3. H2S=27uM; Mn=BDLuM; Fe=10uM	Tmx=24 Tav=22	Massoth/Juniper	
R466-SUAVE-0018	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1314	suave-15 of sulfide worms at base of Phoenix. Site #3. H2S=81uM; Mn=3uM; Fe=17uM	Tmx=3 Tav=2.8	Massoth/Juniper	
R466-SUAVE-0019	SUAVE	ASHES	Phoenix	2	421391	5087130	-130.013983	45.933250	1544	1326	suave-16 of sulfide worms at base of Phoenix. Site #3. Aborted midway through due to ROPOS power failure.	n/a	Massoth/Juniper	
R466-SUAVE-00120	SUAVE	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	1417	suave-17. South side of Inferno on palm worms. H2S=45uM; Mn=10uM; Fe=45uM	Tmx=5.5 Tav=4	Massoth/Juniper	
R466-GTB-0021	GAS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	1445	Gas Tight#6 at top of black beehive spire on south side; hdg 350; near VEMCO.	n/a	Evans	Butterfield/Lilley
R466-GTB-0022	GAS	ASHES	Inferno	n/a	421397	5087162	-130.013900	45.933550	1547	1446	Gas Tight#7 at top of black beehive spire on south side; hdg 350; near VEMCO.	n/a	Evans	Butterfield/Lilley
R466-SUAVE-0023	SUAVE	ASHES	Hell	n/a	421372	5087135	-130.014233	45.933300	1544	1505	suave-18 of sulfide worms. H2S=1690uM; Mn=70uM; Fe=90uM	Tmx=16 Tav=12	Massoth/Juniper	
R466-SUAVE-0024	SUAVE	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1523	suave-19 at back of Porkchop near sulfide worms again. H2S=420uM; Mn=60uM; Fe=87uM	Tmx=19 Tav=17	Massoth/Juniper	
R466-SUAVE-0025	SUAVE	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1545	suave-20 at bone of Porkchop near sulfide and palm worms. H2S=420uM; Mn=45uM; Fe=85uM	Tmx=19 Tav=17	Massoth/Juniper	
R466-SUAVE-0026	SUAVE	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1544	1605	suave-21 in group of palm worms. H2S=1650uM; Mn=75uM; Fe=90uM	Tmx=19.5 Tav=18	Massoth/Juniper	
R466-niskin-0027	niskin	ASHES	Hell	prkchp	421372	5087135	-130.014233	45.933300	1542	1623	Niskin at Hell in buoyant plume at top of triple chimney; top of chimney at 1542 m.	n/a	McLaughlin-West/Gendron/Kaye/Butterfield	
R465											**9/3/98**			
R465-RK-0001	RK	SRZ	n/a	n/a	423444	5080002	-129.986370	45.869330	1785	1010	basalt; wedge/trapezoid shape; orange stripe inner surface; step in side; port biobox	n/a	J Chadwick/Perfit	
R465-RK-0002	RK	SRZ	n/a	n/a	423444	5080021	-129.986370	45.869500	1784	1019	flow structure; in port biobox; long; bonelike; glass; yellow stuff	n/a	J Chadwick/Perfit	
R464											**9/2/98**			
R464-SS-0001	SS	98 flow	Oxide	n/a	423648	5088456	-129.985083	45.945450	1529	0804	Suction sample; small bottle #4; at Oxide Vent??- orange and white material	n/a	Moyer/Juniper	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R464-SS-0002	SS	98 flow	MiniSnow	N9	423711	5088141	-129.984217	45.942617	1522	0911	Suction sample; large bottle #18; diffuse flow with white floc	n/a	Butterfield/Kaye/Huber/Moyer	
R464-SS-0003	SS	98 flow	MiniSnow	N9	423711	5088141	-129.984217	45.942617	1522	0925	Suction sample; small bottle #1; - white bacterial mat	n/a	Moyer/Juniper	
R464-SS-0004	SS	98 flow	SnowBlower	N1	423719	5087835	-129.984067	45.939867	1521	1103	Suction sample; large bottle #12; at Snow Blower Vent near Mkr-N1 - diffuse flow with white floc	n/a	Butterfield/Kaye/Huber/Moyer	Gendron
R464-SS-0005	SS	98 flow	SnowBlower	N1	423719	5087835	-129.984067	45.939867	1521	1111	Suction sample; small bottle #2A; at Snow Blower Vent near Mkr-N1- white floc	n/a	Juniper/Moyer	
R464-SS-0006	SS	98 flow	Snail	N8	423877	5087088	-129.981900	45.933200	1523	1531	Suction sample; small bottle #0; snails and bacterial mat	n/a	Juniper	
R464-SS-0007	SS	98 flow	Mkr-108	108	423784	5086589	-129.983033	45.928650	1520	1649	Suction sample; small bottle #2B; scale worms and bacterial mat; aborted - NO SAMPLE	n/a	n/a	
R464-BT-0008	BT	98 flow	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1856	Bacteria trap#3 at ; in starboard side of biobox (Depl R461)	n/a	Moyer	
R464-TWG-0009	TWG	98 flow	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1938	dead or dying tube worms; Mkr-113 area into port bio box	n/a	Tsurumi	
R464-SF-0010	SF	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1525	2233	base of Castle Vent spire (spire is sulfide and anhydrite)	n/a	Scott	Kaye/Moyer
R464-niskin-0011	niskin	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1525	2234	Niskin sample of seawater adjacent to buoyant plume above Castle Vent spire	n/a	McLaughlin-West/Kaye/Huber/Butterfield	
R464-GTB-0012	GAS	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1525	2241	2 gas tights; one in fluid from the decapitated base of vent (port; GTB#5) one in seawater about 17" away (stbd; GTB#2)	n/a	Evans	Butterfield/Lilley
R464-SS-0013	SS	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1525	2258	Suction sample; large canister #1 - clear fluid from stump of Castle vent	n/a	Butterfield/Huber/Kaye	
R464-TWG-0014	TWG	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1525	2334	Biosample; tube worm grab with claw from FlatTop (Mkr-N5)	n/a	Tsurumi	
R463											**9/1/98**			
R463-GTB-0001	GAS	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	2204	Gas tight sample taken in bottle #6 on stbd arm	n/a	Evans	Butterfield/Lilley
R463-SS-0002	SS	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	2238	Suction sample of water; into bottle #8	n/a	Butterfield/Kaye/Huber	
R462											**8/31/98**			
R462-SS-0001	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1818	Suction Sampler; Bottle #1; fluid. Nozzle placed in crack at vent. Diffuse flow at slow speed.	n/a	Butterfield	Huber/Kaye
R462-SS-0002	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1834	Suction Sampler; Bottle #7; mat and worms. Medium speed. Got lots of polynoids.	n/a	Juniper/Moyer	
R462-SS-0003	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1933	Suction Sampler; Bottle #6; mat and worms.	n/a	Juniper/Moyer	
R462-SS-0004	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	1953	Suction Sampler; Bottle #5; white mat and polynoids.	n/a	Juniper	
R462-SS-0005	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2024	ATTEMPTED Suction Sampler; bottle #4; white mat and "bag creature"	n/a	Juniper	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R462-SS-0006	SS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2044	ATTEMPTED suction sampler; bottle #3; white mat near bag creature.	n/a	Juniper	
R462-BT-0007	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2059	bactrap #7 into port bio box. Trap was deployed for 48 hours. (Depl R461)	n/a	Moyer	
R462-BT-0008	BT	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2059	bactrap #8 into port bio box. Trap was deployed for 48 hours. (Depl R461)	n/a	Moyer	
R462-BIO-0009	BIO	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	2141	Bag creatures sampled with pacman; most floated off and did not end up in biobox; but some small pieces may still be there.	n/a	Juniper?	
R462-BT-0010	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	2229	bactrap #2; down in hole with gray smoke. Trap was in vent for 48 hours. (Depl R461)	n/a	Moyer	
R462-BT-0011	BT	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	2254	bactrap #1; down in hole with gray smoke. Trap was in vent for 48 hours. Depl R461)	n/a	Moyer	
R462-niskin-0012	niskin	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1526	2306	Niskin bottle; in area of super high gray smokey flow.	n/a	Kaye/Huber/Butterfield/Gendron	
R462-GTB-0013	GAS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1526	2310	Gas tight bottle #2 filled with fluid from high flow .	n/a	Evans	Butterfield/Lilley
R462-GTB-0014	GAS	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1526	2310	Gas tight bottle #7 filled with fluid from high flow.	n/a		
R462-RK-0015	RK	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	2328	Basalt sample.	n/a	J Chadwick	
R461											**8/30 - 8/31 1998**			
R461-SUAVE-0001	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0458	suave-1 in bacterial mat at Mkr-33 crack. H2S=470uM; Mn=2uM; Fe=47uM	Tmx=15 Tav=8	Massoth	
R461-SUAVE-0002	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0555	suave-2 over white bacterial mat. H2S=15uM; Mn=5uM; Fe=2uM	Tmx=11	Massoth	
R461-SUAVE-0003	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0607	suave-3 over hole in white mat. H2S=~10uM; Mn=BDLuM; Fe=BDLuM	Tmx=~4.5	Massoth	
R461-GTB-0004	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0633	Gas tight bottle #2 in venting crack.	T=36 - 37	Evans	Butterfield/Lilley
R461-GTB-0005	GAS	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0634	Gas tight bottle #5 in venting crack.	T=20 - 27	Evans	Butterfield/Lilley
R461-SUAVE-0006	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0640	suave-4 at GTB location in crack with floc flow. H2S=1000uM; Mn=18uM; Fe=40uM	Tmx=37 Tav=26	Massoth	
R461-SUAVE-0007	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0707	suave-5 at mat 30 cm from the bag creature. H2S=700uM; Mn=2uM; Fe=5uM	Tmx=17	Massoth	
R461-SUAVE-0008	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0722	suave-6 in the big section of the bag creature. H2S=75uM; Mn=BDLuM; Fe=BDLuM	Tmx=2.8	Massoth	
R461-SUAVE-0009	SUAVE	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0749	suave-7 at baby bag creature further from the sub than little bag creature. H2S=40uM; Mn=BDLuM; Fe=BDLuM	Tmx=3.1	Massoth	
R461-SUAVE-0010	SUAVE	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1526	0844	suave-8 about 50 cm from Mkr-N6. H2S=750uM; Mn=5.5uM; Fe=62uM	Tmx=27	Massoth	
R461-SUAVE-0011	SUAVE	98 flow	Cloud	N4	423896	5087119	-129.981670	45.933420	1523	0923	suave-9 (10 m W of Mkr-N6 at Mkr-N4). H2S=750uM; Mn=2uM; Fe=55uM	Tmx=24	Massoth	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R461-SUAVE-0012	SUAVE	98 flow	Mkr-108	108	423784	5086589	-129.983033	45.928650	1520	1521	suave-10 near white bac mat; scaleworms; some flow. H2S=230uM; Mn=45uM; Fe=25uM	Tmx=8.1 Tav=6	Massoth	
R461-SUAVE-0013	SUAVE	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1832	suave-11 at Mkr-113 (Axial Gardens) at top of pillar with flow and worms. H2S=237uM; Mn=BDLuM; Fe=7uM	Tmx=10	Massoth	
R461-SUAVE-0014	SUAVE	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1919	suave-12 scanning at tip of vemco. H2S=307uM; Mn=BDLuM; Fe=8uM	Tmx=10.5	Massoth	
R461-TWG-0015	TWG	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1941	Tubeworms where suave-12 was; starboard side of biobox - a bit in port side.	Tmx=10.5	Tunnicliffe	
R461-RK-0016	RK	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	1942	Rock fell accidentally into biobox at Mkr-113 when tubeworms were sampled. Subsamp: chips of glass with biofilm for G. Ferris	n/a	J Chadwick	Scott
R461-SUAVE-0017	SUAVE	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	2020	suave-13 at base of lava pillar (where bactraps 3&4 deployed). H2S=500uM; Mn=-BDLuM; Fe=9uM	Tmx=23.5 Tav=20	Massoth	
R461-SUAVE-0018	SUAVE	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	2035	suave-14 in clump of dead tubeworms and shimmering water. H2S=45uM; Mn=-BDLuM; Fe=8uM	Tmx=5.7	Massoth	
R461-TWG-0019	TWG	nSRZ	Mkr-113	113	423372	5085937	-129.988238	45.922728	1523	2047	Sample of dying tube worms at Mkr-113; kept in Pacman until surface	Tmx=5.7	Tsurumi	
R461-SUAVE-0020	SUAVE	nSRZ	Circ	n/a	423887	5086283	-129.981650	45.925917	1523	2144	suave-15 -hole in basalt with iron (yellow) bac mats - floc cover. H2S=87uM; Mn=3uM; Fe=57uM	Tmx=6.6 Tav=6.5	Massoth	
R461-SUAVE-0021	SUAVE	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1525	2219	suave-16 - at base of a sulfide vent - seen on Sonne cam (a white smoker) Castle Vent. H2S=1400uM; Mn=18uM; Fe=71uM	Tmx=90 Tav=60	Massoth	
R461-SUAVE-0022	SUAVE	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1525	2248	suave-17 - in tubeworms at sulphide deposit (Castle). H2S=132uM; Mn=BDLuM; Fe=BDLuM	Tmx=5.3 Tav=5	Massoth	
R461-SUAVE-0023	SUAVE	98 flow - E edge	Castle	N5	424032	5086301	-129.979792	45.926075	1525	2349	SUAVE-18 - in healthy tubeworms. H2S=200uM; Mn=6uM; Fe=19uM	Tmx=21 Tav=19	Massoth	
R461-RK-0024	RK	98 flow - E edge	n/a	n/a	424033	5086409	-129.979791	45.927053	1521	0201	Older lava sample from contact point#1 in port biobox. Subsamp scrapings and chips of glass with biofilm for G. Ferris	n/a	J Chadwick	Scott:
R461-RK-0025	RK	98 flow - E edge	n/a	n/a	424033	5086409	-129.979791	45.927053	1521	0243	Younger lava sample from contact point #1 in port biobox. (no fixes but nearby previous samp.)	n/a	J Chadwick	
R460											**8/28 - 8/29 2998**			
R460-SUAVE-0001	SUAVE	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	0700	suave-1 tip in yellow fluff (bacterial floc). H2S=6uM; Mn=BDLuM; Fe=45uM.	Tmx=2.9	Massoth	
R460-SUAVE-0002	SUAVE	98 flow	Milky	N2	423673	5088424	-129.984753	45.945142	1527	0733	suave-2 at marker (in hole spewing bac floc). H2S=175uM; Mn=40uM; Fe=90uM.	Tmx=8 Tav=8	Massoth	
R460-SUAVE-0003	SUAVE	98 flow	Mkr-N3	N3	423637	5088278	-129.985200	45.943800	1528	0912	suave-3 at Mkr-N3 - hole in basalt with polynoids and bac floc. H2S=200uM; Mn=40uM; Fe=40uM.	Tmx=13 Tav=11.5	Massoth	
R460-RK-0004	RK	98 flow	n/a	n/a	423615	5088226	-129.985471	45.943358	1529	1004	Basalt glass	n/a	J Chadwick	
R460-SUAVE-0005	SUAVE	98 flow	ThePit	n/a	423718	5087823	-129.984083	45.939750	1521	1201	suave-4 at edge of 1m collapse pit.	Tmx=13.7 Tav=13	Massoth	
R460-RK-0006	RK	98 flow	Cloud	N6	423901	5087116	-129.981600	45.933400	1524	2330	Basalt with bac floc? cover. subsamp chips with attached bacteria in 3% gluteraldehyde (for G. Ferris)	n/a	J Chadwick	Scott
R460-water-0007	water	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0622	Water from port Biobox	n/a	Tsurumi	

sample #	type	Area	Vent	Mkr	UTM X	UTM Y	Long	Lat	Z (m)	UTC Time	Description	temp (C)	PI	Sub Samps
R460-water-0008	water	98 flow	Mkr-33	33	423855	5087092	-129.982190	45.933170	1524	0622	Water from stbd Biobox	n/a	Tsurumi	

5.4 Experiments Deployed/Recovered NeMO 2001

Experiment etc.	Vent/Marker	Deployed	Recovered	Sample	Longitude	Latitude
BacTrap 54	Cloud/Mkr-N4	R549	R625	R625-0003	-129.981670	45.933420
BacTrap 59	Cloud/Mkr-N6/21	R629			-129.981600	45.933400
BacTrap 60	Cloud/Mkr-N6/21	R629			-129.981600	45.933400
BacTrap 64	Gollum Vent	R632			-130.013583	45.933583
BacTrap 51	Mkr-33	R549	R623	R623-0004	-129.982190	45.933170
BacTrap 52	Mkr-33	R549	R623	R623-0005	-129.982190	45.933170
BacTrap 55	Mkr-33	R622	R629	R629-0007	-129.982190	45.933170
BacTrap 56	Mkr-33	R622	R629	R629-0008	-129.982190	45.933170
BacTrap 61	Mkr-33	R630			-129.982190	45.933170
BacTrap 62	Mkr-33	R630			-129.982190	45.933170
BacTrap 17	Easy Vent	R463			-129.984717	45.945333
BacTrap 24	Castle Vent	R464	couldn't find		-129.980057	45.926168
BacTrap 33	Gollum Vent	R471	R632	R632-0016	-130.013583	45.933583
BacTrap 35	Milky Vent	R475			-129.984753	45.945142
BacTrap 35	Milky/Mkr-N2	R476			-129.984753	45.945142
BacTrap 4	Mkr-113	R461	R630	R630-0006	-129.988238	45.922728
BacTrap 49	ROPOS Vent	R545	R632	R632-0019	-130.014050	45.933283
BacTrap 50	Gollum Vent	R545	R632	R632-0015	-130.013583	45.933583
BacTrap 53	Cloud/Mkr-N4	R549	R625	R625-0002	-129.981670	45.933420
BacTrap 57	Cloud/Mkr-N6/21	R622	R629	R629-0005	-129.981600	45.933400
BacTrap 58	Cloud/Mkr-N6/21	R622			-129.981600	45.933400
BacTrap 63	Gollum Vent	R632			-130.013583	45.933583
BacTraps 25,26	Phoenix	R466	couldn't find		-130.013983	45.933250
BacTrap 19	Mkr-113	R464	R630	R630-0007	-129.988238	45.922728
Benchmark 1	Magnesia/Mkr-67	R548			-129.984933	45.946233
Benchmark 4	Bag City (SW of vent)	R548			-129.989630	45.916010
Benchmark 5	Mkr-33 area (15 m NW)	R548			-129.982190	45.933170
Benchmark 63	Caldera center (more or less) next to BPR	R548			-130.010170	45.955220
Benchmark 66	S Pillow Anomaly	R546			-130.003710	45.863150
Bottom Pressure Recorder (BPR)	Caldera center (more or less)	between R545/R546			-130.010170	45.955220
Hobo 126	Virgin Vent	R632			-130.013483	45.933650
Hobo 127 (Moyer)	Virgin Vent	R555	R624	R624-0033	-130.013483	45.933650
Hobo 128	Castle Vent (near Anhydrite spire)	R627			-129.980057	45.926168
Hobo 128	Hell Vent	MBARI moved from Inferno summer 00	R624	R624-0021	-130.014233	45.933300
Hobo 128 (fell out of vent)	Inferno Vent	R503	moved to Hell by MBARI summer '00		-130.013900	45.933550
Hobo 130 (Embley)	Virgin Vent	R555	R624	R624-0034	-130.013483	45.933650

Experiment etc.	Vent/Marker	Deployed	Recovered	Sample	Longitude	Latitude
Hobo 130 (redeploy)	Virgin Vent	R632			-130.013483	45.933650
Hobo 152	Vixen (Coquille)	R630			-129.993000	45.917280
Hobo 153	Vixen (Coquille)	R630			-129.993000	45.917280
IronOsoanalyzer	Mkr-33	MBARI 00	R629	R629-0009	-129.982190	45.933170
Johnson Flow/Temp Meter 2000	NW of Crack x=421418, y=5087140	R553	R632	R632-0020	-130.013550	45.933300
Johnson Flow/Temp Meter 2001	NW of Crack x=421418, y=5087140	R624			-130.013550	45.933300
Larval Array E	Cloud/Mkr-N6/21	R629			-129.981600	45.933400
Larval Array F	Cloud/Mkr-N6/21	R629			-129.981600	45.933400
Larval Array G	Cloud (S/SW of N6 ~8m)	R629			-129.981600	45.933400
Larval Array H	Cloud (S/SW of N6 ~8m)	R629			-129.981600	45.933400
Larval Array I	ROPOS Vent	R632			-130.014050	45.933283
Larval Array J	Gollum Vent	R632			-130.013583	45.933583
Larval Array K	Cloud/Mkr-N6/21	R623	R629	R629-0010	-129.981600	45.933400
Larval Array K	Cloud/Mkr-N6/21	R623	R629	R629-0010	-129.981600	45.933400
Larval Array L	ROPOS Vent	R624			-130.014050	45.933283
Larval Array M	Virgin Vent	R632			-130.013483	45.933650
Larval Array N	Virgin's Daughter	R632			-130.013400	45.933750
Larval Traps 1	ROPOS Vent	R624	capped R632	on the bottom/Crack	-130.014050	45.933283
Larval Traps 10	Virgin Vent	R624	R632	R632-0002	-130.013483	45.933650
Larval Traps 11	Virgin Vent	R624	R632	R632-0001	-130.013483	45.933650
Larval Traps 12	Virgin Vent	R624	capped R632	on the bottom/Crack	-130.013483	45.933650
Larval Traps 2	ROPOS Vent	R624	R632	R632-0003	-130.014050	45.933283
Larval Traps 3	ROPOS Vent	R624	R632	R632-0004	-130.014050	45.933283
Larval Traps 4	ROPOS Vent	R624	capped R632	on the bottom/Crack	-130.014050	45.933283
Larval Traps 5	Cloud/Mkr-N6/21	R623	R629	R629-0002	-129.981600	45.933400
Larval Traps 6	Cloud/Mkr-N6/21	R623	R629	R629-0003	-129.981600	45.933400
Larval Traps 7	Cloud/Mkr-N6/21	R623	R629	R629-0001	-129.981600	45.933400
Larval Traps 8	Cloud/Mkr-N6/21	R623	R629	R629 -0004	-129.981600	45.933400
Larval Traps 9	Virgin Vent	R624	capped R632	on the bottom/Crack	-130.013483	45.933650
Mkr 21	Cloud (in the pit) near Mkr-N4	R543			-129.981670	45.933420
Mkr 60	Caldera center (more or less) 5 m south of Bmrk-63	R623			-130.010170	45.955220
Mkr 61	Caldera center (more or less) 5 m north of Bmrk-63	R623			-130.010170	45.955220
Mkr-2	Hell Vent	R624			-130.014233	45.933300
Mkr-53	Mkr-33/Bmrk-5	R623			-129.982420	45.933350
Mkr-65	Bag City (SW of vent)	R548			-129.989630	45.916010
Mkr-67	Magnesia	R547			-129.984933	45.946233
Mkr-M (at modified Nascent position)	Nascent Vent	R543			-129.981597	45.935840
MTR 1055	Mkr-113	R627			-129.988238	45.922728
MTR 3017	T&S Spires	R497			-130.027168	45.989153
MTR 3026	Gollum Vent	R545	R624	R624-0035	-130.013583	45.933583
MTR 3029	Bag City/Mkr-36	R623			-129.989425	45.916167
MTR 3039	Mkr-33	R622			-129.982190	45.933170
MTR 3041	Gollum Vent	R624			-130.013583	45.933583

Experiment etc.	Vent/Marker	Deployed	Recovered	Sample	Longitude	Latitude
MTR 3043	Mkr-33	R622			-129.982190	45.933170
MTR 3045	Mkr-N3	R547	R622	R622-0037	-129.985200	45.943800
MTR 3045	Cloud/Mkr-N4	R625			-129.981670	45.933420
MTR 3048	NW of Inferno Vent x=421387, y=5087175	R545			-130.013900	45.933550
MTR 3049	Bag City/Mkr-36	R623			-129.989425	45.916167
MTR 3053	Mkr-33	R622			-129.982190	45.933170
MTR 3054	Snail/Mkr-N8	R622			-129.981900	45.933200
MTR 3055	Snail/Mkr-N8	R622			-129.981900	45.933200
MTR 3087	Snail/Mkr-N8 (nearby)	R547	R622	R622-0011	-129.981900	45.933200
MTR 3087 on RAS	Cloud/Mkr-N6/21	R625	R627		-129.981600	45.933400
MTR 3176	Mkr-N3	R547	R622	R622-0038	-129.985200	45.943800
MTR 3196	Castle Vent (near Anhydrite spire)	R547	R627	R627-0007	-129.980057	45.926168
MTR 3197	Bag City/Mkr-36	R548	R627	R627-0026	-129.989425	45.916167
MTR 3201	Castle Vent (near Anhydrite spire)	R627			-129.980057	45.926168
MTR 3201	ROPOS Vent	R545	R624	R624-0037	-130.014050	45.933283
MTR 3208	Cloud/Mkr-N6/21	R543	R622	R622-0021	-129.981600	45.933400
MTR 3289	Mkr-33	R543	R622	R622-0007	-129.982190	45.933170
MTR 3292	Mkr-33	R543	R622	R622-0009	-129.982190	45.933170
MTR 3292	Cloud/Mkr-N6/21	R625			-129.981600	45.933400
MTR 3300	Mkr-33	R543	R622	R622-0008	-129.982190	45.933170
MTR 3309	near Mkr-M (Nascent area)	R548	R622	R622-0029 lost - hole in purse	-129.981597	45.935840
MTR 3315 (reposition R552)	Bag City/Mkr-36 (near nemonet cam)	R548			-129.989425	45.916167
MTR 3317	Coquille	R551			-129.993058	45.917530
MTR 3320	Snail/Mkr-N8 (nearby)	R547	R622	R622-0012	-129.981900	45.933200
MTR 3334	Mkr-N41 (near Nascent)	R543	R622	R622-0027	-129.981383	45.936217
MTR 3334	Gollum Vent	R624			-130.013583	45.933583
MTR 4001	Cloud/Mkr-N4	R543	R622	R622-0023	-129.981670	45.933420
MTR 4101	Cloud/Mkr-N6/21	R625			-129.981600	45.933400
MTR 4101	Cloud/Mkr-N6/21	R543	R622	R622-0022	-129.981600	45.933400
MTR 4108	Coquille	R551			-129.993058	45.917530
MTR 4126	Mkr-113	R551			-129.988238	45.922728
MTR 4128	Casper (Coquille)	R627			-129.992970	45.917370
MTR 4128	Old Worms	R547	R622	R622-0033	-129.983308	45.945105
MTR-3211	3 m S of Mkr-N41 (near Nascent)	R548	R622	R622-0028	-129.981383	45.936217
MTR3211 recovered R622	Nascent Vent/Mkr-M	R543	R622 - lost from purse	R622-0029 lost	-129.981597	45.935840
NeMO Net'00 Camera and Tprobes	Bag City/Mkr-36	R552	between R623 and R624		-129.989425	45.916167
osmo MBARI	Cloud/Mkr-N6/21	R627			-129.981600	45.933400
osmosampler	Mkr-33	MBARI'00	couldn't find on R630		-129.982190	45.933170
Osmosampler	Cloud/Mkr-N6/21	MBARI'00	R629	R629-0006	-129.981600	45.933400
OsmoSampler	Magnesia	R499	moved to Mkr-N41-R548		-129.984933	45.946233
OsmoSampler	Milky/Mkr-N2	R474			-129.984753	45.945142

Experiment etc.	Vent/Marker	Deployed	Recovered	Sample	Longitude	Latitude
Osmosampler (didn't work)	Hell Vent	R503	R624	R624-0022	-130.014233	45.933300
Osmosampler (didn't work)	Inferno Vent	R503			-130.013900	45.933550
osmosampler (green)	Mkr-33	R630			-129.982190	45.933170
osmosampler (red)	Cloud/Mkr-N6/21	R629			-129.981600	45.933400
RAS	Cloud/Mkr-N6/21	R630			-129.981600	45.933400
RAS (short term) - 46 smps	Cloud/Mkr-N6/21	R625	R627	R627-0001	-129.981600	45.933400
VEMCO 98-223	Inferno Vent	Alvin3246			-130.013900	45.933550
	Mkr-113	Mkr-113 released by mistake	Mkr-113 released by mistake - R627		-129.988238	45.922728

6.0 ROPOS DIVE LOGS 2001

6.1 R618 DIVE LOG

Area: South Cleft (benchmark-7)

R618 SUMMARY: On our first dive of the year we found extensometer and benchmark 7. The infrared (IR) connection to download the data was not functioning. There was a deckset problem with the nav. The dive was aborted due to air in tether.

Bottom Time: 7/15(JD196) 1517 - 1538

Time (UTC)	Z (m)	Hdg	R618 Comments	Samples	Investigator	SubSamples	FrGrab
			SERIAL DRIVER NOT ON 21:05:51 - 22:19:59. NO TIME UPDATES FOR THAT INTERVAL!!				
13:59:27 7/15/01	3.1	121	Sub motor up, going down @ 7:03am PCT				
13:59:27 7/15/01	0.7	70.8	ROPOS in the water				
14:15:29 7/15/01	426.3	274	Not getting GPS from the ship, quitting out of NAV and restarting. Time really 14:35.				
14:27:57 7/15/01	744.3	242	GPS back up, time correct now.				
15:09:13 7/15/01	2153	7.7	Out of the cage, almost on the bottom.				
15:17:35 7/15/01	2220	15	On the bottom, but NAV still not up.				
15:18:35 7/15/01	2217	90.5	Found extensometer #7. There is air in the tether though, so it will probably be a short dive.				
15:18:35 7/15/01	2217	90.5	Preparing to download data from ext#7. Time is 15:24, NAV is not updating again.				
15:27:13 7/15/01	2215	42.4	Pulling out the IR sensor to download data.				
15:29:23 7/15/01	2215	42.7	So far just getting garbage, turning the IR sensor around to see if the LED is working.				
15:29:23 7/15/01	2215	42.7	Repositioning to try downloading again from #7 at 15:34. NAV updating inconsistently.				
15:34:23 7/15/01	2215	42.6	Deckset problem with NAV. NAV won't work for the dive.				
15:38:29 7/15/01	2215	88	Couldn't make the IR connection to download data. Going back to the cage to surface because of air in the tether.				
15:46:43 7/15/01	2215	88.8	Coming up.				
15:54:27 7/15/01	2176	1.1	ROPOS in the cage, starting to ascend.				
16:20:29 7/15/01	1263	295	we're still coming up.				
16:44:05 7/15/01	373.5	138	switched to lat/long instead of x/y to test arcview ta				
16:46:35 7/15/01	289.4	191	Switched back to x/y. Found out we're not tracking with TA because it expects to get lat/longs in a certain field, which is not happening this cruise.				
16:49:55 7/15/01	161.3	136	back to lat/long				
16:56:55 7/15/01	1	145	sub on deck				

6.2 R619 DIVE LOG

Area: South Cleft (all the extensometers and benchmarks)

R619 SUMMARY: We visited all the extensometers at S.Cleft, performing infrared data readings and pressure sensor readings. Extensometer-10 ranges were off for part of the year. Extensometer-6 was only ranging to one neighbor - probably extensometer-7. Extensometer-5 had leaked and was full of biological material. Extensometer-4 was not talking. Extensometers 2-5 were placed in the elevator for repairs. Extensometer-1 was removed from the elevator and was placed in benchmark-1 (which had no extensometer for the last year). We picked up Extensometer-9 and moved it to benchmark-3 for better coverage across the cleft.

Bottom Time: 7/16(JD197) 0236 - 7/17(JD198) 0550

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
00:36:45 7/16/02	1	89	ROPOS in the water				
02:21:25 7/16/02	2006	41	ROPOS at 2000m.				
02:32:35 7/16/02	2211	127	Cage has stopped at 2180m.				
02:33:55 7/16/02	2216	101	ROPOS can see the bottom.				
02:36:55 7/16/02	2213	129	Benchmark 7				R619-001
02:37:15 7/16/02	2212	125	At benchmark #7.				
02:38:25 7/16/02	2216	122	Benchmark 7				R619-002
02:39:45 7/16/02	2216	120	Setting up for pressure measurement.				
02:43:05 7//16/01	2216	123	IR at Benchmark 7				R619-003
02:46:38 7//16/01	2216	26	IR is "talking" with the extensometer				
02:49:18 7//16/01	2216	25	IR data is coming through well.				
02:50:58 7//16/01	2216	23	ROPOS was just "pulled" off the IR reading, will have to set-up again.				
02:52:58 7//16/01	2216	24	Connection with IR has been established.				
02:53:28 7//16/01	2216	25	IR downloading data from extensometer				R619-004
02:58:48 7//16/01	2216	25	ROPOS is doing a second IR "dump" as a result of disconnection.				
03:13:50 7//16/01	2215	231	Navigating ROPOS to take pressure sensor reading at BM 7.				
03:29:10 7//16/01	2216	88	Waiting for ship to stabilize position (winds increasing).				
03:44:40 7//16/01	2216	5	Taking pressure measurement at benchmark 7.				R619-005
03:48:10 7//16/01	2216	8	We were just pulled off station a bit.. Repositioning to start Pressure reading again.				
03:52:02 7//16/01	2216	5	Pressure measurement (Take 2) at BM 7				R619-006
04:05:02 7//16/01	2216	7	Pulled off station again.				
04:07:04 7//16/01	2216	12	P. measurement ended at 0405.				
04:08:34 7//16/01	2210	26	Moving ROPOS to BM 8				
04:10:34 7//16/01	2217	208	Going back to the cage for tether management.				
04:20:14 7//16/01	2213	346	Still looking for BM 8.				
04:25:44 7//16/01	2215	226	Approaching BM 8.				R619-007
04:26:24 7//16/01	2216	217	At BM 8.				R619-008
04:30:36 7//16/01	2216	298	Begin pressure reading at BM 8 at 0431.				R619-009
04:51:26 7//16/01	2216	298	Finished pressure reading at 0452 for BM 8.				
04:59:16 7//16/01	2216	133	Grabbing IR reader at BM8.				R619-010
05:01:08 7//16/01	2216	134	IR reading started at 0502 at BM 8.				R619-011
05:04:38 7//16/01	2216	134	IR reading at BM 8.				R619-012

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
05:04:48 7//16/01	2216	135	Lost IR port reading, start over.				
05:08:18 7//16/01	2216	134	Jelly at BM 8				R619-013
05:08:28 7//16/01	2216	134	Same jelly at BM 8.				R619-014
05:11:58 7//16/01	2216	136	Finished IR reading at BM 8 at 0512				R619-015
05:13:08 7//16/01	2214	268	Navigating ship and ROPOS to BM 9				
05:17:48 7//16/01	2185	108	ROPOS at the cage.				R619-016
05:43:50 7//16/01	2218	238	Suspension feeding brisingid starfish on transit to BM 9.				R619-017
05:49:30 7//16/01	2216	244	Approaching BM 9.				R619-018
05:50:10 7//16/01	2218	266	At BM 9.				R619-019
05:52:20 7//16/01	2218	256	Lining up IR port at BM 9.				R619-020
05:54:40 7//16/01	2218	255	Begin IR reading for BM 9 at 0555.				
05:56:50 7//16/01	2218	256	Wood at BM 9				R619-021
06:01:32 7//16/01	2218	255	Finished IR reading for BM 9 at 0609				
06:01:32 7//16/01	2218	255	B. Chadwick and S. Merle are updating the time.				
06:19:44 7//16/01	2218	341	Beginning pressure measurement at BM 9 at 0620.				R619-022
06:28:54 7//16/01	2218	341	Fish at BM 9.				R619-023
06:29:04 7//16/01	2218	341	Fish at BM 9.				R619-024
06:29:04 7//16/01	2218	342	Fish at BM 9.				R619-025
06:29:24 7//16/01	2217	342	Same fish at BM 9.				R619-026
06:30:24 7//16/01	2218	342	Fish at BM 9.				R619-027
06:40:56 7//16/01	2218	341	Finish Pressure reading at BM 9				
06:44:46 7//16/01	2218	339	Trying to pick up a piece of wood for Verena before moving onto BM 10.				
06:50:46 7//16/01	2218	3	(z=2215)Taking wood sample from Bmrk-9. Wood has been here since benchmark deployment summer of 1999. (391892/4946684 44 39.923'/130 21.825')	R619-0001	Tunnicliffe		
06:50:46 7//16/01	2217	3	Taking wood sample from BM 9.				R619-028
06:51:56 7//16/01	2218	3	Setting wood in Bio box.				R619-029
06:52:36 7//16/01	2218	2	Piece of wood is in biobox. Moving on to BM 10.				
07:00:26 7//16/01	2214	291	Moving towards BM 10.				
07:06:08 7//16/01	2215	271	Cage motor off, trying to get a good position.				
07:10:18 7//16/01	2213	318	BM 10 is in view. Big crab on the benchmark.				
07:11:28 7//16/01	2215	251	Arriving at BM 10.				R619-030
07:12:38 7//16/01	2217	259	Crab on BM 10				R619-031
07:13:48 7//16/01	2216	260	IR reading starting at 0714.				
07:13:58 7//16/01	2217	259	IR on BM 10				R619-032
07:20:38 7//16/01	2217	260	Starting the data transfer at BM 10 at 0721.				
07:32:00 7//16/01	2216	259	Done with IR reading at 0732.				
07:32:40 7//16/01	2217	260	Setting up for pressure reading at BM 10.				
07:40:20 7//16/01	2216	266	Grabbing the pressure sensor at BM 10.				
07:45:30 7//16/01	2216	345	Beginning pressure measurement at BM 10 at 0746.				
07:45:30 7//16/01	2216	344	Pressure reading at BM 10.				R619-033

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
07:48:50 7//16/01	2216	344	Crab on BM 10.				R619-034
07:52:08 7//16/01	2214	350	Heading off to BM 6 at 1/2 knot.				
08:04:52 7//16/01	2217	344	End pressure measurement at BM 10 at 0805.				
08:06:32 7//16/01	2216	332	Putting sensor away before heading to BM 11.				
08:08:02 7//16/01	2213	313	Moving the ship to BM 11.				
08:11:32 7//16/01	2217	284	BM 11 in view- oh no, that's biota.				
08:11:42 7//16/01	2217	278	Pen sponge type-thing looking like BM 11.				R619-035
08:21:04 7//16/01	2216	191	Still looking for BM 11.				
08:30:34 7//16/01	2216	242	Seastar near BM 11.				R619-036
08:37:26 7//16/01	2213	6	Still looking for BM 11.				
08:40:26 7//16/01	2216	288	Saw a glimpse of BM 11.				
08:40:56 7//16/01	2213	321	BM 11 is in view- approaching BM 11.				
08:41:36 7//16/01	2213	306	BM 11.				R619-037
08:42:26 7//16/01	2216	296	Pressure sensor at BM 11.				R619-038
08:42:36 7//16/01	2216	296	Getting pressure sensor ready at BM 11.				
08:49:16 7//16/01	2216	293	Starting pressure measurement at BM 11 at 0849.				
08:49:16 7//16/01	2216	293	Pressure measurements at BM 11.				R619-039
09:08:58 7//16/01	2216	293	Ending pressure measurement at BM 11 at 0909.				
09:14:18 7//16/01	2216	294	Positioning the IR sensor at BM 11.				
09:20:48 7//16/01	2216	39	We have the IR talking to extensometer 11.				
09:20:48 7//16/01	2216	39	IR on BM 11.				R619-040
09:24:30 7//16/01	2217	39	Talking with BM 11.				
09:26:40 7//16/01	2216	40	Starting data download at 0927 at BM11.				
09:28:50 7//16/01	2216	40	Going to reposition at BM 11 because data downloading is inconsistent.				
09:30:40 7//16/01	2216	39	We have repositioned and are talking again at BM 11.				
09:31:10 7//16/01	2216	40	Starting our third download attempt at BM 11.				
09:42:32 7//16/01	2216	40	Doing a second download (on our third attempt) at BM 11 because we aren't getting good ranges.				
09:46:42 7//16/01	2216	22	Got pulled off BM 11. GPS is flaking out so ship moved.				
09:49:12 7//16/01	2215	36	Trying to reposition at BM 11.				
09:55:32 7//16/01	2216	36	Going back into BM 11 with IR. Got something.				
09:56:14 7//16/01	2216	36	Positioned at BM 11 to reset clock.				
10:01:14 7//16/01	2216	36	All done at BM 11. Putting IR sensor away before heading to BM 12.				
10:08:34 7//16/01	2217	288	Looking for BM 12.				
10:14:54 7//16/01	2215	299	Bringing the cage up a bit.				
10:24:36 7//16/01	2195	35	BM 12 is in view.				
10:27:46 7//16/01	2197	71	Top of BM 12.				R619-041
10:31:56 7//16/01	2199	341	Taking out the IR sensor at BM 12.				
10:32:36 7//16/01	2199	341	IR at BM 12.				R619-042
10:32:56 7//16/01	2199	340	Attempting to talk to BM 12.				
10:36:06 7//16/01	2199	340	We are talking to BM 12.				

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
11:03:58 7//16/01	2199	233	IR out and tucked away, now taking pressure at BM 12.				R619-043
11:25:40 7//16/01	2199	233	We are done with pressure, waiting while Bill looks at the data.				
11:27:00 7//16/01	2199	233	Data from BM 8 still looks good. All the ranges from BM 10 are offset from part of the year. Preparing to head to BM 7 to close the loop.				
11:31:20 7//16/01	2200	246	Holding the pressure sensor in the arm for use at BM 7.				
11:34:00 7//16/01	2197	282	Cage motor is on.				
11:34:50 7//16/01	2197	191	Following tether to cage.				
11:39:10 7//16/01	2205	109	Communicating with the bridge to move the stern of ship over BM 7.				
11:41:40 7//16/01	2219	103	Speed at one knot.				
11:42:40 7//16/01	2198	339	Video is being turned off for the duration of transit in the water column to BM 7.				
12:08:24 7//16/01	2178	99	Ship is arriving on BM 7.				
12:14:44 7//16/01	2215	161	Starting the video.				
12:16:14 7//16/01	2218	162	Looks like we are too deep, heading east.				
12:21:34 7//16/01	2211	57	Pulling up to BM 7.				
12:22:44 7//16/01	2214	2	pressure sensor#7		Chadwick		R619-044
12:23:14 7//16/01	2214	4	Preparing to make a pressure measurement at BM 7.				
12:25:04 7//16/01	2214	3	Begin pressure measurement at BM 7.				
12:25:04 7//16/01	2214	3	Pressure measurement at benchmark 7				R619-045
12:44:46 7//16/01	2214	3	End of pressure measurement at BM 7.				
12:48:26 7//16/01	2212	100	Heading to BM 6 at 1/2 knot.				
12:55:48 7//16/01	2210	86	Cage motor is off.				
12:57:18 7//16/01	2212	58	Benchmark 6 in sight.				
13:00:28 7//16/01	2214	278	Arriving at BM 6.				
13:01:38 7//16/01	2214	264	Maneuvering the pressure sensor into position.				
13:01:58 7//16/01	2214	265	pressure measurement #6				R619-046
13:03:38 7//16/01	2214	266	Starting pressure measurements at BM 6.				
13:03:38 7//16/01	2214	266	BM # 6				R619-047
13:22:38 7//16/01	2214	265	fish at BM6				R619-048
13:22:48 7//16/01	2214	263	fish at BM6				R619-049
13:22:58 7//16/01	2214	265	fish over substrate at BM 6				R619-050
13:24:08 7//16/01	2215	266	Finishing pressure measurements at BM 6, putting pressure sensor away and preparing to do IR download.				
13:27:50 7//16/01	2214	346	Handoff between pressure sensor and IR complete.				
13:31:20 7//16/01	2215	10	Plugging IR sensor into BM 6.				
13:31:50 7//16/01	2215	11	Still attempting to plug in.				
13:32:30 7//16/01	2215	11	Talking, but need to stabilize.				
13:33:00 7//16/01	2215	11	Communication successful, position looks good.				
13:33:10 7//16/01	2215	11	infra red upload BM 6				R619-051
13:37:10 7//16/01	2215	11	Checks complete, starting data transfer.				

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
13:40:40 7//16/01	2214	10	Finished transfer, checking data before departing.				
13:47:02 7//16/01	2215	11	Only range to a single neighbor (likely BM 7) out of 4 was successful.				
13:49:00 7//16/01	2215	12	Debris cloud in water, likely "something" went through the bow thruster.				
13:51:12 7//16/01	2215	12	We are done with IR at BM 6 and preparing to head to BM 5.				
13:52:30 7//16/01	2213	60	Is the debris a fresh eruption? What is going on?				
13:52:40 7//16/01	2214	74	Strange materials in water at Bmrk-6 (later discovered it was a fish that went through the thruster).				R619-052
13:53:12 7//16/01	2214	97	Checking out how extensive the flocculent in the water column is.				
13:55:42 7//16/01	2214	282	Trying to find the source. "Looks like bacterial mat".				
13:57:02 7//16/01	2215	4	Zooming in on the unidentified white material.				
13:57:22 7//16/01	2215	4	Part of dead fish?				R619-053
13:58:32 7//16/01	2214	4	Crab feeding on white tissue.				R619-054
14:01:12 7//16/01	2214	91	Going toward the Rift Valley to see if there is any source from that direction.				
14:03:12 7//16/01	2213	260	Heading to the north side of BM 5.				
14:05:02 7//16/01	2209	96	Moving the ship at 1/2 knot to BM 5.				
14:07:12 7//16/01	2214	100	BIG fish!				
14:13:22 7//16/01	2214	84	Gorgonian				R619-055
14:15:32 7//16/01	2209	146	BM 5 in sight.				
14:17:22 7//16/01	2213	149	BM 5				R619-056
14:30:34 7//16/01	2216	338	Trying to find a stable position to set down.				
14:31:34 7//16/01	2215	337	IR at BM 5				R619-057
14:36:54 7//16/01	2215	336	Still trying to make a IR connection at BM 5, difficult to find a stable position.				
14:52:06 7//16/01	2216	327	Still can't get a reading at BM5, zoomed in and found lots of biological material (probably diatoms) growing over the sensor. We're going to take a pressure sensor here and then move on to BM#4.				
14:52:16 7//16/01	2216	326					R619-058
14:52:36 7//16/01	2216	326	Lost of goop inside, probably diatoms.				R619-059
15:03:28 7//16/01	2216	334	Starting to take a pressure measurement at BM5.				
15:24:58 7//16/01	2216	334	Stopped pressure measurement.				
15:29:40 7//16/01	2214	94	Moving the ship. Starting to move to BM4.				
15:37:30 7//16/01	2214	90	NAV down. Hanging around until we can get it back up.				
15:44:32 7//16/01	2214	77	Looking around for BM4. Still having problems with NAV.				
15:51:20 7//16/01	2214	195	Found BM4.				
15:51:50 7//16/01	2215	188	BM4				R619-060
15:52:20 7//16/01	2216	164	Crab on BM4				R619-061
15:53:50 7//16/01	2216	164	Positioning to make pressure measurement at BM4.				
15:59:10 7//16/01	2216	193	Starting to take pressure measurement at BM4.				
16:11:03 7//16/01	2216	194	Close up of spider crab hanging out on BM4. Most of it's legs are missing.				R619-062

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
16:18:53 7//16/01	2216	194	Stopped taking pressure measurement at BM4.				
16:26:33 7//16/01	2216	110	Positioning for IR connection.				
16:30:13 7//16/01	2216	110	Downloading data from BM4. First try!				
16:33:23 7//16/01	2216	110					R619-063
16:34:15 7//16/01	2216	110	Finished download.				
16:39:37 7//16/01	2216	108	Repositioning slightly to try download again because data from first try showed that BM4 wasn't talking to it's neighbors.				
16:42:57 7//16/01	2216	116	Data on the second try looked the same: BM4 instrument looks fine, but probably no acoustics. No valid ranges recorded.				
16:44:37 7//16/01	2215	106	Moving to BM3. Still don't have good NAV, no good fixes.				
16:46:37 7//16/01	2216	109	Between BM4 and BM3.				R619-064
17:15:09 7//16/01	2213	166	BM3 in sight.				
17:15:49 7//16/01	2215	177					R619-065
17:17:09 7//16/01	2216	178	Positioning for IR connection. Got it again on first try!				
17:18:49 7//16/01	2216	178	IR download from BM3.				R619-066
17:32:21 7//16/01	2216	178	IR data dump done.				
17:33:51 7//16/01	2215	181	Positioning for pressure measurement at BM3.				
17:35:31 7//16/01	2216	180	NAV turned off so we can ping on elevator.				
17:35:31 7//16/01	2216	180	Start pressure measurement at BM3 at 17:40. Time etc. not updating because NAV turned off.				
17:35:31 7//16/01	2216	180	Pressure measurement invalid- ROPOS moved accidentally. Will have to restart measurement.				
17:35:31 7//16/01	2216	180	Restarted pressure measurement at 17:47.00.				
18:06:45 7//16/01	2216	45	Finished pressure measurement at BM3.				
18:08:45 7//16/01	2216	56	Moving to BM2. Still no good fixes from NAV.				
18:21:07 7//16/01	2215	148	BM2 in sight.				
18:21:17 7//16/01	2213	152	BM2				R619-067
18:24:07 7//16/01	2217	193	Positioning to take pressure measurement.				
18:27:17 7//16/01	2217	191	Starting pressure measurement at 18:27:30.				
18:28:27 7//16/01	2217	191	Wood block at BM2				R619-068
18:30:37 7//16/01	2217	191					R619-069
18:34:09 7//16/01	2217	191	Video camera close ups of the wood piece. There are 4-5 shrimp or amphipods living within the forward edge.				
18:39:39 7//16/01	2217	191	Close-up of scale worm on wood block				R619-070
18:39:39 7//16/01	2217	191	Worm moving across wood block				R619-071
18:39:39 7//16/01	2217	191	Close up of scale worm crawling around the top of the wood. Looks like a Harmothoe.				
18:39:39 7//16/01	2217	191	Finished pressure measurement at BM2.				
18:58:33 7//16/01	2217	300	Positioning for IR connection				
18:59:13 7//16/01	2217	299	IR connection locked in at BM2				
19:12:53 7//16/01	2217	299	Finished IR at BM2				
19:14:07 7//16/01	2217	299	Wood at base of benchmark		Verena		R619-072

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
19:20:51 7//16/01	2217	271	Rope pulled right through plank				R619-073
19:21:31 7//16/01	2217	269	Trying to grab piece of wood				
19:23:21 7//16/01	2217	262	Got it!				
19:25:01 7//16/01	2217	261	Put piece of wood in bio box (z=2215)from beneath bmrk-2. Wood was there since deployment of benchmark summer '99.	R619-0002	Tunnicliffe		
19:34:03 7//16/01	2217	255	Getting ready to grab extensometer #2				
19:35:03 7//16/01	2217	254	Picked up extensometer #2				
19:35:03 7//16/01	2217	254	Picking up extensometer #2 to bring home. Didn't move the benchmark.				R619-074
19:35:03 7//16/01	2217	254	ROPOS headed back near the cage				
19:40:51 7//16/01	2183	336	Ship is moving to elevator drop position				
19:57:23 7//16/01	2183	273	Ship is at the elevator position				
19:57:23 7//16/01	2183	273	Looking for the elevator				
20:01:51 7//16/01	2213	319	Found the elevator				
20:04:49 7//16/01	2214	316	Dropped extensometer #2 into elevator				
20:04:49 7//16/01	2213	309	Putting extensometer #2 in elevator to bring up to work on.				R619-075
20:10:17 7//16/01	2211	95	Pulling extensometer #1 out of elevator				
20:13:17 7//16/01	2218	50	Crab eating big fish - Tuna? - with other big fish in background.		Chadwick		R619-076
20:13:37 7//16/01	2218	50	Crabs eating big fish -- tuna?		Chadwick		R619-077
20:13:47 7//16/01	2218	64	Watching spider crabs eat a tuna-like fish				
20:14:17 7//16/01	2217	51	Put the extensometer down in order to get a better grip				
20:14:17 7//16/01	2217	51	Got the extensometer locked in				
20:19:01 7//16/01	2201	297	ROPOS headed back to the cage				
20:20:11 7//16/01	2188	333	Having the ship move to 50 m west of BM 1 at 1 knot				
20:30:05 7//16/01	2182	83	Bringing the cage up a little bit (to 2150 m)				
20:51:49 7//16/01	2196	114	ROPOS on the bottom				
20:56:49 7//16/01	2194	164	Turned the cage motor off				
21:00:11 7//16/01	2195	164	Found BM #1				
21:05:41 7//16/01	2197	56	Positioning to put extensometer into BM#1				
21:14:31 7//16/01	2197	78	Placed the extensometer into BM #1				
21:15:31 7//16/01	2197	85	Getting ready to do IR				
21:15:41 7//16/01	2197	85	locked in to do IR				
21:15:41 7//16/01	2197	85	IR link at Benchmark #1		Chadwick		R619-078
21:32:05 7//16/01	2197	85	Finished with IR at BM#1				
21:40:09 7//16/01	2197	73	Getting ready to take pressure measurement at BM#1				
21:49:47 7//16/01	2197	85	Beginning pressure measurement at BM 1.				R619-079
21:49:57 7//16/01	2197	85	Begin pressure measurement at BM#1. Instead of taking measurement on the nose, we are using the gray slider on the opposite end since the nose is inaccessible.				
22:05:29 7//16/01	2197	85	pressure measurement at BM#1 after p-sensor got moved slightly				R619-080
22:05:39 7//16/01	2197	85	At 22:03 pressure-sensor moved slightly				

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
22:14:09 7//16/01	2197	85	Finished pressure-measurements at BM#1, on the way to extensometer #3.				
22:43:11 7//16/01	2214	324	Located extensometer #3				
22:47:11 7//16/01	2215	297	Attempting to grab extensometer #3.				
22:50:11 7//16/01	2211	285	Extensometer #3 has been captured, ROPOS heading back to cage.				
22:51:23 7//16/01	2211	271	jellyfish?				R619-081
23:01:23 7//16/01	2189	109	Proceeding to elevator to put extensometer #3 in it.				
23:21:45 7//16/01	2214	250	cage motor is off.				
23:28:45 7//16/01	2214	279	Cage motor is back on...just located elevator and will now put extensometer in it.				
23:34:45 7//16/01	2214	348	Loading extensometer #3 into elevator				R619-082
23:34:45 7//16/01	2214	358	Extensometer #3 has been put in the elevator. Cage motor has been turned back off to get a fix of the elevator location.				
23:39:05 7//16/01	2199	356	Cage motor is back on.				
23:43:25 7//16/01	2207	316	Heading to BM 4 to get extensometer #4 to be later placed in elevator.				
23:58:09 7//16/01	2212	93	Located extensometer #4 and will now attempt to grab it.				
00:03:21 7/17/01	2216	23	Picking up extensometer #4				R619-083
00:05:41 7/17/01	2214	26	Extensometer has been picked up by ROPOS without disturbing the base.				
00:07:01 7/17/01	2208	129	Heading to elevator to put extensometer 4 in it.				
00:08:41 7/17/01	2208	123	Located elevator and will now put extensometer #4 in it.				
00:09:41 7/17/01	2214	149	Extensometer 4 in the elevator.				R619-084
00:09:51 7/17/01	2214	158	Extensometer #4 is in the elevator and now heading to BM#5.				
00:33:13 7/17/01	2214	283	Have spotted extensometer #5 and will pick it up.				
00:34:13 7/17/01	2215	323	arriving at BM 5				R619-085
00:37:33 7/17/01	2215	320	Extensometer #5 has been picked up and will now be carried to the elevator.				
00:40:23 7/17/01	2203	239	Moving the ship back to the elevator.				
01:00:26 7/17/01	2208	257	Ship has arrived at the elevator.				
01:01:16 7/17/01	2208	184	Have spotted the elevator and will place extensometer #5 in to it.				
01:03:26 7/17/01	2214	15	Dropping extensometer #5 into elevator				R619-086
01:03:36 7/17/01	2214	18	Extensometer #5 has been placed in the elevator.				
01:10:56 7/17/01	2195	186	Moving ship to BM#7. Elevator has been secured for release to the surface.				
01:16:06 7/17/01	2185	358	video has been turned off for transit to BM#7.				
01:37:28 7/17/01	2211	20	video is back on				
01:44:28 7/17/01	2216	270	Pillar near BM#7				R619-087
01:51:30 7/17/01	2212	56	Located extensometer #7.				
01:52:30 7/17/01	2214	20	Extensometer #7.				R619-088
01:57:02 7/17/01	2215	15	01:57 begin pressure measurement at BM7.				
01:57:42 7/17/01	2215	15	Pressure reading at BM#7				R619-089

Time (UTC)	Z (m)	Hdg	R619 Comments	Samples	Investigator	SubSamps	FrGrab
02:16:52 7/17/01	2216	16	End pressure measurement at 02:17.				
02:22:08 7/17/01	2207	35	Moving ship to BM#9.				
02:42:50 7/17/01	2214	346	Looking for BM#9				
02:46:52 7/17/01	2214	316	Have located extensometer #9				
02:48:22 7/17/01	2218	326	Extensometer #9				R619-090
02:52:42 7/17/01	2218	319	Picking up extensometer 9 and moving to BM 3.				
02:53:42 7/17/01	2218	318	Picking up extensometer #9				R619-091
02:55:22 7/17/01	2210	263	ROPOS moving back to cage with extensometer 9 in right arm.				
02:57:42 7/17/01	2187	154	stopping tape upon transit to BM 3				
03:34:44 7/17/01	2215	242	Tapes started at 0331				
03:40:06 7/17/01	2215	20	BM 3 in sight.				R619-092
03:45:16 7/17/01	2216	279	Mistaken identity. We almost placed extensometer in BM 4. Navigating to BM 3.				
05:26:00 7/17/01	2216	185	Placing extensometer in BM #3				R619-093
05:26:00 7/17/01	2216	185	Finally found BM 3				R619-094
05:34:04 7/17/01	2216	94	Making IR connection with extensometer 9 in BM 3 to inform the circuitry that it is now placed at BM 3.				
05:38:34 7/17/01	2216	42	Calibrating Extensometer #9 to its new home at BM3				R619-095
05:43:04 7/17/01	2216	43	Finished IR reading. Doing ROPOS gauge check before ascent.				
05:51:06 7/17/01	2081	198	Tapes turned off.				
05:56:46 7/17/01	1891	158	JD198 7/17 ROPOS off the bottom at 0550.				
07:00:00 7/17/01	78	358	ROPOS is in the cage.				
07:04:50 7/17/01	1	120	ROPOS is on the deck. Dive R619 is over.				

6.3 R621 DIVE LOG (South Cleft: Vent1, Plume Vent)

Area: South Cleft (Vent1, Plume Vent)

R621 SUMMARY: While at chimney-342 Vent 1, two hobos were deployed and two gastight samples were taken. We then moved on to Plume Vent where we deployed one hobo, recovered one hobo, sampled a sulfide structure and suction sampled orange mat.

Bottom Time: 7/17(JD198) 2215 - 7/18(JD199) 0317

Time (UTC)	Z (m)	Hdg	R621 Comments	Samples	Investigator	SubSamples	FrGrab
20:36:57 7/17/01	46	69	ROPOS in the water at 20:35. This dive had to be designated 621 due to length of time and work done on ROPOS while on deck. (R620 was a ballast dive.)				
20:38:07 7/17/01	42	241	Serial driver is up and running: times are ok now				
22:02:43 7/17/01	2003	348	We're at 2000 m				
22:12:53 7/17/01	2182	12	ROPOS is going through some sort of smoky plume				
22:17:05 7/17/01	2219	346	On the bottom				
22:19:15 7/17/01	2211	302	Vent 1		Chadwick		R621-001
22:19:35 7/17/01	2212	307	We're at chimney 284, Vent1				
22:22:15 7/17/01	2213	353	Fish scared out of hole in chimney 342, vent 1.				R621-002
22:22:45 7/17/01	2214	6	We're at chimney 342 now				
22:24:55 7/17/01	2210	341	In sight of a black smoker				
22:28:25 7/17/01	2203	184	Chimney 342 at vent field 1				R621-003
22:28:55 7/17/01	2206	184	Encountering a really tall chimney				
22:28:55 7/17/01	2206	183	Chimney 342 at vent field 1				R621-004
22:29:15 7/17/01	2206	185	Chimney 342 at vent field 1				R621-005
22:29:15 7/17/01	2206	188	Chimney 342 at vent field 1				R621-006
22:30:15 7/17/01	2207	222	Chimney 342 at Vent 1				R621-007
22:34:45 7/17/01	2211	2	Chimney 342 at Vent field 1				R621-008
22:34:55 7/17/01	2211	3	Vigorously venting black smokers...				
22:35:55 7/17/01	2211	5	smoker 342 at vent field 1		Chadwick		R621-009
22:37:47 7/17/01	2210	0	We're at a smoker that's halfway up the structure, and we plan to deploy a HOBO probe and sample fluids here. There are more smokers at the very top, where we deployed the HOBO last time, but can't find it.				
22:40:57 7/17/01	2211	292	In order to fit the HOBO here, we might have to knock over a part of the structure.				
22:44:07 7/17/01	2211	300	Shimmering particles (calcopyrite?) coming out of the smoker				
22:44:17 7/17/01	2211	288	deploying hobo at chimney 342 at vent field 1				R621-010
22:48:17 7/17/01	2211	315	Preparing to deploy HOBO probe..				
22:48:57 7/17/01	2211	318	hobo deployed at chimney 342 at vent field 1				R621-011
22:49:17 7/17/01	2211	319	HOBO 150 deployed successfully at Vent1 - Chimney 342.				
22:51:27 7/17/01	2211	318	Now looking at the base of this structure for the missing HOBO				
22:54:07 7/17/01	2217	266	base of chimney 342 at vent field 1				R621-012
22:58:27 7/17/01	2215	250	Problems with the fluid sampler since we got on the bottom				
22:58:47 7/17/01	2216	308	Still searching for the missing HOBO				
23:04:37 7/17/01	2222	86	Orange-yellow bacterial mats at chimney 342 at vent 1.				R621-013
23:08:17 7/17/01	2222	42	Cool fish				R621-014
23:09:59 7/17/01	2222	43	Sea spiders				R621-015

Time (UTC)	Z (m)	Hdg	R621 Comments	Samples	Investigator	SubSamples	FrGrab
23:11:39 7/17/01	2216	65	Turning AC power to fluid sampler off				
23:14:49 7/17/01	2208	298	Close up of chimney				R621-016
23:15:09 7/17/01	2206	296	Venting chimney				R621-017
23:19:51 7/17/01	2206	337	Positioning HOBO				R621-018
23:21:01 7/17/01	2206	338	Preparing to deploy another HOBO at the top of the spire				
23:24:11 7/17/01	2206	337	Positioning HOBO				R621-019
23:24:21 7/17/01	2206	337	Turning on AC power to the fluid sampler				
23:27:33 7/17/01	2206	337	Fluid sampler still not working				
23:30:13 7/17/01	2206	337	Positioning the HOBO 134 at the top of the spire				
23:37:15 7/17/01	2207	337	HOBO successfully deployed				
23:37:25 7/17/01	2206	335	HOBO 134 in position				R621-020
23:38:55 7/17/01	2206	338	Preparing to measure temperature with fluid sampler (don't need the pump to do that; can also get gas tight samples without the pump)				
23:41:35 7/17/01	2206	282	HOBO 134 in position				R621-021
23:43:05 7/17/01	2210	335	HOBO 150 in position				R621-022
23:44:05 7/17/01	2211	350	HOBO 150 in position				R621-023
23:48:57 7/17/01	2211	6	Fluid sampler intake now in the vent				
23:49:57 7/17/01	2211	17	VFS in vent - HOBO 150 in background				R621-024
23:50:37 7/17/01	2211	13	Temperatures up to 104 degrees C				
23:51:57 7/17/01	2211	18	now 150 degrees C				
23:52:47 7/17/01	2211	22	230 degrees and going up				
23:53:07 7/17/01	2211	25	VFS - Temperature > 225 degrees C				R621-025
23:55:29 7/17/01	2211	22	Firing port gas tight bottle, T1 probe @~240 degrees C. Next to Hobo 133. (391834/4945943 44 39.522/130 21.859)	R621-GTB-0001	Evans	null	
23:56:09 7/17/01	2211	24	230 degrees: fired starboard gas tight bottle, near hobo 133. Tmax=300 C. (391834/4945943 44 39.522/130 21.859)	R621-GTB-0002	Evans	null	
23:56:19 7/17/01	2211	23	Firing port gas tight				R621-026
23:59:09 7/17/01	2210	5	ROPOS is going back to the cage for transit to plume. ~1 hr transit.				
00:00:19 7/18/01	2198	228	video has been turned off.				
01:35:51 7/18/01	2224	88	Video has been turned back on. The bottom has been sited.				
01:47:55 7/18/01	2222	184	Lava drips at Plume				R621-027
01:48:05 7/18/01	2222	185	Lava drips at Plume				R621-028
01:52:45 7/18/01	2229	222	Old chimneys and iron oxides				R621-029
01:53:45 7/18/01	2230	224	looking for active vent. Lots of Fe-oxide around				
01:57:47 7/18/01	2232	296	Located HOBO probe 137 and will attempt to recover.				
02:00:17 7/18/01	2230	314	Chimneys - one coated with Fe oxides				R621-030
02:00:27 7/18/01	2230	324	Fe oxides at Plume near HOBO 137				R621-031
02:01:07 7/18/01	2231	281	Close up of Fe oxide coated chimney				R621-032
02:01:07 7/18/01	2231	281	Close up of Fe oxide chimney - HOBO in background				R621-033
02:01:17 7/18/01	2232	267	Chimney and HOBO 137				R621-034
02:01:27 7/18/01	2232	249	Chimney has grown over probe. Wow. HOBO probe 137 was recovered at 0203. (391228/4944126 44 38.536/130 22.295)	R621-HOBO-0003	Chadwick	null	

Time (UTC)	Z (m)	Hdg	R621 Comments	Samples	Investigator	SubSamples	FrGrab
02:01:37 7/18/01	2232	256	Chimey and HOBO 137				R621-035
02:01:57 7/18/01	2232	246	Retrieving HOBO 137				R621-036
02:02:57 7/18/01	2232	245	Trying to pull HOBO out of chimney				R621-037
02:04:59 7/18/01	2232	239	ROPOS is moving the entire chimney...wow, ROPOS just pulled the whole chimney over!				
02:05:29 7/18/01	2231	267	HOBO 137 recoved from chimney, which fell over				R621-038
02:07:19 7/18/01	2230	318	HOBO 137 and melted suction sampler				R621-039
02:13:39 7/18/01	2231	44	Fe-oxides and dying chimneys abound.				R621-040
02:15:51 7/18/01	2231	31	sulfide worms				R621-041
02:16:21 7/18/01	2232	31	chimney knocked over, still diffuse venting.				R621-042
02:35:45 7/18/01	2232	2	Have been attempting to deploy HOBO #133				
02:39:15 7/18/01	2232	359	HOBO 133 in position				R621-043
02:41:37 7/18/01	2232	69	HOBO probe 133 deployed				R621-044
02:42:27 7/18/01	2232	54	Iron oxides at HOBO probe 133				R621-045
02:43:07 7/18/01	2232	38	HOBO probe 133 deployed				R621-046
02:49:27 7/18/01	2232	38	Highlights have been turned on.				
02:50:37 7/18/01	2232	38	Iron oxides at Plume near HOBO probe 133				R621-047
02:57:49 7/18/01	2233	25	Highlights have been turned off.				
02:58:29 7/18/01	2233	24	Placing iron oxide in the purse at Plume.				R621-048
02:59:30 7/18/01	2232	24	Retrieved Fe-oxide coated sulfide sample at Plume vent. (391228/4944126 44 38.536 130 22.295)	R621-SF-0004	Leveille		
03:00:52 7/18/01	2232	30	Attempting to acquire slurp sample of orange mat for Moyer.				
03:03:42 7/18/01	2232	28	slurp sample recovery at Plume Vent				R621-049
03:07:32 7/18/01	2233	28	Recovered orange microbial mat from Plume Vent.(391228/4944126 44 38.536 130 11.195)	R621-SS-J4-0005	C. Moyer		
03:07:42 7/18/01	2232	29	SS for Moyer in jar 4.				R621-050
03:09:32 7/18/01	2232	30	Highlights on.				
03:13:04 7/18/01	2234	350	Conehead.				R621-051
03:13:14 7/18/01	2234	347	strange cap atop diffuse flow.				R621-052
03:13:24 7/18/01	2234	321	Strangely shaped cap - beehive - atop diffuse flow.				R621-053
03:13:24 7/18/01	2234	326	Mat (?) covered spire.				R621-054
03:13:54 7/18/01	2233	18	Doing video survey of Plume vent with ROPOS.				
03:14:44 7/18/01	2233	317	Fe coated tubeworms at Plume				R621-055
03:15:44 7/18/01	2228	271	Highlights turned off.				
03:20:06 7/18/01	2164	111	Leaving the bottom at 0320.				
03:24:46 7/18/01	2011	91	All video tapes are turned off.				
04:35:01 7/18/01	1	103	ROPOS on deck. End of dive.				

6.4 R622 DIVE LOG

Area: 98 flow (Mkr-33, Snail, Cloud, Mkr-N41, Nascent, OldWorms, Mkr-N3)

R622 SUMMARY: Our first dive on the '98 lava flow in 2001 involved stops at Mkr-33, Snail, Cloud, Mkr-N41, Nascent, Old Worms, and Mkr-N3. Fluid sampling (HFS) and suction sampling took place at all the vents visited. Two bacteria traps were deployed at Mkr-33, and two were deployed at Cloud. Three MTRs were recovered from Mkr-33, and three more were deployed. Two MTRs were recovered from Snail, and two more were deployed. MTRs were also recovered from Cloud (3), Nascent area (4) - one was lost due to a hole in the purse), Mkr-N3 (2), and OldWorms (1). 46 samples were collected on the dive!

Bottom Time: 7/18(JD199) 1913 - 7/19(JD200) 1656

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
17:51:39 7/18/01	1	174	ROPOS in the water at 1813. Serial driver not running - so time is wrong for this entry.				
19:10:45 7/18/01	1524	116	ROPOS on the bottom NW of Snail vent				
19:12:35 7/18/01	1525	137	Larval traps/bac traps (in their box) deployed from the cage.				
19:25:27 7/18/01	1524	144	ROPOS grabbing the rope on the larval trap box in order to open it.				
19:32:47 7/18/01	1525	321	Still trying to open the larval trap box.				
19:40:43 7/18/01	1525	291	19:20 Larval settling array set down next to larval trap/bac trap box.				
19:45:13 7/18/01	1525	291	Pulling at a bac trap inside the box.				
19:46:13 7/18/01	1525	295	Got ahold of one bac trap - but it is tangled with the others.				
19:49:03 7/18/01	1525	275	Bac traps 55; 56; 57; 58 are being taken out of their box.				
19:59:05 7/18/01	1525	241	Took one larval trap (#5) out of the box				
20:05:55 7/18/01	1524	122	Got another larval trap (#8)				
20:19:27 7/18/01	1524	148	Larval trap #8 got uncorked. Trying to get it back in				
20:22:37 7/18/01	1525	262	Got larval trap #8 corked again				
20:28:17 7/18/01	1525	253	Larval trap box somehow got on its side.				
20:28:27 7/18/01	1525	254	Upright again. Trying to get the larval trap box open.				
20:39:17 7/18/01	1525	239	Taking larval traps #6 and #7 out of box.				
20:45:49 7/18/01	1525	13	Larval traps 5-8 out of box.				
20:49:29 7/18/01	1525	212	Larval trap #8 fell over. trying to pick it up				
20:51:09 7/18/01	1525	207	#8 upright again.				
20:56:19 7/18/01	1523	178	Picked up bac traps 55 and 56				
20:58:49 7/18/01	1521	337	We are headed to Marker 33				
21:03:01 7/18/01	1522	118	Seeing some signs of life.. scanning for Marker 33				
21:04:51 7/18/01	1522	118	found marker 33		Butterfield		R622-001
21:05:01 7/18/01	1521	150	Marker 33 is in sight. SERIAL DRIVER NOT ON 21:05:51 - 22:19:59. NO TIME UPDATES FOR THAT INTERVAL!!				
21:05:51 7/18/01	1523	204	Couple osmo's in sight. White material lining the cracks. The marker itself is missing				
21:05:51 7/18/01	1523	204	marker 33		Butterfield		R622-002
21:05:51 7/18/01	1523	204	marker 33		Butterfield		R622-003
21:05:51 7/18/01	1523	204	blue protazoan; tubeworms				R622-004
21:05:51 7/18/01	1523	204	blue protazoan		Butterfield		R622-005
21:05:51 7/18/01	1523	204	See the old bac traps. Lots of limpets				

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
21:05:51 7/18/01	1523	204	limpets on old bac traps		Butterfield		R622-006
21:05:51 7/18/01	1523	204	Don't see many tube worms				
21:05:51 7/18/01	1523	204	old bac traps		Butterfield		R622-007
21:05:51 7/18/01	1523	204	sampling near old bac traps		Butterfield		R622-008
21:05:51 7/18/01	1523	204	Fluid sampler intake in the flow at Marker 33 (to the right of bac traps)				
21:05:51 7/18/01	1523	204	6 degrees C and going up. 30 uM H2S. pH close to that of seawater.				
21:05:51 7/18/01	1523	204	14 degrees C and rising. pH=6.7 and going down				
21:05:51 7/18/01	1523	204	Up to 50 uM H2S but going down.				
21:05:51 7/18/01	1523	204	Repositioning fluid sampler intake in between the bac traps. Heading 210				
21:05:51 7/18/01	1523	204	Max 16.8 degrees C and going down.				
21:05:51 7/18/01	1523	204	H2Save about 45 uM. pHave=5.98. AveT1=14.3 degreesC				
21:05:51 7/18/01	1523	204	Now moving to the left of the bac traps. In search of higher temperatures.				
21:05:51 7/18/01	1523	204	13 degrees C and going up.				
21:05:51 7/18/01	1523	204	letting h2s and ph stabilize for possible sample		Butterfield		R622-009
21:05:51 7/18/01	1523	204	looking for another site for sampling within Mkr 33 crack.				R622-010
21:05:51 7/18/01	1523	204	third site looking at T; ph; and sulfide for sampling				R622-011
21:05:51 7/18/01	1523	204	Fourth site looking at temp; ph; and sulfide				R622-012
21:05:51 7/18/01	1523	204	Had to restart HFS software				
21:05:51 7/18/01	1523	204	Time has not been updating.				
21:05:51 7/18/01	1523	204	It is 21:47				
21:05:51 7/18/01	1523	204	Repositioning again. Temp variable				
21:05:51 7/18/01	1523	204	Temp 17 degrees C; going down				
21:05:51 7/18/01	1523	204	We are going to sample here. East of the bac traps at Marker 33				
21:05:51 7/18/01	1523	204	Ave temp 15.4				
21:05:51 7/18/01	1523	204	investigating another place at mark 33		Butterfield		R622-013
21:05:51 7/18/01	1523	204	east of the bac traps; we are going to sample here. Avg T 15.4		Butterfield		R622-014
21:05:51 7/18/01	1523	204	52 uM H2S. pH 5.78				
21:05:51 7/18/01	1523	204	22:00 Sampling with fluid sampler: Gas piston #4 at Marker 33. Tave=12.5 degrees C. Tmax=13.9 C. pH=5.76. H2S=57. 105 mL z=1524	R622-HFS-4-0001	Evans	Butterfield/Lilley	
21:05:51 7/18/01	1523	204	22:05 - 22:11 chemistry piston #22 at Marker 33. Tave=13.0. Tmax=14.2. pH=5.76. H2S=57. volume = 629 mL	R622-HFS-22-0002	Butterfield/Lang/Lilley/Huber/Mehta		
21:05:51 7/18/01	1523	204	22:15-22:22 Sampling #19. Bag with filter Tmax=13.6. Tave=12.4. pH=5.76. H2S=57. Volume pumped 630 mL. (left of old bac traps)	R622-HFS-19-0003	Butterfield/Lang/Lilley		
21:05:51 7/18/01	1523	204	not great pic; taking gas piston and chemistry piston		Butterfield		R622-015
21:05:51 7/18/01	1523	204	close up on limpets; bactraps				R622-016
21:05:51 7/18/01	1523	204	better picture of sample site for HFS #4 #19 #22 etc. SERIAL DRIVER NOT ON 21:05:51 - 22:19:59. NO TIME UPDATES FOR THAT INTERVAL!!				R622-017

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
22:19:59 7/18/01	1524	211	22:23-22:35 Sterivex filter #15. Tave=11.8 Tmax=15.2. pH=5.76. H2S=57. 1 L	R622-HFS-15-0004	Huber/Mehta		
22:33:45 7/18/01	1523	210	22:36-22:46 FISH Filter #7 Tave=14.8; Tmax=18.8; pH=5.76. H2S=57. 1 L pumped.	R622-HFS-7-0005	Huber/Mehta		
22:33:45 7/18/01	1523	210	close up of sample location for R622-HFS-4 19 22 15 etc		Butterfield/Baross		R622-018
22:45:13 7/18/01	1523	210	22:48 Fired port gas tight bottle T=14.9 deg C	R622-GTB-2-0006	Evans	Butterfield/Lilley	
22:49:23 7/18/01	1524	209	22:51 Fluid sampler sensor data: Tave=17.2; Ave H2S=57 uM; Ave pH 5.76				
22:57:13 7/18/01	1523	211	Recovered MTR-3300 (deployed R543) from Marker 33.	R622-MTR-3300-0008	Embley		
23:02:03 7/18/01	1524	212	Deploying MTR 3053 at Mkr 33 at eastern end of the crack.				
23:02:53 7/18/01	1523	213	deploying MTR #3053				R622-019
23:10:05 7/18/01	1523	216	Recovered MTR 3289 - south of crack at Mkr 33 (deployed R543)	R622-MTR-3289-0007	Embley		
23:15:05 7/18/01	1523	218	MTR 3043 at Mrk 33 - Fe-osmo sampler in background				R622-020
23:16:35 7/18/01	1523	201	Deployed MTR 3043 in the middle of the crack at Mkr 33.				
23:25:35 7/18/01	1523	187	MTR 3292 - recovered from Mkr 33				R622-021
23:27:35 7/18/01	1523	188	Recovered MTR 3292 - deployed R543.	R622-MTR-3292-0009	Embley		
23:28:45 7/18/01	1523	187	MTR 3039 deployed down in crack next to tube worms				R622-022
23:30:55 7/18/01	1523	186	Deployed MTR# 3039 approx. 1 minute ago.				
23:45:57 7/18/01	1523	256	Preparing for Moyer's suction sample of the crack at Marker 33 into bottle #5.				
23:58:07 7/18/01	1523	253	Moyer's suction sample of mats at Mrk 33				R622-023
23:58:37 7/18/01	1523	253	Suctioning for mat into jar #5. Stopped at 00:08.	R622-SS-J5-0010	Moyer	Bates	
23:59:47 7/18/01	1523	256	Continued suction sample				R622-024
00:07:31 7/19/01	1523	250	Jar #5 on suction sampler -- just taken		Moyer		R622-025
00:11:41 7/19/01	1523	240	Preparing to move BT #s 55 & 56 into position in crack at Mkr 33.				
00:26:51 7/19/01	1523	243	BT's are in position; note that #56 is inverted.				
00:27:01 7/19/01	1523	236	Bacterial traps #55 and #56 in position at Mrk 33				R622-026
00:41:43 7/19/01	1523	290	Recovered MTR#3087 from Snail Mkr-N8 - deployed R547.	R622-MTR-3087-0011	Embley		
00:43:53 7/19/01	1524	176	Recovered MTR 3320 from lower part of Snail vent - deployed R547. (423877/5087088 45 55.992/129 58.914)	R622-MTR-3320-0012	Embley		
00:54:35 7/19/01	1523	284	Deployed MTR#3054 at top of Snail vent				
00:54:35 7/19/01	1524	284	MTR 3054 in position at N8				R622-027
01:00:15 7/19/01	1524	341	Deploying MTR#3055 at Snail west of MTR 3054				
01:02:05 7/19/01	1524	352	MTR 3055 in position				R622-028
01:08:25 7/19/01	1520	82	Picked up BTs for transit over to Cloud.				
01:19:25 7/19/01	1524	252	Marker N4				R622-029
01:21:45 7/19/01	1522	280	one of the BT has been left at N4 but will be picked up later.				
01:28:17 7/19/01	1525	306	Deployed BT #58 at Mkr 21 which used to be N6				

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
01:29:47 7/19/01	1525	307	Preparing for HFS				
01:35:37 7/19/01	1525	306	Gas Piston #5 at Mkr 21/N6 temperature of 9.6. Tmax=9.7. pH 6.67. H2S=12.1. Sampled 182 ml (423901/5087116 45 56.0040 129 58.896)	R622-HFS-5-0013	Butterfield/Lilley/ Evans		
01:43:17 7/19/01	1525	304	HFS with Bag #8; no filter; same location as R622-HFS-5-0013; Tave=9.6; Tmax=9.7; pH 6.67; H2S=12.1. 640 ml (423901/5087116 45 56.0040 129 58.896)	R622-HFS-8-0014	Butterfield/Lilley/ Lang/Huber/Meht a		
01:55:21 7/19/01	1525	304	HFS bag 11 with filter; Tave=9.6; Tmax=9.7; pH 6.67; H2S=12.1. 680ml pumped. (423901/5087116 45 56.0040 129 58.896)	R622-HFS-11-0015	Butterfield/Lang/ Lilley		
02:05:43 7/19/01	1525	304	HFS sterivex filter #12. Tave=9.7; Tmax=9.7; pH 6.67; H2S=12.1. sampled 1L (423901/5087116 45 56.0040 129 58.896)	R622-HFS-12-0016	Huber/Mehta		
02:17:35 7/19/01	1525	304	Taking sample: gas piston 23; volume 160ml; Tave=9.6; Tmax=9.7; pH 6.67; H2S=12.1. (423901/5087116 45 56.0040 129 58.896)	R622-HFS-23-0017	Evans/Butterfield/ Lilley		
02:21:57 7/19/01	1525	303	Sample GTB on the starboard side #7, same vent as HFS (423901/5087116 45 56.0040 129 58.896)	R622-GTB-7-0018	Evans	Butterfield/Lilley	
02:23:07 7/19/01	1525	302	Flushing sensors				
02:23:47 7/19/01	1525	302	flushing sensors				R622-030
02:27:37 7/19/01	1525	303	After flushing sensors; pH average 6.67; H2S of 12.1				
02:29:29 7/19/01	1525	298	HFS has been put away and preparing for SS.				
02:35:49 7/19/01	1525	302	Taking suction sample in J6 of bacterial mat (423901/5087116 45 56.0040 129 58.896)	R622-SS-J6-0019	Moyer	Bates	
02:43:01 7/19/01	1525	287	Tube worms stuck in suction sampler at Mkr 21				R622-031
02:47:31 7/19/01	1525	289	Pulling worms out of suction sampler				R622-032
02:57:05 7/19/01	1525	338	Tube worms at Marker 21 at Cloud Vent				R622-033
03:05:07 7/19/01	1522	206	We're at N6/Mk21 at the periphery attempting to take suction samples.				
03:21:59 7/19/01	1525	235	SS in Jar 2 at periphery of N6. (423901/5087116 45 56.0040 129 58.896)	R622-SS-J2-0020	Tunnicliffe		
03:21:59 7/19/01	1525	235	SS in Jar 2 at periphery of N6				R622-034
03:25:41 7/19/01	1525	236	bent piece of HFS.				R622-035
03:27:11 7/19/01	1525	236	sample site for SS-J2				R622-036
03:27:31 7/19/01	1525	236	close up of sample site for for SS-J2				R622-037
03:30:11 7/19/01	1525	230	sample site for SS-J2.				R622-038
03:30:41 7/19/01	1525	230	sample site for SS-J2.				R622-039
03:32:33 7/19/01	1525	228	Moving NE 2.5 meters for another SS.				
03:44:55 7/19/01	1525	18	Deciding where to put Fluid sampler array now so we don't scatter other sampling devices around.				
03:46:25 7/19/01	1525	18	N6. Looking for a position for Dave's sampler				R622-040
03:47:55 7/19/01	1524	315	Doing a flyby of the area.				
03:48:05 7/19/01	1524	189	Highlights on.				
03:56:37 7/19/01	1523	250	Highlights off.				
04:01:49 7/19/01	1525	255	Picking up BT 57 to move into hole in N6.				
04:08:49 7/19/01	1518	242	Attempting to retrieve MTR at N6.				
04:12:41 7/19/01	1515	324	Transporting MTRs to Fred(larval trap holder).				
04:16:21 7/19/01	1520	288	Retrieving MTR 3208 - deployed R543. (423901/5087116 45 56.0040 129 58.896)	R622-MTR-3208-0021	Embley		

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
04:19:03 7/19/01	1525	274	Retrieving MTR 4101 - deployed R543 (423901/5087116 45 56.0040 129 58.896)	R622-MTR-4101-0022	Embley		
04:22:53 7/19/01	1525	244	Attempting to pick up MTR from N4.				
04:23:14 7/19/01	1525	244	Retrieving MTR 4001 from Mkr-N4 - deployed R543. (423896/5087119 45 56.0052 129 58.9002)	R622-MTR-4001-0023	Embley		
04:26:03 7/19/01	1526	276	We now have 3 MTRs in the larval trap holder.				
04:26:23 7/19/01	1526	308	Crab and Fred the larval box				R622-041
04:28:26 7/19/01	1522	294	Heading to Nascent vent straight North 263 meters.				
04:54:50 7/19/01	1471	28	Heading to bottom to find Nascent vent. Objective; VFS and recover MTRs.				
04:58:42 7/19/01	1518	323	Still trying to find Nascent.				
05:01:02 7/19/01	1521	246	Pillow lava near Nascent vent.				R622-042
05:23:28 7/19/01	1521	270	Orange stain on lava in this area.				
05:24:18 7/19/01	1520	253	A marker is in view; moving in..				
05:24:48 7/19/01	1520	265	We're at Mk N41; NE of desired site.				
05:26:48 7/19/01	1521	249	shimmery flow at N41				R622-043
05:27:08 7/19/01	1521	249	Sniffing N41 to decide whether it's worth sampling.				
05:30:28 7/19/01	1521	242	Mkr N41 venting area				R622-044
05:33:30 7/19/01	1521	242	T ~ 11C; some H2S signal				
05:33:40 7/19/01	1521	242	T = 7 C; No H2S				R622-045
05:39:20 7/19/01	1521	242	AVE H2S=5.3micromolar; T=9 C; pH=6.61				
05:40:00 7/19/01	1521	242	Doing hot fluid sampling in bag 9 with NO filter. Tave=11.2; Tmax=12; pH=6.61; H2S=5.30. Volume 500 ml. (423922/5087428 45 56.173 129 58.883)	R622-HFS-9-0024	Butterfield/Lilley/Evans/Huber/Mehta		
05:46:02 7/19/01	1521	242	The pump on HFS is not functioning consistently.				
05:59:56 7/19/01	1521	242	Doing HFS w/ sterivex filter #13. Tave=12.0; Tmax=11.8; pH=6.61; H2S=5.30. Vol 1 L. (423922/5087428 45 56.173 129 58.883)	R622-HFS-13-0025	Mehta/Huber		
06:00:46 7/19/01	1521	242	Fluid sampler at Marker N41.				R622-046
06:12:58 7/19/01	1521	242	Gas piston #24. Tave=10.0; Tmax=10.3; pH=6.61; H2S=5.30. Vol 100 ml. (423922/5087428 45 56.173 129 58.883)	R622-HFS-24-0026	Butterfield/Lilley/Evans		
06:17:10 7/19/01	1521	242	Now we are picking up 2 MTRs.				
06:21:40 7/19/01	1521	243	Collecting MTR 3334 that was ~1 meter into a hole at N41 - deployed R543. MTR placed into purse. MTR rope and vent site contained white filamentous bacterial mat. MTR placed in the purse. (423922/5087428 45 56.173 129 58.883)	R622-MTR-3334-0027	Embley		
06:27:30 7/19/01	1521	245	Picking up MTR 3334 at N41.				R622-047
06:29:02 7/19/01	1521	246	The pin on the 7-function arm is disabled so ROPOS guys are doing maintenance.				
06:48:46 7/19/01	1521	227	We have reset the arm and are continuing to recover the MTRs.				
06:51:26 7/19/01	1521	222	Collecting MTR 3211 that was located just south of MTR 3334 - deployed R548). MTR rope and vent site contained white filamentous bacterial mat. We placed it in the purse. (423922/5087428 45 56.173 129 58.883)	R622-MTR-3211-0028	Embley		
06:57:18 7/19/01	1521	222	We have found something that looks like another MTR, about 200 degrees south of N41 for 4 m. We are investigating what it might be.				

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
06:58:58 7/19/01	1521	202	MTR looking thing				R622-048
07:00:58 7/19/01	1521	198	MTR number 3309				R622-049
07:00:58 7/19/01	1521	199	The MTR is 3309 - deployed R548 at Nascent vent. We are recovering it into the purse. (423905/5087387 45 56.1504 129 58.89582)	R622-MTR-3309-0029	Embley		
07:05:00 7/19/01	1521	194	We can see Marker M about 6 m south of where we recovered MTR 3309.				
07:05:50 7/19/01	1521	219	We will now head north to Old Worms. We will fly off the bottom.				
07:10:20 7/19/01	1513	350	We have begun to move south and the ship is beginning to get underway.				
07:55:32 7/19/01	1524	347	We're on the bottom looking for Old Worms.				
07:58:04 7/19/01	1523	346	Lots of worms. There's a net too.				
08:01:20 7/19/01	1523	355	We are looking for a spot to land in and sample around Old Worms.				
08:02:52 7/19/01	1522	356	The worms look kind of dead around here.				
08:02:52 7/19/01	1522	356	We don't see any flow coming out anywhere so far.				
08:07:00 7/19/01	1525	199	We haven't found the MTR that is supposed to be here either. Still looking for flow.				
08:08:40 7/19/01	1526	81	We think we might have spied some flow near some tube worms. Very weak flow.				
08:12:10 7/19/01	1526	106	We've found a place to sit down and take a few measurements with the HFS.				
08:15:02 7/19/01	1526	104	The HFS is out of the holster and we are probing around some little worms near a lava arch.				
08:18:02 7/19/01	1526	95	Sensing a little bit of temperature at this spot- around 6.5 degrees right now.				
08:19:02 7/19/01	1526	94	Locking the arm here. Temperature got up to 11.5.				
08:19:22 7/19/01	1526	95	Fluid sampling at old worms				R622-050
08:20:12 7/19/01	1526	96	We are going to take some HFS samples here.				
08:21:12 7/19/01	1526	95	H2S=151 uM. pH=5.69. This is a good spot for sampling.				
08:22:22 7/19/01	1526	95	Collapsed pit near old worm sampling site				R622-051
08:23:12 7/19/01	1526	94	Taking HFS sample bag #16 without a filter at Old Worms. Pumped stopped in the middle of sampling. Tave=12; Tmax=12.2; pH=5.67; H2S=151.2. Vol 650 ml. (423785/5088418 45 56.7063 129 58.99850)	R622-HFS-16-0030	Butterfield/Lang/ Lilley/Huber/Mehta		
08:26:14 7/19/01	1526	94	Blue filaments near old worms				R622-052
08:36:06 7/19/01	1526	95	We are done with Bag #16. Average temperature was around 12 and volume 650 ml. We are going to take another sample now.				
08:37:16 7/19/01	1526	95	Taking another HFS sample; Bag #17 with a filter; Tave=12; Tmax=12.2; pH=5.67; H2S=151.2. Vol 650 ml. (423785/5088418 45 56.7063 129 58.99850)	R622-HFS-17-0031	Butterfield/Lang/ Lilley		
08:43:08 7/19/01	1526	95	Done with bag #17. Max temperature was 12.2. Average temperature 12.0. Volume 650 ml.				
08:45:58 7/19/01	1526	95	Taking Sterivex filter #1 at Old Worms. Tave=12.1; Tmax=12.2; pH=5.67; H2S=151.2. Volume 1 L. (423785/5088418 45 56.7063 129 58.99850)	R622-HFS-1-0032	Mehta/Huber		
08:51:48 7/19/01	1526	95	Some kind of lava structure				R622-053
08:57:20 7/19/01	1526	95	Done with sterivex #1. Average temperature was 12.1 and max was 12.2 and volume 1 L.				

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
08:58:10 7/19/01	1526	94	Switching to get H2S=and pH=measurements at this sampling site at Old Worms. pH=5.60 and H2S=151.				
09:01:10 7/19/01	1526	94	We are removing the HFS sampler and look for the MTR.				
09:06:42 7/19/01	1524	294	We've spotted an MTR 7m southwest of our sampling site at Old Worms.				
09:08:12 7/19/01	1526	1	Recovering MTR 4128 and put it in the purse - deployed R547 (423785/5088418 45 56.7063 129 58.99850)	R622-MTR-4128-0033	Embley		
09:09:12 7/19/01	1526	345	MTR 4128 recovery				R622-054
09:14:44 7/19/01	1524	291	We are going to go to Marker N3 now. Moving the ship.				
09:30:18 7/19/01	1525	225	We are back on the floor looking for Mkr N3.				
09:34:38 7/19/01	1528	251	Blue stuff covering lava pillows around Mkr N3 area.				R622-055
09:35:08 7/19/01	1529	243	We see lots of pillow lavas lined with white mat and blue goo. No tube worms or marker in site so far.				
09:37:08 7/19/01	1531	198	Highlights on.				
09:37:50 7/19/01	1531	199	White mat and some shimmery flow on the underside of a lava pillow near Mkr N3 area.				R622-056
09:38:40 7/19/01	1531	200	White bacterial mat lining a pillow lava.				R622-057
09:41:20 7/19/01	1531	200	Looking at the underside of a pillow lava lined with mat. T1 on the HFS is not working. Highlights off.				
09:42:50 7/19/01	1531	209	White bag looking stuff				R622-058
09:45:50 7/19/01	1528	328	There seems to be a lot of flow around here. We are seeing tons of white bacterial mat and animals.				
09:48:22 7/19/01	1528	218	We are seeing a lobate crust hollow underneath covered with limpets and tube worms and blue mat. There is lots of shimmery flow coming out from the hollow. We are going to probe for temperature here.				
09:49:22 7/19/01	1529	211	Looking under a lobate flow at mat near Mkr N3.				R622-059
09:54:52 7/19/01	1529	212	We are going to probe under this lobate pillow with the HFS; T1 is broken so we are relying on T1.				
09:56:22 7/19/01	1528	211	T2 is around 6 at "Snow Cave." We're somewhere near Mkr N3.				
09:58:44 7/19/01	1529	210	White stuff near marker N3				R622-060
09:59:44 7/19/01	1529	210	T2 is 4.3 and H2S got up to 500 but that is questionable. Sort of around 200. pH=5.4. This is a very goopy place. Highlights on.				
10:01:44 7/19/01	1529	210	Underside of lava pillow with mat.				R622-061
10:02:34 7/19/01	1528	210	HFS sampling - Bag #14 no filter. Sampling on the vertical face of the underside of a broken lobate pillow lava. T1 is broken. T2 7.8; pH=5.80; H2S=100. Vol 650 ml. (aprox position: 423637/5088278 45 56.628 129 59.112)	R622-HFS-14-0034	Butterfield/Lilley/Lang/Huber/Mehta		
10:03:44 7/19/01	1529	211	Tube worms and other animals under the lobate pillow we're sampling fluids at.				R622-062
10:04:54 7/19/01	1529	211	Limpets near Mkr N3.				R622-063
10:09:56 7/19/01	1528	210	Highlights off.				
10:10:16 7/19/01	1528	210	Mat on sulfide structure				R622-064
10:11:26 7/19/01	1528	211	Done with sample bag #14. T2 average was 7.8 and volume 650 ml.				

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
10:11:46 7/19/01	1528	211	Taking a GF/F filter #10 at the same site on the vertical face of the underside of this broken pillow lava. T1 is broken. T2 8.6; pH=5.80; H2S=100. Vol 1050 ml. (aprox position: 423637/5088278 45 56.628 129 59.112)	R622-HFS-10-0035	Lang		
10:13:26 7/19/01	1528	211	Blue and white mat				R622-065
10:13:56 7/19/01	1528	211	Making some more highlights of this contact area between blue mat and white mat.				
10:13:56 7/19/01	1529	210	Blue and white organisms				R622-066
10:22:18 7/19/01	1528	211	Done with GF/F filter #10. T2 average was around 8 and we filtered 1050 ml.				
10:23:48 7/19/01	1528	211	We are done sampling here. We are going to look around for the MTRs.				
10:26:20 7/19/01	1527	230	Highlights are off as we move around to look for the missing MTRs in the Marker N3 area.				
10:31:40 7/19/01	1529	315	Putting highlights back on.				
10:34:42 7/19/01	1530	3	We found some more shimmery flow to sniff with the HFS. Still no sign of the MTRs.				
10:40:32 7/19/01	1530	354	We are locking the arm here- we got T2 of 10.5. This is shimmery flow with tube worms and limpets.				
10:42:22 7/19/01	1530	352	Temperature dropped a lot so we are readjusting the arm.				
10:45:44 7/19/01	1530	348	We have locked in again and the temperature is 12 degrees on T2. H2S=177 uM. pH=5.099. We are going to take a sample.				
10:46:54 7/19/01	1530	348	HFS Bag #18 without a filter at this site near Mkr N3 probably. T1 is broken. T2=12.5. pH=5.31. H2S=127. Vol=600 ml. (aprox position: 423637/5088278 45 56.628 129 59.112)	R622-HFS-18-0036	Butterfield/Lilley/Lang/Mehta/Huber		
10:55:26 7/19/01	1530	349	We are done taking Bag #18. Average temperature is 12.5 degrees and volume is 600 ml.				
10:57:06 7/19/01	1530	350	We are going to look for the Marker N3 and the MTRs.				
11:05:38 7/19/01	1529	328	Highlights are on as we look for N3 and MTRs.				
11:06:38 7/19/01	1527	14	We just went north a ways and found the Marker N3 and the MTRs.				
11:07:08 7/19/01	1527	3	Mkr N3 and MTRs.				R622-067
11:10:10 7/19/01	1528	358	Highlights off.				
11:11:00 7/19/01	1528	358	Deployed MTR 3040 near Mkr N3 and the old MTRs. It is sort of deep inside a hole. latitude is 45.94380, longitude is 129.98520.				
11:17:50 7/19/01	1528	357	Recovering MTR 3045 - deployed R547. (423637/5088278 45 56.628 129 59.112)	R622-MTR-3045-0037	Embley		
11:19:40 7/19/01	1528	356	Looking for another MTR, sited two strings near the marker N3.				
11:21:22 7/19/01	1528	18	Recovering MTR 3176 - deployed R547. (423637/5088278 45 56.628 129 59.112)	R622-Mtr-3176-0038	Embley		
11:32:04 7/19/01	1526	347	Starting the video Mrk N3.				
11:33:24 7/19/01	1528	11	Extensive blue mat. Sharp boundaries at bacterial and protozoan mat.				
11:37:24 7/19/01	1527	44	Large bare rock, looks like it has been grazed, no visible fluid flow in this spot.				
11:38:26 7/19/01	1527	26	Sharp limpet/blue mat boundaries.				
11:42:46 7/19/01	1526	95	Looking around for a good place for Amanda to sample limpets in and out of the flow.				

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
11:53:28 7/19/01	1528	37	Close-up on suction sample location Next frame has distant view with scale				R622-068
11:53:48 7/19/01	1528	36	Snail sample location with scale		Amanda Bates		R622-069
11:55:38 7/19/01	1528	37	SS of limpets into Jar #1. Limpets bathed by flow. Start time 11:54. Stopped around 11:56. (423637/5088278 45 56.628 129 59.112)	R622-SS-J1-0039	Bates		
11:57:00 7/19/01	1528	36	Frame of suction sample area after suctioning. Limpet into Jar #1				R622-070
12:01:10 7/19/01	1528	38	Tried to suction a little more but couldn't reach it.				
12:04:20 7/19/01	1528	36	Looking around for a place to take a peripheral; out-of-flow coupled limpet sample. Taking frame grabs of the suctioned area for scale.				
12:04:30 7/19/01	1528	37	Post sampling close-up with scale				R622-071
12:05:00 7/19/01	1528	37	Post-sample zoom				R622-072
12:08:52 7/19/01	1527	4	Coming in with suction for 2nd samples		Amanda		R622-073
12:09:42 7/19/01	1527	3	Preparing to suction into jar #3. Peripheral limpets out of flow; coupled with prior 'in flow' sample.				
12:14:12 7/19/01	1528	32	view of pre-sample with scale				R622-074
12:14:32 7/19/01	1528	31	Close-up on suction site - pre-sampling				R622-075
12:15:24 7/19/01	1528	31	Start suction into Jar #3 at 12:15. Just a few inches away from prior sample, on edge of flow. Stop at around 12:26. It will be difficult to get density data from this sample. (423637/5088278 45 56.628 129 59.112)	R622-SS-J3-0040	Bates		
12:29:46 7/19/01	1527	27	Post suck with scale				R622-076
12:38:08 7/19/01	1527	291	Preparing to suction into Jar#4 in the Amphisamytha zone. We just moved meters away to a different spot in the same Mkr N3 venting area from where the prior 2 samples were taken.				
12:41:28 7/19/01	1527	239	Area of far periphery suction		Amanda		R622-077
12:42:48 7/19/01	1527	220	Brown tubes covering basalt on vent peripheries are Amphisamytha galapagensis, a common vent polychaete.				
12:42:58 7/19/01	1527	214	Area of far-periphery suction				R622-078
12:44:30 7/19/01	1527	219	Still preparing to suction in Amphisamytha zone. It's difficult to get a good spot where the arm can reach.				
12:46:10 7/19/01	1527	221	suctioning far periphery				R622-079
12:47:00 7/19/01	1527	219	Suctioning into Jar#4 on far periphery (Amphisamytha zone). Start around 12:45. Stopped at 12:55. (423637/5088278 45 56.628 129 59.112)	R622-SS-J4-0041	Bates		
12:56:02 7/19/01	1527	215					R622-080
12:56:22 7/19/01	1527	215	Peripheral suction sample post-suction		Amanda		R622-081
12:59:32 7/19/01	1526	166	Moving to Mkr 33. Flying through the water; should take about an hour and 10 minutes.				
13:02:14 7/19/01	1521	170	Moving the ship for transit to Mkr 33.				
13:57:02 7/19/01	1509	183	140m to Mrk 33				
14:15:46 7/19/01	1522	353	Arrived at snail; moving to Mrk 33.				
14:19:46 7/19/01	1520	263	On Mrk 33.				
14:22:38 7/19/01	1522	236	Exploring for a site for Christian's particulate samples.				
14:25:08 7/19/01	1522	251	Flushing hose into J8.				

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
14:25:38 7/19/01	1522	251	Planning to suction at 25% (low suction); into a crack with fluid flow.				
14:34:40 7/19/01	1522	221	Suctioning flow from crack for particulates - at low power. (423850/5087101 45 55.996 129 58.935)	R622-0042	Levesque		
14:37:50 7/19/01	1522	220	Suction position into J7 for Christian Levesque.		Christian Levesque		R622-082
14:38:40 7/19/01	1522	221	Still suctioning into J7.				
14:38:50 7/19/01	1522	221	Suctioning position.		Christian Levesque		R622-083
14:39:40 7/19/01	1522	221	Still suctioning into J7.				
14:42:22 7/19/01	1522	220	Still suctioning into J7.				
14:43:12 7/19/01	1522	220	Flusing into J8; trying to clear the hose.				
14:47:22 7/19/01	1522	219	Suction position post clearing the hose.				R622-084
14:48:34 7/19/01	1522	218	Going back for more particulates; suctioning in flow into J7.				
14:51:34 7/19/01	1522	218	Stoped sucking. Repositioning to continue suctioning into Jar #7.				
14:54:14 7/19/01	1522	226	Suction sample for J7				R622-085
14:56:14 7/19/01	1522	229	Suctioning for J7				R622-086
14:59:46 7/19/01	1522	229	Getting ready to suction into Jar#8; the flushing jar; for large fauna.				
15:05:06 7/19/01	1522	227	Suction of large fauna into flushing jar at Mkr 33. (423850/5087101 45 55.996 129 58.935)	R622-SS-J8-0043	Levesque		
15:10:18 7/19/01	1522	229	Preparing to fluid sample at Mkr 33 in flow. Sniffing around for a good spot.				
15:12:28 7/19/01	1522	230	HFS intake right at osmo. Temp up to 17 degrees C (T2 temp since T1 is not working); sulfide close to 60 micro mol.				
15:14:18 7/19/01	1522	230	Start piston sample #20. Stop sample at 15:24. T1 is broken. T2 16. pH=5.54. H2S=18.5. Vol 800 ml. (423850/5087101 45 55.996 129 58.935)	R622-HFS-20-0044	Butterfield/Lilley/Lang/Huber/Mehta		
15:25:00 7/19/01	1523	230	Start RNA filter #3 at 15:25. Stop sample at 15:35. Ropos pulled off site. Restarted at 16:14. Final stop at 16:20. T1 is broken. T2 17. pH=5.54. H2S=18.5. Vol 700 ml. (423850/5087101 45 55.996 129 58.935)	R622-HFS-3-0045	Mehta		
15:46:16 7/19/01	1419	21	Lost sub and cage telemetry. Going back to the cage.				
15:49:06 7/19/01	1423	13	Rebooted and going back down to Mkr 33.				
15:59:18 7/19/01	1523	240	Back at Mkr 33. Positioning to resume fluid sampling.				
15:59:58 7/19/01	1522	236	Positioning to resume sampling.				R622-087
16:03:18 7/19/01	1522	235	Fluid sampler is not coming back on line. No communication.				
16:10:10 7/19/01	1523	236	Fluid sampler back on line. Repositioning again to resume sampling.				
16:14:02 7/19/01	1523	237	Resumed sampling: RNA filter#3. Stop at 16:20.				
16:21:02 7/19/01	1522	237	Start sampling FISH filter #6. Sample pump stopped at 16:23. Restarted at 16:24. Pump keeps cutting out. Stop at 9:31. T1 is broken. T2 17.3. pH=5.54. H2S=18.5. Vol 1 L. (423850/5087101 45 55.996 129 58.935)	R622-HFS-6-0046	Huber/Mehta		
16:38:56 7/19/01	1523	236	Stopped pumping filter#6 at 9:31.				
16:42:18 7/19/01	1521	240	Heading to Snail; about 30m at hdg 110 from Mkr33.				
16:47:28 7/19/01	1522	314	Approaching Snail.				

Time (UTC)	Z (m)	Hdg	R622 - Comments	Samples	Investigator	Sub Samples	FrGrab
16:48:58 7/19/01	1524	328	Positioning to pick up Anna's larval trap box (the Cadillac) with the recovered MTRs and surface with it in the claws.				
16:56:50 7/19/01	1524	325	Cadillac in the claws. Going back to the cage for ascent. ROPOS leaving the bottom.				
17:56:25 7/19/01	54	174	Ropos in the cage.				
18:01:55 7/19/01	2	168	ROPOS on deck.				

6.5 R623 DIVE LOG

Area: BPR to S Pillow Mound and back

R623 Summary: Pressure sensor readings were taken at all the benchmarks in the caldera: BPR, Magnesia, Mkr-33, BagCity, S. Pillow Mound - then back again for a 2nd reading at BagCity and the BPR. Two markers (60 and 61) were deployed at the BPR. One marker was deployed at benchmark-5. Two larval settling arrays and four larval traps were deployed at Cloud/Mkr-N6 (short-term). Suction samples were taken at the caldera center, Mkr-33, Cloud, and BagCity. A tubeworm grab was taken at Mkr-33, where two bacteria traps were also recovered. The McLane pump was pumping in several areas of the caldera.

Bottom Time: 7/20(JD201) - 7/21(JD202) 1028

Time (UTC)	Z (m)	Hdg	R623 Comments	Samples	Investigator	SubSamples	FrGrab
08:22:34 7/20/01	1	172	ROPOS off the deck at 0851.				
08:52:22 7/20/01	0	85	Time is now correct. ROPOS is in the water.				
08:56:56 7/20/01	56	278	We are checking status of the navigation system.				
09:01:08 7/20/01	56	226	Navigation seems okay so we are continuing our descent.				
10:06:22 7/20/01	1523	313	The cage has been stopped and we are looking for the bottom.				
10:06:42 7/20/01	1531	313	The bottom is in sight. We are in the center of the caldera.				
10:08:08 7/20/01	1529	40	We are looking for benchmark #63. We can see the top of the BPR mooring.				
10:09:46 7/20/01	1524	23	Mooring for BPR in center of caldera.				R623-001
10:11:02 7/20/01	1534	16	BPR center of caldera				R623-002
10:12:40 7/20/01	1533	53	BM 63.				R623-003
10:12:48 7/20/01	1535	51	Benchmark #63 is right next to the BPR mooring.				
10:13:16 7/20/01	1536	16	BPR and BM 63				R623-004
10:14:48 7/20/01	1536	33	BM 63 and BPR				R623-005
10:15:02 7/20/01	1536	32	We are going to suction sediment around the mooring.				
10:17:08 7/20/01	1536	335	We are suctioning background far-field sediment into Bottle J1. (421717/5089568 45.95522 130 0.01017))	R623-SS-J1-0001	Leveille		
10:23:50 7/20/01	1536	244	We are done getting the sample and will now get pressure measurements at BM #63.				
10:25:34 7/20/01	1536	259	We are removing 2 markers from the biobox to leave here when the BPR mooring is gone.				
10:29:12 7/20/01	1536	341	We are deploying Marker 60 5 m south of BM #63.				
10:29:26 7/20/01	1536	340	Putting Marker 60 in place				R623-006
10:32:08 7/20/01	1535	347	Marker near BM #63.				R623-007
10:33:12 7/20/01	1535	161	We are deploying Marker 61 - 5 m north of Bmrk-63.				
10:35:18 7/20/01	1535	170	We are finished deploying the markers and we will now take a pressure measurement at BM #63.				
10:35:32 7/20/01	1535	168	Marker 61.				R623-008
10:39:32 7/20/01	1536	355	We are positioning the pressure sensor on BM #63.				
10:40:28 7/20/01	1536	357	We are beginning the pressure measurement at BM #63.				
10:40:42 7/20/01	1536	357	Pressure sensor reading				R623-009
10:44:48 7/20/01	1536	357	Deep-sea fish				R623-010
11:00:52 7/20/01	1536	357	Hydroid looking thing				R623-011
11:01:26 7/20/01	1536	357	Finish pressure sensor measurement at BM#63.				
11:03:26 7/20/01	1530	341	Moving to Magnesia at 1.5 knots. ROPOS transiting out of the cage.				
12:21:52 7/20/01	1474	149	Going back down to the bottom.				

Time (UTC)	Z (m)	Hdg	R623 Comments	Samples	Investigator	SubSamples	FrGrab
12:25:16 7/20/01	1524	315	Back on the seafloor. Tapes back on.				
12:48:16 7/20/01	1512	317	Still searching for Magnesia. Went up to the cage for orientation and dropped back down. No NAV.				
12:50:36 7/20/01	1524	298	Found Magnesia. At Mkr 67, BM#1.				
12:57:18 7/20/01	1526	28	Start pressure measurement at BM#1.				
12:57:52 7/20/01	1526	28	Pressure measurement at BM#1				R623-012
13:00:12 7/20/01	1526	27	reposition BM#1 and start reading at 1300.				
13:00:42 7/20/01	1526	27	new position for BM#1.				R623-013
13:10:24 7/20/01	1526	23	Pressure sensor moved again. Restart reading at 13:12.				
13:12:52 7/20/01	1526	23	3rd and hopefully final position for BM#1				R623-014
13:32:12 7/20/01	1526	23	Stopped pressure measurement at BM#1.				
13:34:04 7/20/01	1523	275	Transiting to Mkr 33. Stop tapes during transit. Moving ship. Should take about an hour.				
14:27:30 7/20/01	1513	196	Back on the bottom. Looking for Mkr 33. Tapes back on.				
14:31:02 7/20/01	1521	272	At BM #5. Positioning to take pressure measurement.				
14:38:10 7/20/01	1521	276	Start pressure measurement at BM#5.				
14:41:28 7/20/01	1522	276	Start the McLane port pump at BM#5. Pump speed is 10L/minute. (423838/5087111 45.93335 129 98242)	R623-McLane-0002	Tunnicliffe/Metaxas		
14:44:02 7/20/01	1522	279	Pressor sensor moved. Have to reposition and restart measurement. Restart at 14:47. Run for 20 min (15:07). Stopped and restarted to pump for 15 min.				
14:48:30 7/20/01	1522	3	Pressure sensor at BM#5				R623-015
14:58:20 7/20/01	1521	359	Pressure sensor moved again. Have to reposition and begin again. Ended pressure measurement after 20min (15:21).				
14:59:30 7/20/01	1522	357	Restart pressure measurement at BM#5.				
15:19:18 7/20/01	1522	357	Adding marker; Mrk 53; to pressure sensor position at BM 5.				
15:22:56 7/20/01	1522	339	Noted a red glob coming from sub, maybe hydraulic fluid.				
15:25:38 7/20/01	1521	345	Moving to the crack at Mrk 33.				
15:31:44 7/20/01	1522	227	Retrieving bac traps from crack at Mrk 33, collecting Ridgea for Christian.				
15:32:26 7/20/01	1522	227	Worm grab at marker 33 vent				R623-016
15:33:58 7/20/01	1522	229	Ridgea samples into the port biobox - from Mrk-33 crack(~6 Ridgea). (423850/5087101 45 55.996' 129 58.935')	R623-TWG-0003	Levesque		
15:42:16 7/20/01	1522	226	Recovered bac trap 51 deployed on Dive 549. (423850/5078101 45 55.996' 129 58.935')	R623-BT-51-0004	Moyer/Engebretson	Bates	
15:43:06 7/20/01	1522	225	BT 51 being collected at Mk33				R623-017
15:44:44 7/20/01	1522	226	Recovered bac trap 52 deployed on Dive 549. (423850/5078101 45 55.996' 129 58.935')	R623-BT-52-0005	Moyer	Bates	
15:46:58 7/20/01	1522	226	Preparing to suction sample at Mkr 33. Alien temp file name is 623al_c. Alien temp probe on suction inlet.				
15:52:56 7/20/01	1522	226	Sample location with scale				R623-018
15:55:02 7/20/01	1522	233	Suctioning substrate for limpets. Start suction on top edge near crack. About 6 to 10 cm from crack. End suction 16:03. Alien temp file names are 623al_c;_ca and _cb. Temp from ambient up to 3.4 degrees. (423850/5087101 45 55.996' 129 58.935')	R623-SS-J4-0006	Bates	Marcus	
16:03:16 7/20/01	1522	221	Closeup of substrate after sampling				R623-019

Time (UTC)	Z (m)	Hdg	R623 Comments	Samples	Investigator	SubSamples	FrGrab
16:03:30 7/20/01	1522	222	Substrate after suctioning				R623-020
16:07:08 7/20/01	1522	213	Suction sample about 3m from Mkr 33 crack. Directly back from last sample. (started in J8, not a sample). Restarting at 16:22 into J3. Stop at 16:25. Alien temp file name is R623al_d;_da: No temp. (423850/5087101 45 55.996' 129 58.935')	R623-SS-J3-0007	Bates	Marcus	
16:12:10 7/20/01	1522	215	Suction sampling 3m from crack- "far".				R623-021
16:13:20 7/20/01	1522	216	Far site with scale visible				R623-022
16:16:36 7/20/01	1522	225	Suctioning at far site				R623-023
16:21:40 7/20/01	1522	222	Location for second attempt at "far" sample.				R623-024
16:27:16 7/20/01	1522	228	Post-sampling suction site: far site				R623-025
16:27:58 7/20/01	1522	228	Post-sampling far suction		Bates		R623-026
16:29:58 7/20/01	1522	138	Moving to Snail to pick up Anna's Array K to take to Cloud.				
16:38:18 7/20/01	1522	45	Reached Mrk 21; searching for a spot to stash the array during tubeworm grab sample; surveying the flat spot on the NE side of the hole where we did a suction sample (Dive 622-SS-20).				
16:41:48 7/20/01	1522	38	Mkr 21				R623-027
16:59:10 7/20/01	1524	34	Still looking for a spot to stash the array.				
16:59:52 7/20/01	1524	242	Moving to place the array by the osmo (near Mrk 21).				
17:04:46 7/20/01	1524	284	Mkr N8- Snail.				R623-028
17:11:28 7/20/01	1524	334	Back at Mrk 21; putting Array K down next to osmo sampler.				
17:12:38 7/20/01	1524	332	Array K temporarily near mkr 21.				R623-029
17:13:56 7/20/01	1524	345	Pulling bac trap 57 at N6 (short term deployment) to see if full of bacteria.				
17:16:22 7/20/01	1525	346	Bt #57 not showing any bacteria.				R623-030
17:16:50 7/20/01	1524	345	Bac trap 57 "looks" as if no bacteria growth; Bac trap 57 is being redeployed. Locating Bac trap 58 for bacteria.				
17:19:32 7/20/01	1524	347	Fish at vent				R623-031
17:19:46 7/20/01	1524	346	ROPOS bullying the fish				R623-032
17:24:15 7/20/01	1524	336	Unable to locate Bac trap 58; positioning to take a tubeworm grab; and take a look at the site (N6).				
17:28:55 7/20/01	1525	342	Candidates for grabbing.				R623-033
17:29:31 7/20/01	1525	339	Grabbing tubeworms at N6; starboard biobox. 17:42; adding a small grab to the sample. Successfully grabbed the tubeworm clump at the base. (423901/5087116 45 56.004' 129 58.896')	R623-TWG-0008	Marcus	Levesque	
17:33:29 7/20/01	1524	341	Two MTRs are at the bottom of the starboard biobox; with the tubeworm grab on top. Jean is concerned that the grab will have to be taken out to redeploy the MTRs.				
17:37:15 7/20/01	1525	344	Taking the MTRs out of the starboard side of the biobox and placing them on top of the Bac traps in the port side biobox.				
17:43:41 7/20/01	1525	336					R623-034
17:43:49 7/20/01	1525	335	Positioning to take a small TWG to add to sample in starboard biobox (623-TWG-08).				
17:46:17 7/20/01	1524	341	Worm grab				R623-035
17:47:27 7/20/01	1525	336	Some limpets lost during grab.				
17:49:33 7/20/01	1525	335	Preparing for suction sample for Christian Levesque in tubeworm bush.				

Time (UTC)	Z (m)	Hdg	R623 Comments	Samples	Investigator	SubSamples	FrGrab
18:03:29 7/20/01	1525	352	Suction sample in hole made by TWG at N6 for particulates at 25% flow. (423896/5087119 45 56.0052' 129 58.9002')	R623-SS-J5-0009	Levesque		
18:12:17 7/20/01	1525	349	J5 after particulate sampling.				R623-036
18:13:13 7/20/01	1525	348	Particulate sampling				R623-037
18:14:17 7/20/01	1525	348	Suction sampling position in worm bush.				R623-038
18:15:19 7/20/01	1525	352	Stopped suctioning; organizing to place Array K near N6.				
18:18:09 7/20/01	1525	15	Position for settlement array placement				R623-039
18:18:15 7/20/01	1525	0	Tether check.				
18:19:33 7/20/01	1525	5	Position for deployment of settlement array K.				R623-040
18:22:43 7/20/01	1525	355	Deploying Array K on ledge at edge of hole at N6.				
18:24:13 7/20/01	1525	4	Settlement array K in position				R623-041
18:24:13 7/20/01	1525	3	Successful deployment of Array K, near position where Jean took a tubeworm grab (623-TWG-08).				
18:26:13 7/20/01	1522	266	Moving to the larval traps stowed at Snail to move them near Array K at N6.				
18:40:31 7/20/01	1523	68	Moving to N6 with one larval trap in each arm.				
19:03:37 7/20/01	1525	233	We found N6				
19:09:57 7/20/01	1525	196	Larval traps 6 and 8 put down at N6				
19:10:25 7/20/01	1524	260	array and initial trap deployments		Metaxas		R623-042
19:19:25 7/20/01	1520	231	Moving the stern of the ship over Snail in order to pick up the other two larval traps				
19:28:45 7/20/01	1475	97	ROPOS headed back to the cage				
19:42:19 7/20/01	1510	353	Video temporarily lost and restarted				
19:53:35 7/20/01	1522	342	Looking for Snail				
20:02:57 7/20/01	1526	335	We found Snail, and are in the process of picking up larval traps 5 and 7				
20:06:57 7/20/01	1525	315	Have picked up Larval traps 5 & 7 and now we are heading over to N6 to put them next to the other two traps.				
20:11:03 7/20/01	1523	345	In sight of Cloud/N6 area				
20:13:45 7/20/01	1525	283	Putting down larval traps 5 & 7 next to 6 & 8 at N6				
20:15:31 7/20/01	1525	282	Placing Anna's larval trap at N6.				R623-043
20:16:41 7/20/01	1525	283	Uncorking larval trap at N6				R623-044
20:17:01 7/20/01	1525	282	Uncorked larval trap #7				
20:20:47 7/20/01	1525	278	Larval trap #7 officially deployed				
20:21:35 7/20/01	1526	281	At N6. Anna's larval trap and array in background.				R623-045
20:22:45 7/20/01	1525	282	Uncorking larval trap #5				
20:26:37 7/20/01	1525	283	Larval trap #5 officially deployed				
20:32:37 7/20/01	1525	178	Uncorking larval trap #6				
20:33:39 7/20/01	1525	182	Larval trap #6 officially deployed				
20:34:01 7/20/01	1525	183	Larval trap #6 in foreground with traps #5 &? in background with crab		Metaxas		R623-046
20:34:21 7/20/01	1525	179	Larval traps with close larval trap		Metaxas		R623-048
20:37:31 7/20/01	1525	210	Uncorking larval trap #8				
20:38:21 7/20/01	1526	210	Larval trap #8 officially deployed				
20:42:05 7/20/01	1523	209	Right two larval traps with array and MTR in background				R623-049

Time (UTC)	Z (m)	Hdg	R623 Comments	Samples	Investigator	SubSamples	FrGrab
20:42:19 7/20/01	1524	205	Fuzzy pic of all larval traps with array in background		Metaxas		R623-050
20:42:35 7/20/01	1523	216	All larval traps		Metaxas		R623-051
20:43:03 7/20/01	1522	257	Headed back toward the cage for transit to Bag City, which is approximately 1 km away				
20:47:51 7/20/01	1478	106	Ship is moving to Bag City at 1.5 knots				
20:50:25 7/20/01	1478	59	Tapes are off for the transit				
20:51:43 7/20/01	1478	118	We plan to take a sample with the McLane starboard pump during the transit				
21:17:07 7/20/01	1472	193	McLane starboard set to pump for 60 min at 10L/min. Turned off at 22:20. volume =583L. Started again at 00:36 transiting from Bag City to S. Pillow Mound end at03:05. Volume =1457.76 liters. Start at 04:35 transiting from S Pillow Mound to Bag City.	R623-McLane-0010	Tunnicliffe/Metaxas		
21:59:47 7/20/01	1462	194	We are at Bag City location. ROPOS going down.				
21:59:47 7/20/01	1462	194	Videotapes on again.				
21:59:47 7/20/01	1462	194	ROPOS on the bottom at 2224. SERIAL STRING OUTPUT NOT ON 2159 - 2247!! THEREFORE, TIMES ARE WRONG IN LOG UNTIL IT WAS RESTARTED.				
21:59:47 7/20/01	1462	194	Looking for Bag City				
21:59:47 7/20/01	1462	194	lava tubes with crab peeking out		Chadwick		R623-052
21:59:47 7/20/01	1462	194	22:47 GENERALIZED OUTPUT TURNED BACK ON, SO TIMES ARE NOW UPDATING. (NOT UPDATING FROM 2159 - 2247)				
22:49:47 7/20/01	1535	131	22:52 Found Bag City. Marker 65 in sight.				
22:52:51 7/20/01	1534	22	22:55 Getting ready to do pressure measurements at Benchmark 4				
22:53:53 7/20/01	1534	21	22:56 Beginning pressure measurements at Benchmark 4				
22:55:53 7/20/01	1535	21	Pressure measurement at BM #4		Chadwick		R623-053
22:58:35 7/20/01	1535	20	Tube worms at Bag City				R623-054
22:59:09 7/20/01	1535	21	Scale Worm and Probannid snail				R623-055
23:02:05 7/20/01	1535	21	Nereid Worm at Bag City				R623-056
23:03:59 7/20/01	1534	20	We are spying on a Nereid worm. The surface is covered with the blue protozoan mat.				
23:04:47 7/20/01	1534	21	Blue Protozoan Mat				R623-057
23:13:49 7/20/01	1534	21	Done pressure measurement at BM4				
23:19:47 7/20/01	1533	45	Moving to Bag City proper Mkr 36 where NeMO net camera is.				
23:22:43 7/20/01	1534	57	NeMO net camera at Bag City mkr 36				R623-058
23:24:57 7/20/01	1533	14	We are at Bag City; tube worms are looking fairly healthy.				
23:25:03 7/20/01	1533	13	Bag City Mkr 36 - NeMONet camera				R623-059
23:25:59 7/20/01	1534	323	Temperature probe of NeMONet camera				R623-060
23:26:27 7/20/01	1535	327	Close up of NeMONet camera				R623-061
23:27:11 7/20/01	1535	326	Close up of tube worm bush near NeMONet camera				R623-062
23:32:19 7/20/01	1535	327	Recovering temperature probe from NeMONet - tube worms stuck on probe				R623-063
23:37:43 7/20/01	1535	330	The NeMO net 2000 temperature probe has been removed and we are now working on deploying MTRs in the tube worm bush.				
23:41:55 7/20/01	1535	333	deploying MTR 3049				

Time (UTC)	Z (m)	Hdg	R623 Comments	Samples	Investigator	SubSamples	FrGrab
23:46:01 7/20/01	1535	329	looking northwest, just southwest of where camera and Mkr 36 are we have deployed MTR 3049				
23:46:37 7/20/01	1535	328	Looking NW, just SW of camera - MTR 3049 in foreground; Mkr 36 in background				R623-064
23:52:15 7/20/01	1535	315	setting up for deployment of MTR 3029				
23:55:03 7/20/01	1535	314	Deployed MTR 3029 approx 1m southwest of MTR 3049. It might get moved later for Moyers SS				
23:56:41 7/20/01	1535	314	Beta video on looking at tubeworm field for approx. 1 min.				
23:57:17 7/20/01	1535	315	tube worm field at Bag City proper				R623-065
00:02:49 7/21/01	1535	314	SS- for Jar 6				R623-066
00:03:23 7/21/01	1535	314	Suction sample. Lots of mat attached to tubeworms at Nemonet camera site.(423271.0/5085209.6 45 54.9708' 129 59.3655')	R623-SS-J6-0011	Moyer		
00:08:39 7/21/01	1535	315	mat for Jar 6				R623-067
00:22:43 7/21/01	1535	332	flying around to look for some old MTRs around Bag City.				
00:23:33 7/21/01	1535	333	highlights on.				
00:29:45 7/21/01	1535	353	back to the cage for transit to S. Pillow Mound 6000 m heading 190.				
00:31:37 7/21/01	1528	0	highlights off.				
03:24:34 7/21/01	1719	237	On the bottom at South Pillow Mound.				
03:27:02 7/21/01	1722	269	Looking for benchmark at South Pillow Mound.				R623-068
03:28:20 7/21/01	1722	208	Looking for S. Pillow mound. Mk66 and BM66.				
03:40:02 7/21/01	1723	278	south pillow mound				R623-069
03:40:10 7/21/01	1724	280	south pillow mound anomaly				R623-070
03:40:44 7/21/01	1724	255	new lava at the south pillow mound				R623-071
03:42:22 7/21/01	1724	114	Sponge while looking for Mkr. 66				R623-072
03:43:20 7/21/01	1724	118	Sponge while looking for Mkr. 66				R623-073
03:44:52 7/21/01	1724	186	Looking for Mkr. 66				R623-074
03:44:58 7/21/01	1723	197	Looking for Mkr. 66				R623-075
03:46:44 7/21/01	1723	203	Looking for Mkr. 66				R623-076
03:46:50 7/21/01	1722	204	Looking for Mkr-66. Fissure at south pillow mound.				R623-077
03:49:39 7/21/01	1723	32	Marker 66 found.				R623-078
03:53:57 7/21/01	1723	21	Taking pressure sensor reading at Bmrk-66 - south pillow mound.				R623-079
03:57:07 7/21/01	1723	20	03:57 begin pressure sensor reading at BM66.				
03:57:29 7/21/01	1723	20	pressure reading at BM66				R623-080
04:09:41 7/21/01	1723	20	Strange hydroid on rope				R623-081
04:09:41 7/21/01	1723	20	Strange hydroid on rope				R623-082
04:12:01 7/21/01	1723	20	a strange chrinoid. feather star				R623-083
04:24:19 7/21/01	1723	20	skate				R623-084
04:24:27 7/21/01	1723	19	skate				R623-085
04:24:27 7/21/01	1723	20	skate; good one.				R623-086
04:24:27 7/21/01	1723	20	skate				R623-087
04:24:33 7/21/01	1723	20	skate				R623-088
04:24:33 7/21/01	1723	20	skate				R623-089
04:24:41 7/21/01	1723	20	skate				R623-090

Time (UTC)	Z (m)	Hdg	R623 Comments	Samples	Investigator	SubSamples	FrGrab
04:27:01 7/21/01	1723	19	Pressure reading done at 0427; BM66				
04:33:35 7/21/01	1688	26	ROPOS to the cage; ship in transit to bag city. ROPOS is leaking some hydraulic fluid; at bag city we'll reevaluate whether we'll keep going.				
05:47:39 7/21/01	1301	13	0708 We are going back down to the bottom. Video is started up again. GENERALIZED OUTPUT WAS OFF (AGAIN!) BAD TIME STAMPS FROM 0547 - 0719)				
05:47:39 7/21/01	1301	13	The bottom in is sight and we landed right on BM #4.				
05:47:39 7/21/01	1301	13	BM 4.				R623-091
05:47:39 7/21/01	1301	13	We are setting up to take a pressure measurement.				
07:19:29 7/21/01	1536	354	Pressure measurement at BM #4 starting at 0719.				
07:19:35 7/21/01	1536	355	Pressure measurement at BM 4.				R623-092
07:40:07 7/21/01	1536	354	Finished with pressure measurement at BM #4 at 0740.				
07:43:17 7/21/01	1526	357	We are going back to the cage and will then transit to the central caldera for BM #63. The video is off.				
07:45:43 7/21/01	1485	93	Starboard McClane pump is turned on for transit to central caldera. Nope - investigator does not want this sample so turned off - no sample.				
09:45:29 7/21/01	1533	239	Hitting the bottom at the center of the caldera. The video is back on.				
09:50:11 7/21/01	1525	358	We are looking for the BPR mooring.				
09:52:39 7/21/01	1535	38	BPR and BM 63				R623-093
09:52:59 7/21/01	1537	25	We have found BM #63 and the BPR mooring.				
09:57:41 7/21/01	1537	338	Pressure measurements at BM 63.				R623-094
09:57:47 7/21/01	1537	338	Starting pressure measurement at BM #63 at 0958.				
10:12:55 7/21/01	1536	337	Another flower looking thing on the rope of BM 63				R623-095
10:16:33 7/21/01	1537	337	BPR near BM 63.				R623-096
10:27:47 7/21/01	1537	338	Pressure measurement at BM #63 is complete at 1027. We are going back to the cage now.				
10:30:43 7/21/01	1513	206	ROPOS has left the bottom.				
11:39:59 7/21/01	2	150	Sub is on deck...the end.				

6.6 R624 DIVE LOG

Area: ASHES (Styx, Gollum, Marshmallow, Virgin, Inferno, Crack, Hell, Phoenix, FeHyde, Tunnicliffe, ROPOS)
R624 SUMMARY: The dive started with deploying H. Paul Johnson's flow/temperature meter at Crack Vent. HFS samples were taken at Styx, Gollum, Marshmallow, Virgin, Inferno, Crack and Hell. Suction samples were taken at Gollum, Phoenix, FeHyde and Tunnicliffe Vents. Sulfide worm observations took place near the flange pool at Hell (near Mkr-2 - deployed this dive), and at Phoenix. Two hobos were recovered at Virgin, and one at Hell. One larval settling array and four larval traps were deployed at ROPOS Vent. We also deployed four larval traps at Virgin. Two MTRs were deployed at Gollum, and one was recovered. One MTR was recovered at ROPOS. An osmosampler that didn't work was recovered from Hell Vent.
Bottom Time: 7/22(JD203) 0112 - 2206

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
22:56:24 7/21/01	1	174	ROPOS is in the water at 23:00				
22:56:24 7/21/01	1	174	23:04 ROPOS is out of the cage. Nav is off line at the moment so time is being entered manually.				
23:10:04 7/21/01	63	86	Nav is back on-line and time is now correct				
23:13:06 7/21/01	58	121	ROPOS is too heavy; will have to bring back on deck and adjust.				
23:30:30 7/21/01	0	166	ROPOS is out of the water and on deck.				
00:06:50 7/22/01	1	59	ROPOS IS BACK IN THE WATER AT 00:07.				
00:19:02 7/22/01	153	242	ROPOS is "Eh" ok now and heading to the bottom.				
01:15:44 7/22/01	1539	351	ROPOS has reached the bottom				
01:17:24 7/22/01	1545	358	Dropping larval trap boxes (2) + settling array				R624-001
01:17:54 7/22/01	1546	359	The array for Metaxas has been dropped to the bottom. We are at the SE end of the field near crack.				
01:21:46 7/22/01	1544	338	There is a 0.5degree temperature difference between T1 and T2 on the VFS with T1 being warmer.				
01:26:36 7/22/01	1543	304	chimney structure -- we think we are at Phoenix.				R624-002
01:27:56 7/22/01	1543	210	Highlight tape has been turned on at 01:28.				
01:32:18 7/22/01	1545	42	Deploying Paul Johnson temperature sensor package at crack vent. Highlights have been turned off ay 01:33.				
01:36:48 7/22/01	1546	298	We are taking apart the array and larval trap boxes.				
02:30:20 7/22/01	1546	93	We are done with taking off the array and larval traps. Now setting up for VFS.				
02:31:40 7/22/01	1546	93	Larval traps waiting for deployment.				R624-003
02:35:32 7/22/01	1545	53	background pH is 7.42				
02:38:22 7/22/01	1546	10	unidentified fish				R624-004
02:56:16 7/22/01	1546	39	At the Styx area; Tave=14.2; H2Save=163 micromolar; pHave=5.57; Tave2=9.3				
02:58:26 7/22/01	1546	39	Sample site for HFS at Styx area; bag 9 and Sterivex 13.				R624-005
02:59:26 7/22/01	1546	39	Sample for HFS. Bag #9 started at 02:59. Sample finished at 03:07. Tave=13.0; Tmax=14.4; 650 mLs.H2Save=163 micromolar; pHave=5.57. Sample taken in a clump of tubeworms and limpets in depression. (421412/5087132;45 55.9955/130 0.82231)	R624-HFS-9-0001	Butterfield/Lilley/Lang/Huber/Mehta		
03:08:28 7/22/01	1546	39	Sterivex #13. Started at 3:09. Stopped at 3:20. Tavg=11.9; Tmax=13.5; 1000 mLs H2Savg=163 uM; pHavg=5.57 Sample in a clump of tubeworms and limpets in a depression about 2 m SW of the larval trap box. (421412/5087132;45 55.9955/130 0.82231)	R624-HFS-13-0002	Huber/Mehta		
03:20:32 7/22/01	1546	39	anemones near Styx				R624-006
03:21:32 7/22/01	1546	38	sniffing around some more at this site.				

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
03:25:23 7/22/01	1546	40	touching an anemone at this site 20 cm to the right of the fluid sample spot. Tave=3.2; Ave H2S=2.6; pH=6.42.				
03:32:45 7/22/01	1546	46	anemone				R624-007
03:33:35 7/22/01	1546	46	beautiful anemone				R624-008
03:34:25 7/22/01	1546	46	in a crack above the place we sampled. Tave=5.6; Tmax=6.0; H2S=45+/-12 micromolar; pH=6.17.				
03:35:35 7/22/01	1546	46	Bob Holland's anemone				R624-009
03:38:07 7/22/01	1542	347	We are now going NE to Gollum vent. Observed Mkr-7 from an unknown group.				
03:44:27 7/22/01	1541	50	highlights were on for ~40 min.				
03:51:39 7/22/01	1545	288	2 bactraps and 1 MTR at Gollum				R624-010
03:52:59 7/22/01	1545	222	highlights on.				
03:52:59 7/22/01	1545	228	a view of Gollum vent.				R624-011
03:53:39 7/22/01	1544	265	sniffing around at Gollum.				
03:56:41 7/22/01	1545	289	a bac trap was possibly pierced by the probe.				
03:58:31 7/22/01	1545	289	probe right next to bactrap. Tave=3.9; Tmax= 4.1; H2S=5.9; pH=7.08. H2S is likely not reliable because signal noise.				
03:59:31 7/22/01	1545	302	Highlights off.				
04:07:03 7/22/01	1545	263	Tave=18.2; Tmax=19.1; T2=12.3; H2S=101 +-8; pH=5.68 +- .022.				
04:07:43 7/22/01	1546	262	Gollum sample site for HFS #10 etc; in the middle of a bunch of tube worms		Butterfield		R624-012
04:08:13 7/22/01	1546	264	GFF Filter 10 starting at 04:10; Stop at 04:20. TOTAL CHN and Carbos HFS sample taken right in a bunch of tubeworms at Gollum. H2S=101 +-8; pH=5.68 +-.022. vol=2015 mL. Tmax=17.5; Tave=15.4. (45 56.0144/130 0.8151; 421422/5087166.2)	R624-HFS-10-0003	Lang		
04:15:55 7/22/01	1545	262	Tubeworms in a crack				R624-013
04:17:05 7/22/01	1545	263	Something that looks like brittle stars but aren't brittle stars		Butterfield		R624-014
04:18:05 7/22/01	1545	263	highlights on.				
04:19:05 7/22/01	1545	264	Sulfide worm and palm worm.				R624-015
04:21:35 7/22/01	1545	263	two worms: enemys or lovers?		Butterfield		R624-016
04:21:35 7/22/01	1545	263	Bag 8. No filter. Starting sample at 04:22. H2S=101 +-8; pH=5.68 +- .022. Stopping sample at 04:29. vol=651 mL. Tave=16; Tmax=17. (45 56.0144/130 0.8151; 421422/5087166.2)	R624-HFS-8-0004	Butterfield/Lang/Lilley/Huber/Mehta		
04:22:47 7/22/01	1545	263	Good picture of HFS #10 and 8 and etc		Butterfield		R624-017
04:22:57 7/22/01	1545	262	Close up of sample intake for HFS sample #10 & 8		Butterfield		R624-018
04:23:07 7/22/01	1545	263	Close up of sample intake for HFS #10 &8 & etc		Butterfield		R624-019
04:23:47 7/22/01	1545	262	Exhaust tube for HFS #10 & 8 & etc		Butterfield		R624-020
04:24:46 7/22/01	1546	263	Another good picture of HFS #10 and 8 and etc		Butterfield		R624-021
04:27:27 7/22/01	1545	263	scale worm at Gollum.				R624-022
04:30:17 7/22/01	1546	263	FISH filter #6 started at 04:30. H2S=101 +-8; pH=5.68 +- .022. Stopping sample at 04:42. vol=1007 mL. Tave=13.0; Tmax=16.2. (45 56.0144/130 0.8151; 421422/5087166.1)	R624-HFS-6-0005	Huber/Mehta		
04:38:09 7/22/01	1545	263	anemone on top				R624-023

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
04:42:41 7/22/01	1546	263	HFS Sterivex #1 for DNA. Started at 04:44; H2S=101 +-8; pH=5.68 +- .022. Stopping sample at 04:56. vol=1000 mL. Tave=14.6; Tmax=16.3. (45 56.0144/130 0.815158;421422/5087166.1)	R624-HFS-1-0006	Huber/Mehta		
04:43:11 7/22/01	1545	264	clams at Gollum vent				R624-024
04:50:13 7/22/01	1546	263	scale worm.				R624-025
04:50:43 7/22/01	1545	263	limpet chain.				R624-026
04:55:23 7/22/01	1545	264	crab covered with mat(?).				R624-027
05:01:35 7/22/01	1546	263	sniffing around at Gollum.				
05:06:15 7/22/01	1546	254	probing at a clam and seeing ambient temp and H2S even after dislodging the clam. The pH is 6.6.				
05:10:47 7/22/01	1546	245	Butterfield's computer is at 10:05 PM (PST). ROPOS clock is 05:11 (UTC - GMT).				
05:11:37 7/22/01	1546	244	near potential suction site.				R624-028
05:12:17 7/22/01	1546	244	HFS data for "near" SS site. Tmax=11.0; Tave=10.6 +-0.2; H2S=57 micromolar+-4; pH=6.0+-0.1.				
05:15:47 7/22/01	1546	244					R624-029
05:16:37 7/22/01	1546	244	Close-up on near suction site		Amanda		R624-030
05:17:19 7/22/01	1546	244					R624-031
05:17:39 7/22/01	1546	244	Close-up on far suction site		Amanda		R624-032
05:20:29 7/22/01	1546	256	"near" sampling site.				R624-033
05:26:29 7/22/01	1546	254	SS#6 at this site for ~4 min (BIO - particulate limpets). Attempting to quantify the amount of material sucked by the pics. (45 56.0144/130 0.8151;421422/5087166.1)	R624-SS-6-0007	Tunnicliffe/Bates	Leveille	
05:41:23 7/22/01	1546	232	"far" site at Gollum				R624-034
05:45:13 7/22/01	1546	254	potential "far" site.				R624-035
05:46:45 7/22/01	1546	254	SS#7 for Amanda at "far" site. Good particulate sample. (45 56.0144/130 0.8151; 421422/5087166.1).	R624-SS-7-0008	Tunnicliffe/Bates		
05:54:37 7/22/01	1546	259	**AMANDA** Check video log for area suction sampled. We suctioned in three separate areas ~ 5X5cm. We got alot of white, unknown substance in the sample. Maybe "fecal".				
05:56:07 7/22/01	1546	230	sniffing around to determine whether there is a temperature anomaly.				
06:00:47 7/22/01	1546	239	Background Temp=2.8; no H2S; pH+D93=7.04 and rising. No Temp anomaly; no H2S anomaly.				
06:01:37 7/22/01	1546	239	Heading off to Marshmallow vent.				
06:04:07 7/22/01	1546	352	Found Marshmallow.				
06:05:59 7/22/01	1545	6	arrived at Mk 1. and Marshmallow.				
06:07:09 7/22/01	1546	348	Marshmallow vent w/ anhydrite spire.				R624-036
06:09:39 7/22/01	1546	8	Measuring temp at Marshmallow. ~130 C.				
06:16:51 7/22/01	1546	8	HFS sampling bag with no filter #14. Started sample at 06:17. Stopped sample at 06:24. vol=625 mLs. Tmax=194.4; D125Tave=188.7. (421420.4/087179 45 56.0220 130 0.8170)	R624-HFS-14-0009	Butterfield/Huber/Lang/Mehta/Lilley		
06:26:03 7/22/01	1546	8	Starting sample 12 Sterivex filter at 06:26. Stopping sample at 06:37. vol=1002 mLs. Tave=191; Tmax=202.4.(421420.4/5087179 45 56.0220 130 0.8170)	R624-HFS-12-0010	Mehta/Huber		
06:26:23 7/22/01	1546	8	Marshmallow sample site for HFS sampling.				R624-037

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
06:38:15 7/22/01	1547	8	FISH filter #7. Started sample at 06:39. Loss of coms with HFS at 0641. STS (Science Telemetry System) down - back online at 0710. Continuing sample at 0712. Tmax=218.Tavg=209. Vol=1010 ml. (421420/5087179 45 56.0220 130 0.8170)	R624-HFS-7-0011	Huber/Mehta		
07:01:21 7/22/01	1547	8	Fish near Marshmallow				R624-038
07:06:21 7/22/01	1547	8	STS is back up. HFS is back up.				
07:27:47 7/22/01	1547	8	Gas Piston #4 at Marshmallow. Start sample at 0731. Stop sample at 0733. Tavg=221. Tmax=222. Vol=138 ml. T2 is not working right and says 47. (421420/5087179 45 56.0220 130 0.8170)	R624-HFS-4-0012	Evans	Butterfield/Lilley	
07:35:17 7/22/01	1547	8	Moving to Virgin Mound.				
07:36:29 7/22/01	1544	108	It looks like the intake for the fluid sampler has some anhydrite on it; this probably explains the low T2. There may be a clog.				
07:37:29 7/22/01	1545	83	Virgin Mound is in view.				
07:38:29 7/22/01	1546	65					R624-039
07:38:39 7/22/01	1546	63					R624-040
07:38:39 7/22/01	1546	71	virgin mound				R624-041
07:38:49 7/22/01	1545	75	virgin mound				R624-042
07:41:09 7/22/01	1547	97	Close up on Virgin Mound				R624-043
07:41:59 7/22/01	1547	91	Temperature measurement at Virgin Mound				R624-044
07:42:09 7/22/01	1547	92	Highlights have been on since 0740.				
07:46:31 7/22/01	1547	7	Fluid sampling at Virgin Mounds				R624-045
07:47:41 7/22/01	1547	360	Highlights stopped. We are trying to find a good sample location here.				
07:49:31 7/22/01	1547	44	Another fluid sampling at Virgin Mounds				R624-046
07:52:11 7/22/01	1547	45					
07:52:11 7/22/01	1547	44	Gas Piston #5 at Virgin. Started at 0753. topped at 0754. Vol=33. Tavg=299.7. Tmax=299.8.(45 56.019 130 0.809 421430/5087174)	R624-HFS-5-0013	Evans	Butterfield/Lilley	
07:54:53 7/22/01	1547	45	Port gastight at Virgin. Started at 0755. Stopped at 0756. Tavg=299.7. Tmax=299.8. (45 56.019 130 0.809 421430/5087174)	R624-GTB-0014	Evans	Butterfield/Evans	
07:58:23 7/22/01	1547	45	Bag #18 at Virgin. Started at 0802. Vol=307. Tavg=299.8. Tmax=299.8. (45 56.019 130 0.809 421430/5087174)	R624-HFS-18-0015	Butterfield/Lilley/Lang/Huber/Mehta		
08:03:23 7/22/01	1547	50	Chemistry Piston #20 at Virgin. Started at 0804. Stopped at 0808. Vol=431. Tavg=299.9. Tmax=299.9. (45 56.019 130 0.809 421430/5087174)	R624-HFS-20-0016	Butterfield/Lilley/Lang/Huber/Mehta		
08:12:15 7/22/01	1546	273	Marker 1.				R624-047
08:13:05 7/22/01	1546	229	We are now looking for Inferno.				
08:14:17 7/22/01	1547	302	Black spire on Mushroom.				R624-048
08:15:27 7/22/01	1546	259	Inferno.				R624-049
08:17:17 7/22/01	1546	8	Active venting on Inferno.				R624-050
08:17:27 7/22/01	1545	25	We have found Inferno.				
08:21:17 7/22/01	1545	60	Trying to find a good sampling spot at Inferno.				
08:22:07 7/22/01	1546	230	Highlights on. We can see Mushroom and are looking for Inferno.				
08:22:07 7/22/01	1546	230	Mushroom				R624-051

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
08:23:29 7/22/01	1544	58	Highlights were turned off a few minutes ago.				
08:29:09 7/22/01	1544	60	Gas Piston #23. Start at 0830. End at 0832. Tavg=246. Tmax=291. Vol=202. (421397/5087162 45 56.0130 130 0.8340)	R624-HFS-23-0017	Evans	Butterfield/Lilley	
08:29:59 7/22/01	1544	61	Fluid sampling on Inferno.				R624-052
08:38:11 7/22/01	1544	65	Chemistry piston #22. Start 0838; End 0840. Starting again at 0849; got jerked off the vent. Stopped at 0854. Tavg=262.9. Tmax=264.8. Vol=600. Temps are probably higher because pump is clogged. (421397/5087162 45 56.0130 130 0.8340)	R624-HFS-22-0018	Butterfield/Lang/Lilley/Huber/Mehta		
08:38:21 7/22/01	1545	64	2nd fluid sampling on Inferno.				R624-053
08:54:55 7/22/01	1545	39	3rd fluid sampling on Inferno.				R624-054
08:55:35 7/22/01	1545	40	Bag #19 with filter at Inferno. Start at 0856. End at 0901. Tavg=274. Tmax=293.9. Vol=475 ml. During this sample the clog broke loose so the temperatures are more accurate. (421397/5087162 45 56.0130 130 0.8340)	R624-HFS-19-0019	Butterfield/Lilley/Lang		
08:59:05 7/22/01	1545	40	Exhaust at Inferno.				R624-055
09:02:27 7/22/01	1545	40	Starboard gastight at 0902 at Inferno. Stop at 0903. Tavg=292.9. Tmax=293. (421397/5087162 45 56.0130 130 0.8340)	R624-GTB-0020	Evans	Butterfield/Lilley	
09:03:47 7/22/01	1544	39	Going to Hell.				
09:07:17 7/22/01	1545	223	We're at Hell.				
09:07:17 7/22/01	1544	223	Hell.				R624-056
09:08:19 7/22/01	1543	223	Highlights on.				
09:08:49 7/22/01	1544	204	Top of Hell.				R624-057
09:09:39 7/22/01	1547	93	Flange on Hell.				R624-058
09:10:59 7/22/01	1545	171	Hobo on Hell.				R624-059
09:14:49 7/22/01	1542	224	We are at Hell and maneuvering to remove the osmosampler and HOBO.				
09:15:39 7/22/01	1541	192	Highlights off.				
09:17:31 7/22/01	1545	178	Hobo recovery				R624-060
09:17:41 7/22/01	1545	178	Removing HOBO 128 from top of Hell. It is very crusty. The HOBO was placed in the larval tube boxes near Crack. MBARI moved this hobo from Inferno summer '00 - where it fell out of the vent. D154(421372/5087135 45 56.01' 130 0.839')	R624-HOBO-128-0021	Embley		
09:18:51 7/22/01	1545	177	Hobo in hand				R624-061
09:19:31 7/22/01	1545	177	Now we are trying to remove the osmosampler.				
09:21:01 7/22/01	1544	204	T-handle in hand				R624-062
09:21:01 7/22/01	1544	203	T-handle pulled off				R624-063
09:21:11 7/22/01	1544	200	We have attempted to retrieve the osmosampler at Hell. We pulled out the T-handle and the tubing came off and it appears to be hanging by a wire. We have successfully retrieved it and are placing it in the larval boxes near Crack.	R624-Osmo-0022	MBARI		
09:25:43 7/22/01	1545	233	Osmo out of the structure				R624-064
09:28:13 7/22/01	1545	90	Push cores near Hell.				R624-065
09:29:23 7/22/01	1547	110	Hobo in larval tubes boxes.				R624-066
09:32:33 7/22/01	1546	133	Probe is put on the larval boxes				R624-067

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
09:35:25 7/22/01	1546	142	We are finished putting things in the larval box and are now going to Crack Vent.				
09:36:55 7/22/01	1546	130	We are going to remove Paul Johnson's package from Crack before sampling here. There is a bit of diffuse leaking around the edges. It doesn't look there is much flow coming out of the exhaust at all.				
09:36:55 7/22/01	1546	134	Instrument package at Crack.				R624-068
09:38:45 7/22/01	1546	119	Big rat-tail fish.				R624-069
09:43:27 7/22/01	1547	186	lifting cap of the instrument package				R624-070
09:43:37 7/22/01	1547	186	Removed the Johnson lid from Crack Vent.				
09:45:27 7/22/01	1547	186	We are probing the cement box with the fluid sampler.				
09:47:07 7/22/01	1547	43	fluid sampling in the instrument pack's box				R624-071
09:49:27 7/22/01	1547	43	Sample Bag #11 with a filter. Start 0949; Stop 0956. Tavg=35.3. Tmax=36.0 Vol=565mL. H2Save=108 +/- 1.5uM. pHave+D165=5.50 +/- .02. (421424/5087135 45 55.998 130 0.813)	R624-HFS-11-0023	Butterfield/Lilley/Lang		
10:01:49 7/22/01	1547	43	Sterivex filter #15. Start 1003; Stop 1014. Tavg=32.7. Tmax =33.5. Vol=1L. Average H2S=108 +/- 1.5uM. Average pH=5.50 +/-.02. (421424/5087135 45 55.998 130 0.813)	R624-HFS-15-0024	Huber/Mehta		
10:01:59 7/22/01	1547	43	tube worm on instrument package's box at Crack vent.				R624-072
10:15:13 7/22/01	1547	43	FISH filter #21. Start 1015; Stop 1028. Tavg=31.9. Tmax=32.4. Vol=1006 ml. Average H2S=108 +/- 1.5uM. Average pH=5.50 +/- .02. (421424/5087135 45 55.998 130 0.813)	R624-HFS-21-0025	Huber/Mehta		
10:31:17 7/22/01	1547	42	We are removing the HFS intake from the cement box. It appears that we used the intake to "plug" up the hole because when we removed our intake, all sorts of fluid and particulates came flying out. While sampling, we saw nothing.				
10:33:47 7/22/01	1547	41	We are deploying the new Paul Johnson flow meter at Crack vent.				
10:33:57 7/22/01	1547	41	putting the lid back on Johnson's box				R624-073
10:35:47 7/22/01	1547	41	Paul Johnson's box				R624-074
10:36:27 7/22/01	1547	41	We are leaving the old Paul Johnson package next to Crack Vent for later retrieval.				
10:38:29 7/22/01	1545	270	We are going back to Hell now.				
10:39:09 7/22/01	1547	282	rat-tail fish				R624-075
10:40:49 7/22/01	1543	250	Back at Hell				R624-076
10:41:09 7/22/01	1543	246	We are back at Hell now.				
10:46:09 7/22/01	1544	194	We are trying to position to sample fluids at Hell.				
10:47:31 7/22/01	1544	189	fluid sampling at Hell				R624-077
10:48:41 7/22/01	1544	190	Gas Piston #24 at Hell. Start 1049; Stop 1051. Tavg=283.4. Tmax=284.4 Vol=145. (421372/5087135 45 55.998 130 0.8533)	R624-HFS-24-0026	Evans	Butterfield/Lilley	
10:52:11 7/22/01	1544	189	Bag #17 with filter at Hell. Start 1052; Stop 1058. Tavg=283.7. Tmax=284.3. Vol=505mL. (421372/5087135 45 55.998 130 0.854)	R624-HFS-17-0027	Butterfield/Lilley/Evans		
10:58:23 7/22/01	1544	189	Bag #16 at Hell. Start 10??; Stop 1105. Tavg=283.0. Tmax=283.7. Vol=520. This vent is half a meter north of where the osmo and hobo were. (421372/5087135 45 55.998 130 0.854)	R624-HFS-19-0028	Butterfield/Lilley/Lang/Huber/Mehta		
11:14:07 7/22/01	1544	143	We are now going to Hillock/Phoenix to view worms.				

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
11:16:17 7/22/01	1545	174	At Phoenix, looking for Mkr 2.				
11:21:07 7/22/01	1547	128	Positioning for sulfide worm observations at the northwest side of the base of Hillock/Phoenix; hdg 130. removing Mkr-2 from the base of vent to be positioned at a later time. (421397/5087162 45 56.013' 130 0.834')				
11:30:29 7/22/01	1546	69	Still looking for a site with warm temperature and high fluid flow across the substratum. Repositioning the sub.				
11:35:01 7/22/01	1546	170	Heading to Ropos, after unsuccessful search at Phoenix candidate sites.				
11:38:11 7/22/01	1546	286	Checking short chimney (might be porkchop) at Hell for appropriate conditions for sulfide worm observations. Heading 111 N.				
11:43:23 7/22/01	1546	243	Examining Hell for a site.				
11:44:13 7/22/01	1546	242	Flange found at Hell and covered in Ridgeia.				
11:44:13 7/22/01	1546	242	Flange pool at Hell				R624-078
11:45:03 7/22/01	1546	242	Flange pool				R624-079
11:45:53 7/22/01	1546	242	Highlights going on to capture flange imaging.				
11:46:53 7/22/01	1546	243	Tube worms and sulfide worms at flange				R624-080
11:47:23 7/22/01	1546	243	Edge of flange				R624-081
11:47:55 7/22/01	1546	245	Close up edge of flange				R624-082
11:48:35 7/22/01	1546	245	Flange pool with tube worm bush				R624-083
11:50:25 7/22/01	1544	215	Highlights just turned off.				
11:56:15 7/22/01	1544	230	Heading 230; looking at a flange for potential sampling on a biobox dive.				
12:00:47 7/22/01	1544	235	Small flange - potential spot for UQAM observations				R624-084
12:03:27 7/22/01	1544	235	Highlights were turned on at 12:00.				
12:04:57 7/22/01	1544	165	Trying to get a side profile of the flange we were previously observing from 12:00 to 12:06. Highlights turned off.				
12:08:17 7/22/01	1544	200	This is an excellent view. Considering sampling at this site.				
12:08:47 7/22/01	1544	200	Same small flange viewed from right side				R624-085
12:09:59 7/22/01	1544	200	Flange overview				R624-086
12:10:59 7/22/01	1544	201	DV video turned on. Observation period initiated.				
12:12:59 7/22/01	1544	199	Close up of worms on flange				R624-087
12:15:09 7/22/01	1544	198	Heading 198. Observing sulfide worms from side flange view. (45 55.9976/130 00.8527; 421373./5087136)				
12:19:21 7/22/01	1544	199	worm observations				R624-088
12:20:01 7/22/01	1544	199	Suspending sulfide worm observations to look at gages.				
12:21:01 7/22/01	1544	199	Back checking out the sulfide worms.				
12:27:01 7/22/01	1544	199	migrating worm				R624-089
12:28:23 7/22/01	1544	200	worm observations				R624-090
12:29:53 7/22/01	1544	199	worm backing up				R624-091
12:31:13 7/22/01	1544	199	worms grabbing other worm				R624-092
12:39:55 7/22/01	1544	200	Worm observations				R624-093

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
12:57:19 7/22/01	1543	203	Zoomed out from observation position of sulfide worms at Hell vent.				
12:57:49 7/22/01	1545	217	Mkr-2 deployed on ocean floor just under flange (Hell vent) that we observing from 12:11 to 12:58.				
12:58:09 7/22/01	1545	218	Placing Mkr-2 next to worm observation site				R624-094
13:00:19 7/22/01	1543	230	DV and highlights (betacam) are off.				
13:01:39 7/22/01	1542	125	Heading to Hillock/Phoenix vent.				
13:02:49 7/22/01	1546	99	At Phoenix vent; checking out sulfide worm observation positions. DV and highlights are back on.				
13:06:23 7/22/01	1546	100	We went off nav from 13:02 to 13:05.				
13:27:37 7/22/01	1546	183	Found a site at Phoenix; hdg 180. (45 55.9947/130 00.8388) Site located at 13:25.				
13:40:51 7/22/01	1546	183	Observation stopped due to obscured vision by shimmering water.				
13:43:51 7/22/01	1546	184	Checking gages.				
13:49:53 7/22/01	1545	149	Restarting observation of sulfide worms at Phoenix vent; heading 149.				
14:22:59 7/22/01	1545	149	Stopped observation 3 minutes ago. Exploring vent wall further and looking at sulfide worm interactions.				
14:29:11 7/22/01	1545	149	Started observation of sulfide worms at 14:23 on side of Phoenix; heading 149; same spot as the previous heading but cameras zoomed in on different worms.				
14:32:33 7/22/01	1545	149	Observation spot on side of Phoenix				R624-095
14:53:37 7/22/01	1545	149	Stopped observations at 14:52.				
14:59:07 7/22/01	1545	142	limpets on a spire at Phoenix				R624-096
15:02:39 7/22/01	1541	306	Flying around Phoenix. Checked out potential areas to put the larval traps. A few minutes later: looking around to find iron oxides for Chris K.				
15:05:09 7/22/01	1544	184	Iron oxide mounds on the periphery of Phoenix				R624-097
15:10:17 7/22/01	1544	181	Start to suction iron oxides into jar #1 at 15:11. Moved the fluid sampler intake out of the way for better access. Stop at 15:26. (Phoenix - 421391/5087130 45 55.995 130 0.839)	R624-SS-J1-0029	Kennedy		
15:11:57 7/22/01	1544	180	Suction sample of iron oxides into J#1 for Chris K.				R624-098
15:18:09 7/22/01	1544	217	Iron oxides where Chris sampled into J#1				R624-099
15:30:01 7/22/01	1544	136	FeO mounds at Fe Hyde				R624-100
15:30:11 7/22/01	1544	130	FeO mounds at Fe Hyde				R624-101
15:30:21 7/22/01	1544	130	FeO mounds at Fe Hyde				R624-102
15:32:21 7/22/01	1544	145	We moved to Fe Hyde south of Ashes. Preparing for a suction sample into jar #2 for Chris K.				
15:34:31 7/22/01	1544	134	Start suction of FeO into jar#2. Stopped suctioning at 15:38. (421406/5087100 45 55.979' 130 0.827')	R624-SS-J2-0030	Kennedy		
15:40:33 7/22/01	1544	137	Fe highway at Fe Hyde (S. of Ashes)				R624-103
15:43:03 7/22/01	1544	106	Susan just moved the video overlay to the upper left of the screen.				
15:44:45 7/22/01	1544	116	Suction sampling iron oxides at Fe Hyde into jar #3. Start at 15:44. Stopped at 15:48. (421406/5087100 45 55.979' 130 0.827')	R624-SS-J3-0031	Kennedy		
15:49:57 7/22/01	1544	112	Moving west to the wall of the caldera.				
15:57:47 7/22/01	1542	287	Sponges and holothurians between Ashes and the caldera wall				R624-104

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
16:00:09 7/22/01	1543	324	At the wall of the caldera. Venting and tubeworms again.				
16:00:39 7/22/01	1542	282	The wall.				R624-105
16:00:39 7/22/01	1542	287					R624-106
16:00:59 7/22/01	1544	266	At the caldera west wall, somewhere in the area of Tunnicliffe vent.				R624-107
16:02:19 7/22/01	1544	292	Area for oxide sampling				R624-108
16:02:19 7/22/01	1544	292	At iron oxides on the base of the caldera wall. Preparing to suction sample.				
16:02:39 7/22/01	1544	294	Iron oxide heaven.				R624-109
16:03:19 7/22/01	1544	295	Start suction sample of iron oxides into jar #4 at 16:04. Stopped at 16:08. (location ?? no nav)	R624-SS-J4-0032	Kennedy		
16:08:31 7/22/01	1544	283	Fe oxides at base of caldera wall. Where Chris suctioned.				R624-110
16:09:11 7/22/01	1543	283	Fe oxide field at base of caldera wall.				R624-111
16:09:21 7/22/01	1542	279	Fe oxide field at base of caldera wall				R624-112
16:09:41 7/22/01	1542	280	Fe oxide field at base of caldera wall				R624-113
16:09:51 7/22/01	1541	285	Fe oxide field at base of caldera wall				R624-114
16:11:01 7/22/01	1535	103	Heading back to the cage.				
16:20:53 7/22/01	1542	96	We were back at the cage and now we're back on the bottom approaching Ashes.				
16:22:13 7/22/01	1544	331	Back the larval traps. Positioning to pick up two larval traps and move them to Virgin.				
16:41:28 7/22/01	1544	61	Flying to Virgin with a larval traps in each claw.				
16:43:58 7/22/01	1541	359	Close up of Mushroom. Still heading to Virgin.				
16:46:00 7/22/01	1543	54	At Virgin.				
16:46:20 7/22/01	1544	39	Virgin vent with two hobos.				R624-115
16:47:30 7/22/01	1544	53	Deploying larval traps #11 and #12 next to Virgin.				
16:50:30 7/22/01	1544	77	Recovering hobo#127 from Virgin. (4214305/087174; 45.93365/130.01348)+D278	R624-HOBO-127-0033	Moyer		
16:53:42 7/22/01	1544	20	Recovering hobo#130 from Virgin.	R624-HOBO-130-0034	Embley		
16:56:42 7/22/01	1540	195	Moving back to Anna's larval cadillac (near Crack) to put HOBOs inside for recovery to surface.				
16:59:42 7/22/01	1544	139	Finders, Keepers!!!				R624-116
17:00:14 7/22/01	1544	142	First hobo dropped into the cadillac.				
17:05:13 7/22/01	1544	135	Second hobo dropped in cadillac.				
17:06:04 7/22/01	1544	86	Picking up larval traps #9 and #10 and heading to Virgin.				
17:10:56 7/22/01	1545	28	Please don't take it away!				R624-117
17:15:46 7/22/01	1544	62	Back at Virgin. There are sulfide worms at the base.				
17:16:56 7/22/01	1544	62	Sulfide worms at base		Verena		R624-118
17:20:26 7/22/01	1544	47	Opening larval trap #10.				
17:21:48 7/22/01	1544	43	Deploying larval trap #10 next to Virgin. About 0.5m from the edge of the anhydrite.				
17:24:08 7/22/01	1544	56	Opening larval trap #9. Placed it next to Virgin about 0.5m away from anhydrite edge. Heading 140; placed on the opposite side of the vent; across from #10.				

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
17:25:48 7/22/01	1544	137	The anhydrite spire of Virgin vent just toppled over.				
17:32:50 7/22/01	1544	76	Opening larval trap #12.				
17:41:12 7/22/01	1544	324	Opened larval trap #11.				
17:44:02 7/22/01	1544	312	Placed larval trap #11 and #12 next to Virgin. Trap #11 is about 1m away from Virgin. Trap #12 is about 0.5 m away.				
17:45:32 7/22/01	1543	49	larval traps in place at Virgin.				R624-119
17:48:02 7/22/01	1543	305	Looking around Ashes to find a good spot to deploy the larval array and two MTRs.				
17:51:24 7/22/01	1544	342	Checking out the backside of Phoenix. Moving to ROPOS vent.				
17:53:04 7/22/01	1546	226	ROPOS vent				R624-120
17:59:46 7/22/01	1546	188	Checking out temperature in ROPOS vent to decide whether to deploy a MTR here. Temp was up to at least 50 C. Too hot to deploy a MTR right in the flow.				
18:01:16 7/22/01	1546	188	Deploying MTR #3041 at ROPOS vent. (later decided NOT to deploy it here)				R624-121
18:02:16 7/22/01	1546	188	Recovering MTR-D3003201 from ROPOS vent. (later decided NOT to deploy it here)				
18:02:26 7/22/01	1546	188	recovered MTR3201				R624-122
18:05:16 7/22/01	1546	189	Fauna at ROPOS vent				R624-123
18:05:56 7/22/01	1546	188	Highlights on.				
18:07:38 7/22/01	1546	189	Highlights off.				
18:12:08 7/22/01	1546	189	Decided NOT to deploy MTR #3041 at ROPOS vent. BOB wants to deploy the 2 MTRs at the same vent.				
18:13:18 7/22/01	1545	145	view of ROPOS vent.				R624-124
18:13:58 7/22/01	1545	176	ROPOS vent				R624-125
18:14:18 7/22/01	1545	173	bac trap at ROPOS to pick up on later dive.				R624-126
18:15:40 7/22/01	1544	286	Looking around again for a good spot to deploy MTRs. Back at Hell vent.				
18:16:00 7/22/01	1544	238	Highlights on of Hell vent.				
18:17:00 7/22/01	1545	137	Close up of the flange pool at Hell vent.				
18:17:00 7/22/01	1545	140	flange pool at Hell vent.				R624-127
18:18:00 7/22/01	1545	138	flange pool at Hell vent.				R624-128
18:18:00 7/22/01	1545	136	flange pool at Hell vent.				R624-129
18:18:10 7/22/01	1545	139	flange pool at Hell vent.				R624-130
18:19:30 7/22/01	1542	127	Moving back to near Crack vent to put the recovered MTR in the larval cadillac for surface recovery.				
18:20:00 7/22/01	1543	134	Highlights off.				
18:23:30 7/22/01	1543	236	MTR-D3333201 put in the cadillac. (421386/5087134 45 55.997 130 0.843)	R624-MTR-3201-0037	Embley		
18:23:50 7/22/01	1544	281	Moving to Gollum to deploy 2 MTRs and to make a FINAL decision on where to deploy the last larval traps.				
18:36:24 7/22/01	1542	328	Arrived at Gollum vent.				
18:43:14 7/22/01	1545	294	Deployed MTR #3041 at Gollum vent; at the bottom of a tube worm clump				
18:48:56 7/22/01	1545	281	Deployed MTR #3334 at Gollum				
18:51:16 7/22/01	1542	206	Recovered MTR #3026 from Gollum vent	R624-MTR-3026-0035	Embley		

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
18:58:08 7/22/01	1546	132	Picked up settling array L; and going to go put it at ROPOS vent				
19:02:10 7/22/01	1546	189	Found a suitable spot at ROPOS and put settling array L down				
19:03:50 7/22/01	1547	244	monkfish at ROPOS				R624-131
19:07:50 7/22/01	1545	120	We are at the larval trap boxes				
19:13:52 7/22/01	1546	275	Traveling to ROPOS with the larval trap box in hand				
19:17:32 7/22/01	1546	155	ROPOS isn't as flat as once thought; larval trap box suddenly on it's side				
19:19:22 7/22/01	1546	151	Searching for a level spot to put the larval traps down				
19:27:04 7/22/01	1547	118	Larval trap box opened				
19:29:24 7/22/01	1546	73	Standing the box upright				
19:35:26 7/22/01	1546	73	Pulled one larval tube out of the box				
19:39:18 7/22/01	1546	133	Got another larval tube out				
19:40:58 7/22/01	1546	131	One of the larval tubes fell over				
19:44:18 7/22/01	1545	128	With one larval tube in hand we are going to find a flat spot near ROPOS to put them down				
19:48:18 7/22/01	1547	166	Uncorked larval trap # 4				
19:51:30 7/22/01	1547	154	Larval trap #4 put down. It's not exactly vertical; slightly slanted.				
19:56:40 7/22/01	1546	169	Larval trap #1 picked up and on it's way to it's spot				
20:05:22 7/22/01	1547	205	Larval trap #1 fell over				
20:12:34 7/22/01	1547	221	Picked larval trap #1 up				
20:15:16 7/22/01	1547	221	Uncorked larval trap #1				
20:27:08 7/22/01	1546	128	Took larval traps 2 and 3 out of the larval trap box				
20:35:50 7/22/01	1548	184	Searching for another flat spot				
20:41:22 7/22/01	1548	183	larval trap #3 in the process of being put down				
20:49:22 7/22/01	1548	173	Larval trap #3 uncorked				
20:51:34 7/22/01	1548	177	larval trap #3 deployed				
20:55:34 7/22/01	1547	217	larval trap #2 uncorked				
20:59:04 7/22/01	1547	219	larval trap #2 deployed				
21:00:24 7/22/01	1547	219	Larval traps finished; now taking the last suction sample for Jeff E/Moyer				
21:01:36 7/22/01	1543	171	Going south to Fe Hyde				
21:07:26 7/22/01	1546	291	21:07-21:16 turned on suction sample jar 5; sucking up orange mat/FeO. (421406/5087100 45 55.979' 130 0.827')	R624-SS-J5-0036	Engebretson/Moyer		
21:11:28 7/22/01	1547	281	orange mat/FeO at Fe-Hyde for suction sample #5		Jeff E/Moyer		R624-132
21:16:38 7/22/01	1546	272	Suction sampling location for jar #5		Jeff E/Moyer		R624-133
21:16:48 7/22/01	1546	273	Suction sampling spot for Jar #5		Jeff E/Moyer		R624-134
21:23:30 7/22/01	1545	319	Lost STS again; like last night				
21:42:44 7/22/01	1547	321	Craig is working on getting STS up and running again				
21:47:56 7/22/01	1547	326	We will not be able to get STS back; that means that we cannot get the last HFS filter sample at Gollum.				
21:56:48 7/22/01	1547	188	Getting the larval trap box for trip to the ship				
22:03:08 7/22/01	1547	134	Securing the larval box lid..				

Time (UTC)	Z (m)	Hdg	R624 Comments	Samples	Investigator	SubSamples	FrGrab
22:05:40 7/22/01	1536	224	ROPOS leaving bottom. Up to the cage..				
23:23:16 7/22/01	2	95	ROPOS on deck at 2325. End of dive.				

6.7 R625 DIVE LOG

Area: 98 flow (Cloud, Nascent, OldFlow, Mkr-N3)

R625 SUMMARY: The dive began with an Imagenex and video survey at Cloud. The McLane pump was running during the survey. The RAS sampler was deployed (short-term) at Cloud/Mkr-N6. Two bacteria traps were recovered from Cloud/Mkr-N4, and two were deployed at Cloud/Mkr-N6. Five suction samples were collected in the Nascent area (Mkr-M and N41) and one tubeworm grab. Another tubeworm grab was collected at OldFlow, as well as a suction sample. Also suction sampled at Mkr-N3.

Bottom Time: 7/23(JD204) 0455 - 1815

Time (UTC)	Z (m)	Hdg	R625 Comments	Samples	Investigator	SubSamples	FrGrab
23:33:58 7/22/01	2	213	ROPOS in the water at 7/23 0412.				
04:55:20 7/23/01	0	0	We're at the bottom at 04:55. Landed at Mkr-33.				
04:58:00 7/23/01	0	0	Going to drop the biobox at N4.				
04:58:10 7/23/01	0	0	recognized that depth is not registering in log.				
05:05:12 7/23/01	1517	261	We have intermittent communications with depth, heading, and time.				
05:08:54 7/23/01	1518	226	We tried to use the RAS as another relay and it didn't work. It was messing with the sensor data so we removed the coms with RAS.				
05:26:14 7/23/01	1520	113	Going to observe the RAS to be sure it made it to the bottom OK.				
05:26:54 7/23/01	1523	136	RAS Sampler between Mkr-33 and Snail.				R625-001
05:27:14 7/23/01	1524	130	Anchor for RAS sampler between Mkr33 and Snail				R625-002
05:29:44 7/23/01	1517	89	RAS looks good we're going to begin the imagenex survey.				
05:40:24 7/23/01	1520	154	Susan's Pillar near Cloud				R625-003
05:52:47 7/23/01	1518	4	Starting beta tape for video transect and imagenex. Sebastian's imagenex survey over Cloud is officially starting. He has started Beta video tapes starting with tape 6A.				
05:54:27 7/23/01	1519	2	Starting transect.				
06:04:27 7/23/01	1521	184	Pillar during Sebastian's survey near cloud.				R625-004
06:19:59 7/23/01	1524	182	McLane pumps are not functioning; don't know why.				
06:29:59 7/23/01	1518	126	Susan's beautiful pillar.				R625-005
06:48:31 7/23/01	1524	2	believe it or not; we are officially starting the imagenex survey. McLane pump was also started.				
06:49:21 7/23/01	1523	2	We did line 1 already and we are now starting line 2.				
06:49:51 7/23/01	1521	2	Lava spire on Sebastian's traverse				R625-006
06:52:51 7/23/01	1522	22	McLane pump sample. 2-4 meters above bottom; 10 liters per minute for 120 minutes. (423877/5086283 45 56.001' 129 58.8936')	R625-McLane-0001	Metaxas/Tunnicliffe		
06:53:01 7/23/01	1521	22	More lava pillars				R625-007
06:54:31 7/23/01	1520	185	Beginning line 3 of imagenex survey at 06:55.				
06:59:11 7/23/01	1522	176	Lava pillars on traverse				R625-008
06:59:11 7/23/01	1522	177	Lava pillars on traverse				R625-009
06:59:21 7/23/01	1521	179	Lava pillars on traverse				R625-010
07:03:21 7/23/01	1525	85	End of line 3 of imagenex survey at 0703.				
07:05:31 7/23/01	1524	2	Starting line 4 of imagenex survey at 0705.				
07:08:33 7/23/01	1522	14	Surface reaction on lava pillar				R625-011
07:10:43 7/23/01	1522	40	End of line 4 at 0710.				
07:12:13 7/23/01	1523	173	Starting line 5 at 0712.				
07:16:13 7/23/01	1524	176	End of line 5 at 0716.				

Time (UTC)	Z (m)	Hdg	R625 Comments	Samples	Investigator	SubSamples	FrGrab
07:20:03 7/23/01	1520	209	Starting line 6 at 0720.				
07:26:33 7/23/01	1520	178	End of line 6 at 0726.				
07:28:43 7/23/01	1521	6	Starting line 7 at 0728.				
07:31:55 7/23/01	1519	2	End of line 7 at 0731.				
07:35:15 7/23/01	1523	90	Starting line 8 at 0735. This is the first east-west line.				
07:39:05 7/23/01	1520	98	End of line 8 at 0739.				
07:41:25 7/23/01	1524	269	Starting line 9 at 0741.				
07:45:25 7/23/01	1523	271	End of line 9 at 0745.				
07:46:55 7/23/01	1522	104	Starting line 10 at 0746.				
07:51:15 7/23/01	1524	107	End of line 10 at 0751.				
07:55:07 7/23/01	1523	267	Starting line 11 at 0755.				
08:00:47 7/23/01	1521	250	End of line 11 at 0800.				
08:02:37 7/23/01	1521	96	Starting line 12 at 0802.				
08:06:47 7/23/01	1519	30	End of line 12 at 0806.				
08:11:17 7/23/01	1524	267	We're just looking around Cloud as part of the video survey.				
08:22:39 7/23/01	1521	269	We are done with the video survey at Cloud.				
08:24:39 7/23/01	1520	268	We are going to N6 to deploy the MTRs.				
08:31:19 7/23/01	1526	6	MTRs 4101 and 3292 are being deployed at Cloud N6. They are being placed in the hole at N6.				
08:40:09 7/23/01	1526	4	MTR deployment				R625-012
08:46:29 7/23/01	1523	264	We are done deploying the MTRs at N6 and will now do some deployment and retrievals at N4.				
08:48:59 7/23/01	1525	232	Short term bacterial trap #53 being retrieved at Cloud N4. Placed in the portable biobox (423896/5087119 45 56.0052'/129 58.9002')	R625-BT-53-0002	Moyer		
08:51:31 7/23/01	1525	39	Bac-trap recovery				R625-013
08:52:51 7/23/01	1524	39	Short term bacterial trap #54 being retrieved at Cloud N4. It has orange iron oxide stuff on it. Placed in the portable biobox. (423896/5087119 45 56.0052'/129 58.9002'). Kennedy subsample FeO from trap.	R625-BT-54-0003	Moyer	Kennedy	
09:11:51 7/23/01	1525	234	We are deploying MTR 3045 at Cloud N4 in the hole.				
09:16:21 7/23/01	1525	228	MTR deployment at Cloud				R625-014
09:16:53 7/23/01	1525	227	We are now going to find the RAS and deploy it.				
09:21:43 7/23/01	1524	250	The RAS is in view.				
09:22:03 7/23/01	1524	263	RAS before deployment at Marker 33		Butterfield		R625-015
09:25:03 7/23/01	1526	332	We are trying to pick up the RAS.				
09:28:23 7/23/01	1525	285	We are releasing the heavy anchor from the RAS before we move it.				
09:34:23 7/23/01	1526	212	We have released the heavy anchor from the RAS.				
09:34:33 7/23/01	1526	213	Releasing the heavy weight from RAS				R625-016
09:37:33 7/23/01	1526	233	We have successfully picked up the RAS and will now take it to N6 at Cloud.				
09:46:25 7/23/01	1526	19	We are setting the RAS down about 3 m east of the hole at N6. It is right beside the osmosampler and the larval traps are just north of it.				
09:47:05 7/23/01	1526	26	Putting RAS down at N6				R625-017
09:47:35 7/23/01	1527	17	RAS at N6				R625-018
09:50:25 7/23/01	1526	50	We are releasing the intake valve. Highlights on.				

Time (UTC)	Z (m)	Hdg	R625 Comments	Samples	Investigator	SubSamples	FrGrab
09:52:25 7/23/01	1526	347	We are putting the pull pin in the starboard side of the biobox. We will now position the intake valve of the RAS in the hole at N6.				
10:01:07 7/23/01	1526	336	Dropping the hose down the hole				R625-019
10:01:57 7/23/01	1526	339	We have positioned the intake of the RAS in the hole at N6.				
10:03:27 7/23/01	1524	12	RAS sampler at N6.				R625-020
10:03:57 7/23/01	1525	358	Highlights off.				
10:04:17 7/23/01	1524	2	RAS and larval trap at Cloud N6.				R625-021
10:05:37 7/23/01	1524	1	We are done deploying the RAS and are now moving onto biological sampling.				
10:16:07 7/23/01	1496	104	We're going back to the cage to take the turns out of the tether due to the loss of telemetry.				
10:38:29 7/23/01	1452	169	We're parking the ROV in the cage so that we can power down and reboot STS.				
10:48:17 7/23/01	1452	310	We're getting out of the cage to check gauges.				
10:51:17 7/23/01	1450	1	We are going back down to the bottom now.				
11:00:27 7/23/01	1520	9	Nav not working; getting a serial error.				
11:00:47 7/23/01	1520	6	Nav is working and we have a ROV fix.				
11:02:47 7/23/01	1520	123	Using the McLane Pump computer to turn on ALIEN. (didn't actually get a sample on this run.)				
11:06:09 7/23/01	1523	353	Heading to Nascent.				
11:09:19 7/23/01	1524	64	Putting the biobox with the bac traps (BT-53 and 55) in the right arm; 380m; bearing N.				
11:13:39 7/23/01	1506	290	Moving the ship to Nascent; about 275m north of Cloud. Moving at 3/4 knots.				
11:19:19 7/23/01	1474	36	HVSS tape being stopped for transit.				
11:36:11 7/23/01	1515	357	Back on the bottom.				
11:39:01 7/23/01	1515	14	Turned the VHS tape back on when we reached to bottom (11:35).				
11:52:13 7/23/01	1516	356	Stopped the VHS momentarily.				
11:55:31 7/23/01	1516	40	Trying to find Nascent.				
11:57:43 7/23/01	1516	108	We are at spot where nav fixes are marking N41 ; however nav is shifted 15m SW. Travelling 15m SW of the marked N41 position.				
12:02:43 7/23/01	1517	192	Located Mkr-M at Nascent.				
12:03:23 7/23/01	1519	185	nascent				R625-022
12:04:33 7/23/01	1520	144	Preparing to take a tubeworm grab for Jean Marcus. Moving away from Mrk M which was the position that Jean sampled at in 2000.				
12:05:23 7/23/01	1520	107	Putting on Tunnicliffe video.				
12:08:33 7/23/01	1520	58	Noting fault in the altimeter.				
12:09:33 7/23/01	1520	65	Jean Marcus' last tubeworm grab ever!!!!				
12:11:43 7/23/01	1520	112	Hdg 113; 0.75m from Mrk-M; TWG with temp data from a SS. Temp file is AL625. Before grab temp: 2-3 degrees above ambient; max 6 degrees above ambient. After grab temp: 1-3 degrees above. (45 56.15040' 129 58.89582'; 423905/5087367)	R625-TWG-0004	Marcus		
12:24:35 7/23/01	1520	108	Before tubeworm grab pic.		Marcus		R625-023
12:25:25 7/23/01	1520	108	Positioning for grab.		Marcus		R625-024
12:27:35 7/23/01	1520	105	Making a mess.		Marcus		R625-025
12:30:05 7/23/01	1520	107	The tubeworm grab was successfully stuffed into the biobox.				

Time (UTC)	Z (m)	Hdg	R625 Comments	Samples	Investigator	SubSamples	FrGrab
12:34:45 7/23/01	1520	81	Note that the tubeworm grab came up with "foot long roots" and a chunk of rock.				
12:37:35 7/23/01	1520	115	Moving in to take after-grab temperature.				
12:41:05 7/23/01	1520	103	Pausing temperature logging while the arm is re-positioned.				
12:42:05 7/23/01	1520	115	Logging temperature again.				
12:43:55 7/23/01	1520	114	Positioning to take a suction sample of tubeworm bush for Christian Levesque.				
12:47:15 7/23/01	1520	118	Bacteria on tubeworm bush.				R625-026
12:51:37 7/23/01	1520	114	Flushing the suction hose through jar #8 prior to Christian's suction sample.				
12:53:37 7/23/01	1520	113	Logging temperature at tube worm bush a few meters from Mkr-M where Christian's suction sample will be taken. Temperature file is alR625_a.				
13:02:07 7/23/01	1520	88	Started SS about 1255. Suctioning particulates and fauna from a worm bush with visible flow. Stop 13:05. (45 56.15040' 129 58.89582'; 423905/5087367)	R625-SS-J4-0005	Levesque		
13:11:07 7/23/01	1520	67	Amanda's looking around for a good place to suction sample.				
13:17:29 7/23/01	1520	139	We are at a potential sampling spot (TW bush). We are taking temperature measurements.				
13:20:59 7/23/01	1520	134	Flushing jar #8 prior to suctioning.				
13:21:39 7/23/01	1520	134	Begin suctioning limpets etc. around 13:25 into jar 3. Temp logging file is alR625_b. We are about 4m NE of Mkr-M. Stop at 13:31. (45 56.15040' 129 58.89582'; 423905/5087367)	R625-SS-J3-0006	Bates		
13:21:59 7/23/01	1520	133	limpet nascent				R625-027
13:30:59 7/23/01	1520	145	limpet nascent after sampling				R625-028
13:31:59 7/23/01	1520	147	limpet nascent with laser point				R625-029
13:35:29 7/23/01	1520	146	hole plus laser				R625-030
13:35:49 7/23/01	1520	143	Preparing to suction about 1 m away from last sample.				
13:37:49 7/23/01	1520	146	SS jar2 limpets/fauna. About 1m away from last suction sample; on the 'periphery'. Temp file is alR625_c. Stopped suction at 13:43. (45 56.15040' 129 58.89582'; 423905/5087367)	R625-SS-J2-0007	Bates		
13:42:39 7/23/01	1520	139	Post suction sample 07				R625-031
13:45:31 7/23/01	1520	141	Preparing to suction 6m away from suction sample that went into J2; suction site is beyond amsamytha worms; far periphery.				
13:51:41 7/23/01	1520	99	Scale for far periphery suction.		Tunnicliffe		R625-032
13:54:41 7/23/01	1520	111	Starting to suction in J1.				
13:55:01 7/23/01	1520	111	SS of far periphery ~10m Mrk M (111) for limpets/fauna; 6m from last suction sample (J1). Temperature file is AL625_d. Temperature is ambient.(45 56.15040' 129 58.89582'; 5087367 423905)	R625-SS-J1-0008	Tunnicliffe		
13:57:11 7/23/01	1520	114	Suction turned off; checking temperature; rebooting ALIEN for temperature data.				
14:00:01 7/23/01	1520	111	Aftermath picture with scale of suction site for far periphery sample that went into J1.				R625-033
14:03:51 7/23/01	1518	106	Outskirts of Nascent vent field.				R625-034
14:04:21 7/23/01	1518	93	Inner Nascent field including Mrk M.		Tunnicliffe lab		R625-035
14:05:03 7/23/01	1519	36	Picking up the biobox with the bac traps and then heading to Mrk N41 to do a suction sample.				

Time (UTC)	Z (m)	Hdg	R625 Comments	Samples	Investigator	SubSamples	FrGrab
14:05:41 7/23/01	1519	185	Looking for a site to deploy a MTR in most vigorous flow at Nascent vent field.				
14:08:41 7/23/01	1519	183	Deploying MTR-3211 in tubeworm bush (heading 183).				
14:09:21 7/23/01	1518	185	Deployment site at Nascent for MTR-3211.		Embley		R625-036
14:11:01 7/23/01	1519	185	Site for MTR-3211 in tubeworm bush at Nascent		Embley		R625-037
14:13:31 7/23/01	1519	36	Picking up biobox with Bac Traps then heading to N41 to do a suction sample; looking for iron oxides for Chris on the way.				
14:20:03 7/23/01	1518	165	N41 vent field looking back toward Nascent (looking south).				R625-038
14:22:23 7/23/01	1518	281	Cleft area on the periphery of N41 vent field.				R625-039
14:24:33 7/23/01	1519	284	Suction site for J5.		Christian Levesque		R625-040
14:27:13 7/23/01	1519	249	Flushing into J8.				
14:28:23 7/23/01	1519	250	SS for particulates. Temp file is AL625_e. Starting suction sample into J5. (4239222/5087428 45 56.173 129 58.883)	R625-SS-J5-0009	Levesque		
14:29:53 7/23/01	1519	250	Suction sample position at N41.				R625-041
14:32:23 7/23/01	1519	251	We are finished suctioning.				
14:36:53 7/23/01	1516	344	Heading north to Old Flow vent.				
14:45:25 7/23/01	1519	13	Old Flow site				R625-042
14:45:45 7/23/01	1518	13	We have arrived to Old Flow site				
14:48:15 7/23/01	1519	345	Old Flow site. Note claw of crab in back				R625-043
14:48:55 7/23/01	1519	345	Old Flow tube worm bush				R625-044
14:49:45 7/23/01	1519	346	Weird crab at Old Flow site				R625-045
14:52:25 7/23/01	1519	329	Setting down the portabox in order to grab a TW bush at Old Flow.				
14:55:45 7/23/01	1519	327	Tube worm grab at Old Flow. (423898/5087455 45 56.1868' 129 58.9023)	R625-TWG-0010	Marcus		
14:56:25 7/23/01	1519	327	Galatheid Crab (squat lobster) at Oldflow.				R625-046
15:00:25 7/23/01	1519	204	Looking around periphery of Old Flow for iron oxides for Chris K.				
15:02:17 7/23/01	1519	251	Suction of iron oxides. Start 15:03; stop 15:14. Re-start sampling 15:32; stopped at 15:41. Suctioning was intermittent. (Old Flow: 423898/5087455 45 56.18680 129 58.9023)	R625-SS-J7-0011	Kennedy		
15:03:47 7/23/01	1519	255	Iron oxides on Old Flow edge				R625-047
15:03:57 7/23/01	1519	243	Iron oxides on Old Flow edge				R625-048
15:18:09 7/23/01	1519	37	Power to sub turned off accidentally.				
15:31:35 7/23/01	1517	292	Back on line, full screen nav.				
15:33:55 7/23/01	1518	358	Returning to iron oxide sampling site to add more material to J7.				
15:36:05 7/23/01	1518	357	Sampling position for iron oxide sampling into J7.		Kennedy		R625-049
15:41:55 7/23/01	1518	335	Post sampling (distance between lasers is 10cm)		Kennedy		R625-050
15:42:05 7/23/01	1518	338	Post sampling pic.		Kennedy		R625-051
15:45:55 7/23/01	1518	295	Doing a white balance to adjust for colour.				
15:48:35 7/23/01	1518	339	Post sampling pic at iron oxide site.		Kennedy		R625-052
15:51:45 7/23/01	1501	177	In transit to N3.				
15:53:45 7/23/01	1456	231	The ship is moving toward N3 at 1.5 knots.				
16:37:39 7/23/01	1487	4	Heading to the bottom.				

Time (UTC)	Z (m)	Hdg	R625 Comments	Samples	Investigator	SubSamples	FrGrab
16:39:59 7/23/01	1504	352	Ship is at N3 site.				
16:42:19 7/23/01	1523	347	Near N3				R625-053
16:43:09 7/23/01	1525	347	Heading to N3 along the bottom.				
16:43:39 7/23/01	1527	350	Near N3				R625-054
16:49:19 7/23/01	1527	86	N3 in sight				R625-055
16:49:39 7/23/01	1527	72	Highlights on at N3. Note extensive blue mat.				
16:52:09 7/23/01	1526	31	Looking for the 'hole' at N3.				
17:01:31 7/23/01	1526	135	Highlights being turned off.				
17:03:21 7/23/01	1529	352	more postcard colors near Mk N3.				R625-056
17:06:41 7/23/01	1527	14	Lava formation near N3				R625-057
17:08:31 7/23/01	1528	349	potential mat SS site.				R625-058
17:08:41 7/23/01	1528	349	Highlights being turned on. Scraping off limpets for access to bacterial mat. Nice flow.				
17:09:01 7/23/01	1528	349	potential mat SS.				R625-059
17:09:21 7/23/01	1528	349	Still looking for a site to sample bacterial mat.				
17:09:51 7/23/01	1528	349	potential mat SS site.				R625-060
17:14:33 7/23/01	1528	31	Highlights off three minutes ago.				
17:50:33 7/23/01	1525	199	Returning to Mrk N3 to find a sampling position for bacterial mat; giving up on finding the hole.				
17:54:26 7/23/01	1528	33	Found a sampling site for Craig.				
17:57:06 7/23/01	1529	352	Preparing to suction bacterial mat into J6; flushing through J8.				
17:58:06 7/23/01	1529	353	Site for suction sample into J6.				R625-061
17:58:46 7/23/01	1529	352	Start SS of bacterial mat at 17:59. End SS 18:13. Temp: AL625_f 4 degrees above ambient. (423637/5088278 45 56.628' 129 59.112')	R625-0012	Moyer		
18:13:16 7/23/01	1529	349	Checking gauges; then returning to the cage.				
18:15:56 7/23/01	1527	300	Off the bottom.				
18:30:58 7/23/01	1482	104	Ropos is in the cage.				
18:32:18 7/23/01	1462	57	Coming up.				
18:40:18 7/23/01	1171	40	Ropos is on deck.				

6.8 R626 DIVE LOG

Area: CASM (Imagenex surveys, T&S Spires, Shepherd)

R626 SUMMARY: Prior to the dive, three recoverable transponders were deployed and calibrated at CASM. For the first time ever we had acoustic navigation at CASM. Imagenex lines 1-22 were completed (the caldera floor portion of the survey). The McLane pump and plankton net sampled during the survey. After the Imagenex survey, and a bit of searching, T&S Spires and Shepherd Vent were located just in time for a live-video feed. Samples were collected at T&S including: three suction samples, two gastights, one sulfide and one rock. The dive was finished up with more Imagenex, this time at the top of the caldera and down the wall.

Bottom Time: 7/24(JD205) 0236 - 7/25(JD206) 0327

Time (UTC)	Z (m)	Hdg	R626 Comments	Samples	Investigator	SubSamples	FrGrab
01:22:18 7/24/01	1	72	ROPOS is in the water.				
02:03:02 7/24/01	1462	315	ROPOS is on the bottom 02:07.				
02:22:24 7/24/01	1558	346	Deploying the plankton net.				
02:22:24 7/24/01	1557	353	Deploying plankton net		Tunnicleffe/Metaxas		R626-001
02:22:54 7/24/01	1558	359	Setting up for the imagenex survey with the McLane pump and video taping of the water column for Tunnicliffe.				
02:24:34 7/24/01	1558	355	Beginning the plankton tow.				
02:26:14 7/24/01	1558	358	Cage motor is off.				
02:34:46 7/24/01	1555	122	Still setting up for imagenex at 25m from the bottom.				
02:35:56 7/24/01	1554	3	Starting line C1 for imagenex and the starboard Mclean pump has been turned on.				
03:28:38 7/24/01	1553	357	ROPOS at target 1.				
03:31:00 7/24/01	1552	2	Ship stopped.				
03:53:00 7/24/01	1554	182	Ship moving south and SOL C2. ROPOS is about 50 m south of caldera wall.				
04:01:22 7/24/01	1554	183	EOL C1 occurred at 03:33. ROPOS is at the caldera wall.				
04:50:04 7/24/01	1552	181	EOL C2 occurred at 04:50. (Started line at 0354)				
04:54:56 7/24/01	1553	355	SOL C3 at 04:55.				
05:51:00 7/24/01	1552	360	We're at target 3 with ROPOS (and the ship).				
05:53:20 7/24/01	1552	358	EOL C3 at 05:53.				
05:57:10 7/24/01	1552	176	SOL C4 at 5:57.				
05:59:50 7/24/01	1552	178	ROPOS is at target 4. (EOL C4 at 0702)				
07:04:54 7/24/01	1554	356	SOL C5 at 7:05				
08:04:49 7/24/01	1555	46	EOL C5 at 8:04				
08:08:29 7/24/01	1554	118	SOL C6 at 8:08				
08:58:03 7/24/01	1555	180	SVHS tape was started at 8:31				
09:10:05 7/24/01	1556	181	EOL C6 at 0910.				
09:12:45 7/24/01	1556	1	SOL C7 at 0912.				
10:12:59 7/24/01	1556	359	EOL C7 at 1012.				
10:14:59 7/24/01	1556	183	SOL C8 at 1014.				
10:31:11 7/24/01	1556	182	SVHS tape was stopped at 1031 and a new tape started.				
11:16:43 7/24/01	1556	190	EOL C8 at 11:16.				
11:19:13 7/24/01	1556	0	SOL C9 at 11:19.				
12:24:59 7/24/01	1556	132	EOL C9 at 12:25.				
12:29:59 7/24/01	1556	176	SOL C10 at 12:29.				

Time (UTC)	Z (m)	Hdg	R626 Comments	Samples	Investigator	SubSamples	FrGrab
12:45:09 7/24/01	1556	163	McLane pump start 02:35; stop 12:35 (assuming pumped for 10hr). Pumped 5831.63 L. File saved. Pumped during Imagenex lines C1-C9. (end position 420703/5093107 45 59.3759' 130 1.4336')	R626-McLane-0001	Tunnicliffe/Metaxas		
13:30:53 7/24/01	1556	176	EOL C10 at 13:31.				
13:35:03 7/24/01	1556	357	Start of C11 at 13:35.				
14:48:39 7/24/01	1556	1	End of line C11 at 14:48.				
14:50:09 7/24/01	1556	4	Stowing the plankton net at 14:50. Started at 02:22 - sampled for 12hours 28min. Location of end of surevey: (420800/5093470; 45 59.4135'/130 1.359'). Net dropped at 15:00; successfully collected from bottom and restowed in purse at 1530.	R626-net-0002	Tunnicliffe		
15:00:29 7/24/01	1556	4	Dropped the plankton net and gas tight holster ripped off the front of the sub. Good fix on ROPOS is: 420842/5093487 (X/Y). Going down to get them.				
15:03:59 7/24/01	1580	360	At the bottom. Picking up the gas tight bracket that broke off.				
15:10:01 7/24/01	1580	8	Plankton net in seven function claw.				
15:14:01 7/24/01	1579	10	Verena's tape stopped because we're done with Imagenex. We don't have time for an imagenex line north of CASM because of plankton net drop.				
15:15:01 7/24/01	1579	10	Overlay moved back up on video (it was moved down for Verena's taping of the water column).				
15:20:11 7/24/01	1579	11	Plankton net successfully stowed in purse. Picking up gas tight holster and stowing it in the port side biobox.				
15:29:31 7/24/01	1577	7	Gas tight holster in port biobox at 12:28.				
15:30:31 7/24/01	1576	6	Archive tape put back on at 15:29.				
15:35:21 7/24/01	1576	9	SIT cam on as well. At 13:35.				
15:36:23 7/24/01	1576	323	Flying to the base of the caldera wall. We will be travelling SW along the caldera wall for geological exploration.				
15:38:53 7/24/01	1578	297	Asteroid on lavas near CASM				R626-002
15:42:03 7/24/01	1576	345	Boulders at the bottom of the wall				R626-003
15:43:43 7/24/01	1577	344	Moving up to the wall to take a rock sample. Highlights on at 15:44.				
15:44:33 7/24/01	1577	346	Tallus at bottom of wall				R626-004
15:45:23 7/24/01	1575	344	Tallus bolders at base of wall with a swimming shrimp in foreground				R626-005
15:47:23 7/24/01	1569	340	Smaller tallus chunks at base of N. wall				R626-006
15:48:13 7/24/01	1566	344	Pillow lavas that have been sheared by falling down the wall				R626-007
15:50:23 7/24/01	1566	345	Tallus at base of wall with an ophuroid				R626-008
15:51:03 7/24/01	1566	345	We are now officially at the base of the wall.				
15:52:13 7/24/01	1565	344	More brittle stars and sea cucumber feces!				R626-009
15:53:23 7/24/01	1565	347	Positioning to take a rock sample of the wall.				
15:54:33 7/24/01	1565	347	Going in to sample a piece of basalt with the 5 function				R626-010
15:59:43 7/24/01	1565	348	Rock sample - about 4.5 meters up the N caldera wall; aprox 0.5 km E of CASM fissure. Break in sampling to deal with the gas tight intake. Restart sampling at 16:07. Basalt grab at 16:13. (420817/5093545 45 59.4537' 130 1.3470')	R626-RK-0003	Kulp/Embley		
16:00:53 7/24/01	1565	349	Highlights off.				
16:12:15 7/24/01	1568	358	Rock sample from caldera wall.				R626-011

Time (UTC)	Z (m)	Hdg	R626 Comments	Samples	Investigator	SubSamples	FrGrab
16:19:15 7/24/01	1576	182	Heading to the CASM fissure (T&S Spires) at 340 m at bearing of 236 at a 0.5 knot. Moving the ship.				
16:22:07 7/24/01	1578	219	Glass sponges and star fish on floor moving to CASM				R626-012
16:23:57 7/24/01	1579	219	Sponges and holothurian on jumbled lava; heading to CASM.				R626-013
16:25:07 7/24/01	1578	227	Small lobates				R626-014
16:25:37 7/24/01	1578	226	Sheet flow with glass sponges				R626-015
16:26:27 7/24/01	1578	254	Flow transition; with brisingid in foreground				R626-016
16:26:37 7/24/01	1578	251	Flow transition; from jumbled to ropy flow				R626-017
16:28:37 7/24/01	1577	254	Sheet flow with sponges				R626-018
16:30:37 7/24/01	1578	252	Closeup of glass sponges and brittle stars.				R626-019
16:31:57 7/24/01	1576	265	Moving towards the CASM fissure. Still about 250m away.				
16:34:17 7/24/01	1575	241	Continuing over flow; mostly jumbled (aa).				
16:34:57 7/24/01	1576	248	Neat glass sponge.				R626-020
16:36:07 7/24/01	1576	239	Note: we have very good nav! Yeah Kim!				
16:37:47 7/24/01	1577	242	Going over another flow transition - from ropy to jumbled.				
16:38:27 7/24/01	1575	258	We are about 150m away from CASM in from east side.				
16:40:17 7/24/01	1575	259	Demosponge city!				R626-021
16:40:37 7/24/01	1577	264	Going over another lava flow transition.				
16:41:17 7/24/01	1577	257	Flying over ropy flow now.				
16:43:07 7/24/01	1574	259	Back over jumbled flow. Outcrops several meters high.				
16:44:27 7/24/01	1572	246	Ropy channel between two jumbled (aa) flows.				
16:46:17 7/24/01	1575	2	Glass sponges on lava sill.				R626-022
16:47:49 7/24/01	1574	297	This could be the CASM.				
16:48:07 7/24/01	1575	292	Potentially the CASM				R626-023
16:50:09 7/24/01	1574	354	Crinoid on the right with sponge. We think we are moving up the CASM				R626-024
16:52:59 7/24/01	1575	303	We are at the old nav target for CASM; but we are NOT here! The old nav target is wrong.				
16:54:29 7/24/01	1572	263	Rim of CASM				R626-025
16:58:19 7/24/01	1576	352	Spider crab down on the floor of CASM - actually probably not the floor because the depth is not any different				R626-026
17:00:29 7/24/01	1576	126	We are 40 m west of T&S target but we still don't know exactly where CASM is.				
17:01:59 7/24/01	1574	110	We might be too far south and have overshot the CASM fissure because the fissure gets thinner at the southern end and is difficult to distinguish.				
17:04:29 7/24/01	1571	207	Moving the ship back 20 m east.				
17:06:19 7/24/01	1573	313	Still searching for CASM. We are probably too far south.				
17:06:59 7/24/01	1573	346	Back in the crack we were in before; following it north. This is probably not the right fissure!				
17:07:49 7/24/01	1576	52	Heading northeast; to a spot between T&S and Shepherd's Spire.				
17:11:49 7/24/01	1575	37	Heading due west. We should be far enough north now to intersect the fissure by going west.				
17:14:19 7/24/01	1572	262	This may be the real rim to CASM - yes it is!				R626-027
17:15:39 7/24/01	1575	254	There are tube worms scattered along the eastern wall.				

Time (UTC)	Z (m)	Hdg	R626 Comments	Samples	Investigator	SubSamples	FrGrab
17:21:51 7/24/01	1572	349	Back at the tube worms along the eastern wall of the fissure. Going to move north along the fissure.				
17:21:51 7/24/01	1571	348	Worms somewhere near CASM.				R626-028
17:23:11 7/24/01	1572	8	This is definitely the CASM fissure. We are searching for T&S and Lamphere Chimney now; moving north along the fissure.				
17:28:01 7/24/01	1570	43	Moving up to the top of the fissure to fly along the top flat edge. Then will drop back into the fissure once we're gone further north.				
17:30:21 7/24/01	1575	335	Ok forget that. Back on the floor of the fissure.				
17:33:21 7/24/01	1583	224	Moving southwest along the fissure. We are 10 meters deeper than before.				
17:37:01 7/24/01	1582	200	Patches of clams along the fissure floor.				
17:38:21 7/24/01	1581	205	Chimney at the northern end of the CASM field.				R626-029
17:38:31 7/24/01	1581	210	Chimney at the northern end of the field. We are here!				
17:39:11 7/24/01	1580	194	Highlights on.				
17:40:31 7/24/01	1578	212	Moving the ship 30 m due west.				
17:41:51 7/24/01	1578	255	Palm worm colony on side of chimney. This is T&S vent.				R626-030
17:44:01 7/24/01	1580	228	T&S chimney at CASM vent.				R626-031
17:44:11 7/24/01	1579	226	T&S chimney at CASM. Covered with sulfide worms and tubeworms.				R626-032
17:47:33 7/24/01	1580	261	Fuana at T&S chimney - limpets, tubworms, palmworms.				R626-033
17:49:43 7/24/01	1581	278	We are positioning to find a good spot to sample for the internet live feed video that will start at 11am (in 10 minutes!). Broadcast will be for 15min.				
17:50:53 7/24/01	1581	275	Grabbing the gas tight sampler intake at T&S.				R626-034
17:51:23 7/24/01	1581	275	Target was added to nav called TS2001 - good position for T&S spires this year. (420448.6/5093355.2; 45 59.3492' 130 01.6301') Highlights off at 17:52.				
17:56:03 7/24/01	1580	261	Close up of sulfide worms in foreground. Highlights on at 17:55, off at 17:56.				R626-035
17:56:33 7/24/01	1580	266	Gas tight intake in flow with tubeworms and sulfide worms in the background				R626-036
17:58:23 7/24/01	1580	259	Started live feed video transmission. Bob, Verena, Dave B. and Keith S. are narrating the video.				
18:06:03 7/24/01	1580	286	Taking a gas tight sample. Port side. Started at 17:58. (420449/5093355 45 59.3492' 130 01.630')	R626-GTB-0004	Evans	Butterfield/Lilley	
18:07:03 7/24/01	1580	286	Ridgeia.				R626-037
18:08:33 7/24/01	1580	285	Palm worms sulfide worms				R626-038
18:09:43 7/24/01	1580	283	Took the second gas tight sample right after the first. Starboard side. Around 18:00. (420449/5093355 45 59.3492' 130 01.630')	R626-GTB-0005	Evans	Butterfield/Lilley	
18:14:23 7/24/01	1580	283	Panning video to give audience a broader view of venting area.				
18:17:45 7/24/01	1580	291	Positioning to grab a piece of sulfide with worms on it.				
18:20:25 7/24/01	1580	276	Done with the live broadcast. Cheers!!				
18:21:15 7/24/01	1580	247	Took a sulfide chimney grab with sulfide worms on it. Putting it into the port side of the biobox. (420449/5093355 45 59.3492' 130 01.630')	R626-SF-0006	Leveille		
18:22:05 7/24/01	1580	254	A sample of the chimney being placed in the biobox.				R626-039
18:23:35 7/24/01	1581	237	Highlights on.				
18:25:15 7/24/01	1581	294	Picking up the gas tight sampler intake that was dropped during the live feed.				

Time (UTC)	Z (m)	Hdg	R626 Comments	Samples	Investigator	SubSamples	FrGrab
18:27:25 7/24/01	1581	294	Highlights off.				
18:36:05 7/24/01	1581	294	Pycnogonid and limpets at the base of T&S.				R626-040
18:38:05 7/24/01	1581	294	Highlights on at 18:37.				
18:40:15 7/24/01	1581	294	Scale worm				R626-041
18:40:55 7/24/01	1581	294	Checking out a spot for a suction sample of sulfide worms.				
18:41:25 7/24/01	1581	294	We are going to record 10 minutes of video of sulfide worms and then slurp them up.				
18:42:15 7/24/01	1581	294	Stop highlights				
18:45:07 7/24/01	1581	294	Start sulfide worm observation for 10 minutes.				
19:02:57 7/24/01	1581	294	End of worm observations. Time to suction sample them.				
19:03:47 7/24/01	1581	289	diffuse flow; suction sampler location		Juniper		R626-042
19:06:27 7/24/01	1581	287	Beginning suction sample of sulfide worms at T&S vent at 1906; stopped at 1917. (420449/5093355 45 59.3492' 130 01.630')	R626-SS-J6-0007	Juniper		
19:06:47 7/24/01	1581	287	Suction sampler location for Jar #6		Juniper		R626-043
19:07:17 7/24/01	1581	288	Suction sampler location after sample		Juniper		R626-044
19:10:57 7/24/01	1581	287	Furthur damage to suction sampling location		Juniper		R626-045
19:17:59 7/24/01	1581	284	post Suction sampling at T&S				R626-046
19:20:19 7/24/01	1581	282	Looking around the base of T&S for a good suction sample for Moyer				
19:24:09 7/24/01	1577	92	ROPOS tether getting hung up. ROPOS headed back up to the cage				R626-047
19:30:39 7/24/01	1575	337	Cage motor off.				
19:35:39 7/24/01	1584	326	Back to T&S. Looking around for a good place to take suction sample of microbial mats				
19:42:01 7/24/01	1580	73	made a bit of a mess while looking around T&S				
19:51:01 7/24/01	1583	58	microbial mat at T&S				R626-048
19:52:21 7/24/01	1583	57	Getting ready to suction sample..				
19:52:31 7/24/01	1583	57	Suction sample of white filamentous microbial mat at T&S; stopped 20:00. (420449/5093355 45 59.3492' 130 01.630')	R626-SS-J2-0008	Moyer		
20:00:11 7/24/01	1583	56	Suction sample of white filamentous microbial mat continued from J2 into J3. Stopped 20:09. (420449/5093355 45 59.3492' 130 01.630')	R626-SS-J3-0009	Moyer		
20:10:53 7/24/01	1580	42	Looking for another spot to suction sample.				
20:14:53 7/24/01	1582	192	Zoarcid (vent fish) near T & S.				R626-049
20:15:53 7/24/01	1581	237	T & S spires.				R626-050
20:16:04 7/24/01	1581	247	T & S spires.				R626-051
20:20:54 7/24/01	1582	215	T & S spires.				R626-052
20:22:44 7/24/01	1582	203	Imagenex up next.				
20:24:34 7/24/01	1581	216	TnS spires.				R626-053
20:24:44 7/24/01	1581	202	TnS spire.				R626-054
20:24:54 7/24/01	1580	208	TnS spire.				R626-055
20:25:24 7/24/01	1579	231	TnS spires.				R626-056
20:25:34 7/24/01	1580	242	TnS spires.				R626-057
20:26:34 7/24/01	1581	159	From T&S spires we are going south and we see some tubeworms and mat on the base (on a bench) of the west wall of CASM; there is venting on the west wall. Approaching Shepherd vent.				

Time (UTC)	Z (m)	Hdg	R626 Comments	Samples	Investigator	SubSamples	FrGrab
20:28:24 7/24/01	1587	254	shepherd vent				R626-058
20:30:14 7/24/01	1584	271	shepherd vent again.				R626-059
20:30:34 7/24/01	1584	281	Shepherd vent is 5 to 10 meters south of T&S spires; further south of the bench; along the west wall of the fissure or CASM. (420445.7/5093323.5 45 59.3321' 130 01.6320')				
20:41:56 7/24/01	1488	145	Bringing up the cage to 1430 m.				
20:43:56 7/24/01	1435	130	Ship is moving to the north end of Imagenex line C12.				
20:54:48 7/24/01	1430	297	Telling the ship to move at 1.5 knots				
21:04:40 7/24/01	1429	343	Sonar has stopped. Nav is gone too.				
21:20:42 7/24/01	1431	353	Sonar is back				
21:28:28 7/24/01	1505	179	Cage motor off; getting fixes.				
21:29:28 7/24/01	1504	179	Beginning line C12. Going south.				
21:31:58 7/24/01	1503	175	Verena's 2 hour tape on.				
22:04:00 7/24/01	1472	180	done with line C12 - went over rim and lost bottom				
22:06:50 7/24/01	1473	86	Went from the rim over the wall; can't see the caldera floor; lost imagenix so cutting line C12 short				
22:07:40 7/24/01	1472	86	Starting line C13 from the southern end; heading North				
22:14:40 7/24/01	1470	360	ROPOS back above caldera rim (have bottom again on Imagenex)				
22:44:32 7/24/01	1497	358	End of line C13.				
22:44:52 7/24/01	1497	42	Heading over to line C14				
22:49:44 7/24/01	1497	176	Starting line C14. Heading South.				
23:21:36 7/24/01	1466	177	end of line C14 moving ship to commence C15.				
23:27:46 7/24/01	1467	3	Started line C15.				
23:58:28 7/24/01	1494	357	end of line C15; moving to start line C16.				
00:02:10 7/25/01	1493	177	start of line C16 and now heading south.				
00:29:22 7/25/01	1476	126	end of line C16; moving to start line C17				
00:33:32 7/25/01	1476	357	start of line C17				
00:59:44 7/25/01	1498	357	End of line C17; moving to C18				
01:04:44 7/25/01	1499	174	Start of line C18 and now heading south.				
01:26:56 7/25/01	1502	181	End of line C18; moving ship for line C19.				
01:30:26 7/25/01	1503	1	Start of line C19 and heading north.				
01:54:48 7/25/01	1502	360	End of line C19; moving ship for line C20.				
02:00:08 7/25/01	1504	178	Start of line C20.				
02:24:20 7/25/01	1506	122	End of line C20; ,moving ship to line C21.				
02:30:00 7/25/01	1503	5	Start of line C21.				
02:56:12 7/25/01	1504	358	End of line C21; moving ship for line C22 the last line!				
03:02:02 7/25/01	1503	129	Starting line C22. and heading south.				
03:25:34 7/25/01	1500	180	EOL C22 and finished the survey. ROPOS and cage heading to surface.				
04:39:00 7/25/01	2	220	ROPOS on deck at 0440.				

6.9 R627 DIVE LOG

Area: 98 flow and northern SRZ (Cloud, Castle, Mkr-113, FeCity, BagCity, Vixen, Casper)

R627 SUMMARY: The dive began with the release of the RAS at Cloud. An osmo was deployed at Cloud. HFS and suction sampling on nSRZ: Castle, Mkr-113, FeCity, BagCity, Coquille (Vixen and Casper). Vixen and Casper are two anhydrite structures located in the Coquille vent field, newly discovered on this dive. A hobo was deployed at Castle. A MTR was recovered from Castle and another was deployed. One MTR was deployed at Mkr-113. A MTR was also recovered at BagCity.

Bottom Time: 7/25(JD206) 1415 - 7/26(JD207) 0758

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
13:14:00 7/25/01	1	179	In the water at 13:14.				
13:29:13 7/25/01	298	255	Lost updating; no nav for three minutes.				
13:29:13 7/25/01	298	255	Nav back online.				
14:15:21 7/25/01	1522	10	Reached bottom; landed at Mkr-33.				
14:18:21 7/25/01	1522	76	Heading to Cloud to retrieve the RAS				
14:25:03 7/25/01	1524	38	At the base of RAS				
14:25:53 7/25/01	1525	37	Stashing the OSMO on the seafloor next to Cloud (just south of).				
14:29:13 7/25/01	1525	355	Taking the RAS intake from in Cloud vent; and placing it in the holster.				
14:30:03 7/25/01	1525	358	Recovering RAS intake.				R627-001
14:32:13 7/25/01	1525	6	Recovering the RAS intake.				R627-002
14:41:13 7/25/01	1523	121	Putting the RAS intake in the holster.				
14:50:15 7/25/01	1525	15	Moving the stashed OSMO to a safer position.				
14:59:15 7/25/01	1525	22	Deploying the intake of the new osmo into the smoking pit at Cloud (Mkr N6)				
15:01:15 7/25/01	1523	18	Moving the old osmo from Cloud (N6) away from the vent. Putting it up on the ridge beside the larval tubes (by the pit). The osmo will be picked up later on another dive.				
15:04:25 7/25/01	1525	28	Going back to the new osmo - to position the intake in the N6 pit.				
15:08:05 7/25/01	1524	14	Osmo intake in the N6 pit.				
15:10:05 7/25/01	1524	76	Note: Two of Anna's larval traps are knocked over by Mkr N6.				
15:11:05 7/25/01	1525	70	Moving the RAS a 100 m to east to release it to the surface.				
15:12:55 7/25/01	1523	81	RAS in claw. Moving to the east 100m				R627-003
15:21:27 7/25/01	1521	86	We are 100m east of Cloud (N6). Getting ready to release the RAS.				
15:22:27 7/25/01	1521	87	Pulled the pin on the RAS at 15:29. Was deployed at Cloud Mkr-N6. (423901/5087116 45 56.004' 129 58.896')	R627-RAS-0001	Butterfield		
15:29:17 7/25/01	1521	84	A MTR (# unknown) is on the RAS. Released at 15:29.	R627-MTR-0002	Butterfield		
15:31:37 7/25/01	1520	270	Moving back west to a position under the ship. Have to wait until the RAS is on the surface to move to Castle vent.				
15:37:09 7/25/01	1520	346	Back at Cloud (N6); checking out Anna's larval traps.				
15:37:39 7/25/01	1524	342	Anna's 4 larval traps at Cloud (N6). Two were knocked over.				R627-004
15:39:59 7/25/01	1524	303	Heading to Mkr 33 to do some temp/pH/H2S sensing with the HFS intake.				

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
15:44:39 7/25/01	1521	240	At Mkr 33.				
15:50:21 7/25/01	1522	238	Sniffing around with HFS at Mkr 33				R627-005
15:52:41 7/25/01	1522	249	Sniffing with HFS-temp maxed out at 41 C; H2S up to 115uM just to the north of the MTR#3039.				
15:59:33 7/25/01	1523	253	HFS probe - up to 41 C at Mkr 33				R627-006
16:06:43 7/25/01	1522	248	Moving MTR 3039 to the hot spot; ~6 inches to the right				
16:08:55 7/25/01	1523	272	Sniffer back in the holster				
16:11:15 7/25/01	1522	239	Preparing to leave for Castle				
16:15:37 7/25/01	1522	230	RAS recovered on deck. NAV turned back on.				
16:20:59 7/25/01	1522	234	Leaving for Castle; it's 800m away at a bearing of 175.				
16:27:01 7/25/01	1519	173	Pillars and wall of collapsed area				R627-007
16:27:21 7/25/01	1519	180	Wall of collapsed area				R627-008
16:28:41 7/25/01	1517	174	Lone pillar				R627-009
16:28:51 7/25/01	1518	130	Top of 3 pillars				R627-010
16:32:01 7/25/01	1516	91	Ship speeding up to one knot. NAV is great!				
16:38:11 7/25/01	1517	173	Collapsed area with pillars				R627-011
16:38:51 7/25/01	1516	174	frame grab				R627-012
16:38:51 7/25/01	1517	172	frame grab				R627-013
16:39:01 7/25/01	1517	172	Flying over a collapsed area with a lots of pillars. Lava drips on underside of roof on collapsed area edge.				
16:39:01 7/25/01	1517	174	frame grab				R627-014
16:39:41 7/25/01	1518	174	Lava drips				R627-015
16:40:31 7/25/01	1517	172	Beautiful archway				R627-016
16:40:31 7/25/01	1518	172	Door				R627-017
16:41:01 7/25/01	1518	168	Porthole				R627-018
16:58:43 7/25/01	1514	114	Approaching Castle. Venting in site.				
17:00:13 7/25/01	1511	39	Castle				R627-019
17:01:13 7/25/01	1511	138	Castle cont'd				R627-020
17:02:33 7/25/01	1510	93	Castle again				R627-021
17:03:43 7/25/01	1511	185	Still more Castle				R627-022
17:07:43 7/25/01	1512	51	Checking out Castle area.				
17:08:53 7/25/01	1518	40	Anhydrite spire at the base of Castle.				
17:09:43 7/25/01	1521	36	Castle vent anhydrite spire.				R627-023
17:16:13 7/25/01	1519	12	highlights on 17:16				
17:21:05 7/25/01	1519	48	Highlights off.				
17:22:25 7/25/01	1519	48	Positioned with HFS intake at the base of the anhydrite spire flow. Temp only up to 100 C. We are going to knock over the spire to get a better fluid sample.				
17:31:25 7/25/01	1519	49	Anhydrite spire knocked over				R627-024
17:34:05 7/25/01	1519	44	HFS intake in the anhydrite spire flow - max temperature up to 259.4 C				
17:34:55 7/25/01	1519	44	HFS intake in anhydrite spire flow				R627-025
17:35:55 7/25/01	1519	44	Fired starboard gas tight. Temp is 257.9 C. (424011/5086311; 45 55.5701'/129 58.8036').	R627- GTB-0003	Evans	Butterfield/Lille y	

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
17:37:45 7/25/01	1519	44	Start at 17:36. Gas piston #24. Stop pumping at 17:39. Tave=259.1 C; Tmax=259.2 C. Volume pumped about 200 ml. (424011/5086311; 45 55.5701'/129 58.8036').	R627-HFS-24-0004	Evans	Butterfield/Lilley	
17:40:55 7/25/01	1519	44	Start piston #22 at 17:41. Stop pump at 17:44. Volume=350ml; Tmax=259.2; Tave=259.1. (424011/5086311; 45 55.5701/129 58.8036)	R627-HFS-22-0005	Butterfield/Lilley/Lang/Huber/Mehta		
17:46:15 7/25/01	1519	44	Start bag#19 with a filter at 17:46. Stop the pump at 17:49. Volume pumped=350ml; Tmax=259.4; Tave=259.3. (424011/5086311; 45 55.5701/129 58.8036)	R627-HFS-19-0006	Butterfield/Lilley/Lang/Huber/Mehta		
17:52:17 7/25/01	1519	37	Stowing the HFS intake.				
17:56:57 7/25/01	1519	34	Deploying the HOBO-128 into the anhydrite spire flow at Castle vent. Successfully deployed at 18:08.				
17:59:27 7/25/01	1519	35	Deploying hobo-128 into Castle vent anhydrite spire flow.				R627-026
18:09:57 7/25/01	1519	30	NOTE: Started the live feed video transmission at 18:00. Bob, Dave, Chris M., Big Keith and Verena are narrating.				
18:14:17 7/25/01	1519	30	Castle vent				R627-027
18:15:47 7/25/01	1519	30	Scale worm and limpets at Castle vent				R627-028
18:19:29 7/25/01	1516	24	Tube worm bush on the side of Castle				R627-029
18:21:09 7/25/01	1513	4	Signed off from live video transmission. Highlights on.				
18:22:39 7/25/01	1517	330	Worm bush on the side of Castle.				R627-030
18:23:49 7/25/01	1517	349	This worm bush may be another active vent (so far we have only found venting at the anhydrite spire). We are going in to investigate.				
18:25:09 7/25/01	1516	16	Close up of tube worm bush on side of Castle				R627-031
18:26:29 7/25/01	1516	30	We think that there is no flow in the tube worms; rather they are situated about 2-3 meters above the anhydrite spire flow from below.				
18:29:29 7/25/01	1519	326	Highlights off.				
18:30:19 7/25/01	1519	326	Deploying MTR-3201 at the base of Castle near anhydrite spire flow; within a limpet/palm worm colony.				
18:35:29 7/25/01	1519	325	MTR-3201 deployed at base of Castle				R627-032
18:40:29 7/25/01	1519	327	Recovered MTR-3196 from the base of Castle. (424011/5086311; 45 55.5701/129 58.8036)	R627-MTR-3196-0007	Embley		
18:58:41 7/25/01	1511	0	Headed to Marker 113. ROPOS up to the cage				
19:03:01 7/25/01	1488	228	Ship is moving at 1.5 knots to Mkr-113				
19:47:03 7/25/01	1506	91	Ship is at Mkr-113 location				
19:47:53 7/25/01	1520	86	ROPOS on the bottom				
19:48:43 7/25/01	1524	90	lungfish at Mkr-113				R627-033
19:52:43 7/25/01	1524	5	Looking around on the bottom.. dead tube worms				
19:56:03 7/25/01	1523	280	shrimp near Mkr-113				R627-034
20:00:04 7/25/01	1523	2	Still looking.. seeing cloudy water, but no vents				
20:05:56 7/25/01	1522	152	Found Mkr-113				
20:06:16 7/25/01	1523	183	Mkr-113				R627-035
20:07:36 7/25/01	1524	177	diffuse flow; worms at Mkr-113				R627-036
20:11:06 7/25/01	1523	163	Spotted an outcrop of nice-looking tubeworms near flow. picture below				

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
20:12:36 7/25/01	1523	212	tubeworms at Mkr-113				R627-037
20:14:26 7/25/01	1524	233	tubeworms at Mkr-113				R627-038
20:15:16 7/25/01	1524	233	Highlights on				
20:18:06 7/25/01	1524	233	Positioning fluid sampler intake in flow				
20:19:06 7/25/01	1524	221	Ambient pH=7.35				
20:19:26 7/25/01	1524	220	Highlights off				
20:20:06 7/25/01	1524	220	Temperature at 14 C and going up				
20:21:46 7/25/01	1524	220	Temperature at 22 C				
20:24:16 7/25/01	1524	220	At the base of the tube worm bush. This is where we will take fluid samples. Tave=17.3; H2S=202 uM; pHave=5.965				
20:25:16 7/25/01	1524	220	Fluid sample bag #18. Start 20:27 Stop 20:33 653 ml. Tave=20; Tmax=21.8; H2S=202 uM; pHave=5.965 (423372/5085937 45 55.3637' 129 59.2943')	R627-HFS-18-0008	Butterfield		
20:26:06 7/25/01	1524	220	tubeworms at Mkr-113				R627-039
20:27:16 7/25/01	1524	220	Highlights on.				
20:27:26 7/25/01	1524	220	Healthy Ridgea.				R627-040
20:28:46 7/25/01	1524	220	Highlights off.				
20:33:28 7/25/01	1524	220	Fluid sample FISH filter 21 Start 20:35 Stop 20:46. vol=917 ml. Tave=21.7; Tmax=21.9; H2S=202 uM; pHave=5.965. (423372/5085937 45 55.3637' 129 59.2943')	R627-HFS-21-0009	Huber (Baross)		
20:46:58 7/25/01	1524	221	Fluid sample. Filtered bag #17. Start 20:48 Stop 20:53 650 mls. Tave=21; Tmax=21.8; H2S=202 uM; pHave=5.965. (423372/5085937 45 55.3637' 129 59.2943')	R627-HFS-17-0010	Butterfield		
20:54:18 7/25/01	1524	220	Fluid sample. Sterivex #15. Start 20:54 Stop 21:03; vol=1003 mls. Tmax=21.7; Tave=20.1; H2S=202 uM; pHave=5.965. (423372/5085937 45 55.3637' 129 59.2943')	R627-HFS-15-0011	Huber (Baross)		
21:04:10 7/25/01	1524	220	Fluid sample: gas piston #4. Start 21:07 Stop 21:09. vol=141ml. Tmax=21.5; Tave=19.7; H2S=202 uM; pHave=5.965. (423372/5085937 45 55.3637' 129 59.2943')	R627-HFS-4-0012	Evans	Butterfield/Lilley	
21:07:20 7/25/01	1524	220	Fluid sampler sensor data before we leave this site. H2S=237 pH=5.95				
21:11:00 7/25/01	1524	220	Suction sampling is up next.				
21:13:40 7/25/01	1524	221	Flushing the suction sample jar 8.				
21:14:50 7/25/01	1524	220	Suction sample: bottle 6. White microbial mat. (423372/5085937 45 55.3637' 129 59.2943')	R627-SS-J6-0013	Moyer		
21:18:30 7/25/01	1524	220	Start of SS J6 at Mkr-113				R627-041
21:35:32 7/25/01	1524	214	Suction sample: particulate matter from within the tube worm bush. Bottle 5. (423372/5085937 45 55.3637' 129 59.2943')	R627-SS-J5-0014	Leveille		
21:37:52 7/25/01	1524	214	Before suction sample #5				R627-042
21:48:22 7/25/01	1525	214	Flushing the suction sampler				
21:51:22 7/25/01	1524	212	Going to suction microbial mats at the bottom of Mkr-113.				
21:55:34 7/25/01	1527	359	Looking around at the base of Mkr-113				
21:56:34 7/25/01	1526	353	We see something that might be a missing bacterial trap. Also a red rag?				

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
21:59:04 7/25/01	1527	11	base of Mkr-113				R627-043
22:02:04 7/25/01	1525	38	The base is too limpet-rich and Moyer does not want to sample here. So we are headed back up to look for the MTR.				
22:06:14 7/25/01	1520	138	Still looking for the MTR				
22:08:34 7/25/01	1524	16	looking around near Mkr-113				R627-044
22:09:04 7/25/01	1525	58	Highlights on				
22:12:34 7/25/01	1524	298	still looking around Mkr-113				R627-045
22:14:54 7/25/01	1524	102	We are back at Mkr-113				
22:15:24 7/25/01	1522	230	Highlights off.				
22:20:16 7/25/01	1523	305	HFS laptop clock is off by 6 minutes. It says 3:15 but the ROPOS clock says 22:21:15. Dave is synchronizing his clock to the ROPOS clock.				
22:25:46 7/25/01	1525	246	fish inspecting ROPOS at Mkr-113				R627-046
22:25:56 7/25/01	1525	246	fish inspecting camera at Mkr-113				R627-047
22:26:06 7/25/01	1524	247	fish at Mkr-113				R627-048
22:26:06 7/25/01	1525	247	fish at Mkr-113				R627-049
22:28:06 7/25/01	1525	246	Gave up on trying to find the MTR. Going to deploy an MTR here.				
22:30:16 7/25/01	1524	247	Deployed MTR-1055 at Mkr-113.				
22:30:46 7/25/01	1525	246	Next stop FeCity.				
22:37:06 7/25/01	1527	12	Mkr-113 inadvertently dislodged. Oops. Maybe we'll find it floating on the surface.				
22:39:56 7/25/01	1479	100	ROPOS headed up to the cage.				
22:41:26 7/25/01	1474	68	Ship is moving to FeCity at 1.5 knots				
23:23:10 7/25/01	1472	193	we have arrived at FeCity.				
23:27:10 7/25/01	1532	356	We are at the bottom - will try to get a fix and look for a good Fe-oxide sample.				
23:36:40 7/25/01	1535	89	Collapsed lava structure near FeCity.				R627-050
23:39:50 7/25/01	1535	129	We are still looking around for the fissure west of FeCity.				
23:45:00 7/25/01	1535	127	Cage motor turned off to get a fix.				
23:52:53 7/25/01	1536	342	Fish				R627-051
23:53:22 7/25/01	1536	319	Lava structure				R627-052
00:13:10 7/26/01	1535	44	Fe oxides and white mat at FeCity.				R627-053
00:13:30 7/26/01	1535	35	white mat at FeCity.				R627-054
00:20:10 7/26/01	1535	149	white and orange mat at FeCity.				R627-055
00:21:00 7/26/01	1535	149	white and orange mat with diffuse flow at FeCity.				R627-056
00:22:10 7/26/01	1535	142	moving fluid sampler out of the way for a suction sample.				
00:31:32 7/26/01	1535	99	started SS Jar #7 at FeCity at 00:32. Ended SS at 00:41. (423291/5085361 45 55.0524' 129 59.083' - 2000 position)	R627-SS-J7-0015	Kennedy		
00:41:52 7/26/01	1535	113	Sniffing with HFS at same site.				
00:44:32 7/26/01	1535	89	Post SS for Kennedy at Fe City.				R627-057
00:54:54 7/26/01	1535	177	HFS sniffing mat material at Fe City. No apparent H2S signal at this site. We're going to "mass" sample this site.				R627-058

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
00:59:54 7/26/01	1535	181	Tave=10.9 +-.1; H2S=4.1 +-.4; pH=7.07 +- .04 at this site.				
01:11:46 7/26/01	1535	122	another pic of white and orange mat at FeCity.				R627-059
01:17:26 7/26/01	1535	122	T=9.3; bottle 10 with GFF filter; start 01:18 end 01:24; vol=1200 ml; Tave=9.6 +/-0.4; Tmax=10.3. H2S=1 micromolar +/- 1.3; pH=7.094. (423291/5085361 45 55.0524 129 59.3514 - 2001)	R627-HFS-10-0016	Butterfield		
01:25:16 7/26/01	1535	122	HFS bag 9; start 01:26; vol=670ml; Tave=7.6 +/-0.5; Tmax=9.2; 01:30 end; H2S=1 micromolar +/-1.3; pH=7.094 (423291/5085361 45 55.0524 129 59.3514 - 2001). Kennedy subsample 10ml water.	R627-HFS-9-0017	Butterfield	Kennedy	
01:29:56 7/26/01	1535	122	HFS at Fe-city				R627-060
01:32:26 7/26/01	1535	124	Gas piston 5 start 01:32; 01:34 stop; vol=134ml. Tave=7.4 +/-0.15; Tmax=7.7; H2S=1 micromolar +/-1.3; pH=7.094. (423291/5085361 45 55.0524 129 59.3514 - 2001)	R627-HFS-5-0018	Butterfield		
01:34:16 7/26/01	1535	124	HFS Sterovex 1; start 01:35; end 01:44; vol=1003ml; Tmax=8.6; Tave=7.6 +/-0.54. H2S=1 micromolar +/-1.3; pH=7.094. (423291/5085361 45 55.0524 129 59.3514 - 2001)	R627-HFS-1-0019	Butterfield		
01:51:18 7/26/01	1535	121	Preparing to suction sample white fluffy material.				R627-061
01:52:38 7/26/01	1535	122	Suction sample for bacterial mat - the white stuff. Started at 01:52 and ended at 02:03.(423291/5085361 45 55.0524 129 59.3514 - 2001)	R627-SS-J1-0020	Moyer		
02:05:08 7/26/01	1534	157	Collapsed lava structure.				R627-062
02:05:18 7/26/01	1534	141	Collapsed lavas structure.				R627-063
02:05:28 7/26/01	1534	147	The suction hose has broken so suctioning is done for this dive. Now heading for Bag city.				
02:29:00 7/26/01	1535	85	ROPOS has arrived at BagCity.				
02:38:52 7/26/01	1535	122	BagCity area; low temp tube worm bushes				R627-064
02:40:40 7/26/01	1535	140	Tube worms near Mkr-36, BagCity				R627-065
02:44:32 7/26/01	1535	354	Tube worm bushes near Mkr-36, BagCity				R627-066
02:55:02 7/26/01	1535	317	Looking NW to Mkr-21 and can see both MTRs deployed this year.				
02:55:32 7/26/01	1535	317	Mkr-21; note blue mat and a few bag creatures on periphery; and tons of Amphisamytha.				R627-067
03:03:22 7/26/01	1535	55	sniffing around with HFS at BagCity vent.				
03:11:34 7/26/01	1535	48	site where HFS samples are being taken.				R627-068
03:11:44 7/26/01	1535	48	Tave=18.6 +-.05; H2S=82 +-2; pH=6.45 +-.01at this vent in BagCity.				
03:12:54 7/26/01	1535	50	FISH filter #7. start 03:13. H2S=82 +-2; pH=6.45 +-.01; Tave=18.1 +-.7; Tmax=19.3. vol=1005 mLs. stop 03:23. (423271/5085209 45 54.97' 129 59.3655')	R627-HFS-7-0021	Mehta		
03:23:56 7/26/01	1535	47	HFS Bag #8, no filter. start 03:24. H2S=82 +-2; pH=6.45 +-.01; Tave=18.6 +- .45; Tmax=19.4. vol=725 mLs. stop 03:29. (423271/5085209 45 54.97' 129 59.3655')	R627-HFS-8-0022	Butterfield		
03:29:26 7/26/01	1535	48	HFS Bag #11 with GFF filter. start 03:30. H2S=82 +-2; pH=6.45 +-.01; Tave=18.7+- 0.2; Tmax=19.1. vol=700 mLs. stop 03:35. (423271/5085209 45 54.97' 129 59.3655')	R627-HFS-11-0023	Butterfield		
03:40:06 7/26/01	1535	57	HFS with Sterivex filter #13. Start 03:41. H2S=82 +-2; pH=6.45 +-.01; Tave=17.2 +- .3; Tmax=17.8. vol=1005 mLs. stop 0350. (423271/5085209 45 54.97' 129 59.3655')	R627-HFS-13-0024	Butterfield		

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
03:44:26 7/26/01	1534	57	remaining NeMo net 2000 camera emplacement.				R627-069
03:51:48 7/26/01	1535	57	Firing port GTB at 03:52. Tave =17 C. (423271/5085209 45 54.97' 129 59.3655')	R627-GTB-0025	Evans	Butterfield/Lilley	
03:52:08 7/26/01	1535	57	BagCity tube worm bush for fluid sampling				R627-070
03:52:58 7/26/01	1535	56	BagCity diffuse venting				R627-071
03:54:58 7/26/01	1535	57	BagCity diffuse venting.				R627-072
03:56:38 7/26/01	1534	57	Sensor data at end of HFS for Bag City. Tave=17 +- .1; H2S=67 +- 5; pH=6.49 +- .02.				
04:11:58 7/26/01	1535	153	Collected MTR 3197 from BagCity that was encrusted in a tube worm bush. Couldn't find other MTR. (423271/5085209 45 54.97' 129 59.3655')	R627-MTR-3197-0026	Embley		
04:19:18 7/26/01	1535	152	MTR-3197 being placed in the purse.				R627-073
04:23:51 7/26/01	1534	162	Heading towards BM 4 to look for the other MTR.				
04:25:10 7/26/01	1533	216	Looking around BagCity for MTR.				R627-074
04:27:00 7/26/01	1534	261	Benchmark #4 at BagCity.				R627-075
04:29:10 7/26/01	1533	139	MTR-3315 (R548 and rp552) was not found; we are now heading to Coquille.				
04:32:41 7/26/01	1494	181	Coquille is 320 meters from Bag City at a bearing of 300. ROPOS to cage and moving the ship.				
04:57:33 7/26/01	1536	93	On the bottom near Coquille.				
05:00:03 7/26/01	1533	270	tube worms and clam shells near Coquille.				R627-076
05:01:53 7/26/01	1536	300	clam shell deposit between pillow lavas.				R627-077
05:09:53 7/26/01	1536	329	frame grab				R627-078
05:10:03 7/26/01	1536	323	New anhydride mound.				R627-079
05:10:13 7/26/01	1537	324	Newly discovered anhydride mound. 20 cm across at the base. about 1 meter tall				R627-080
05:11:33 7/26/01	1536	323	We just found a previously undiscovered anhydride mound with quite a heap at its base.				
05:12:33 7/26/01	1536	323	venting surface of new mound				R627-081
05:13:57 7/26/01	1536	324	highlights were turned on briefly for the new mound.				
05:14:57 7/26/01	1536	323	New chimney at Coquille.				R627-082
05:16:57 7/26/01	1536	319	base of new mound.				R627-083
05:18:27 7/26/01	1536	271	new mound.				R627-084
05:18:37 7/26/01	1536	270	highlights on.				
05:18:57 7/26/01	1536	270	peak of new mound at Coquille.				R627-085
05:19:47 7/26/01	1536	270	knocking over mound.				R627-086
05:19:47 7/26/01	1536	270	knocking over mound.				R627-087
05:19:57 7/26/01	1536	270	timber.				R627-088
05:19:57 7/26/01	1536	270	knocking over mound.				R627-089
05:19:57 7/26/01	1536	270	timber!				R627-090
05:20:07 7/26/01	1536	269	knocking over new mound.				R627-091
05:20:07 7/26/01	1536	269	remnants of new mound.				R627-092
05:21:37 7/26/01	1536	269	new mound				R627-093
05:21:47 7/26/01	1536	269	sampling new mound after removing spire.				R627-094
05:23:47 7/26/01	1536	268	sniffing the new mound. The temperature is around 311 C!				

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
05:24:17 7/26/01	1536	267	HFS Gas Piston #23. Start 05:25. Tmax=312 C; vol=~200 mLs. Likely was overfilled. Stop at 05:38. (422995/5085336; 45 55.0368'/129 59.5802')	R627-HFS-23-0027	Butterfield		
05:30:37 7/26/01	1536	268	DHFS Gas Piston #20. Start 05:30. Tmax=312.7; Tave=312.6; T2=149 C. Stop 05:34. (422995/5085336; 45 55.0368'/129 59.5802')	R627-HFS-20-0028	Butterfield		
05:35:01 7/26/01	1536	267	Starting HFS Bag #16 no filter at 05:36. vol=250 mLs. stop 05:38. Tmax=312.9; Tave=312.7; T2=145. (422995/5085336; 45 55.0368'/129 59.5802')	R627-HFS-16-0029	Butterfield		
05:36:31 7/26/01	1536	268	New vent at Coquille is officially named Demon. Dave the Demon. Later changed name to Vixen because there is already a Demon at ASHES.				
05:39:21 7/26/01	1536	265	Vixen has a steady temp of 312 C.				
05:41:41 7/26/01	1536	265	Now looking for a low temp vent for another HFS.				
05:45:41 7/26/01	1536	271	yet another mound at Coquille.				R627-095
05:50:53 7/26/01	1536	267	Location for 2 new mounds. Demon, renamed Vixen: (422995/5085336; 45 55.0368/129 59.5802) Casper: (422997/5085346 ; 45 55.0422/129 59.5786)				
05:55:53 7/26/01	1536	249	New mound #2. Casper.				R627-096
05:59:33 7/26/01	1536	249	HFS sample bag #14 no filter. Tave=14.9 +-0.00; H2S=39.6; pH=6.09. Start 06:01. Stop 06:07. Vol=700 mLs. Tmax=15.0; AveTave=14.9 +-0.1. Sample at base of Casper where temperatures are consistent.	R627-HFS-14-0030	Mehta		
06:01:33 7/26/01	1536	249	newly discovered Casper; near Coquille				R627-097
06:02:53 7/26/01	1536	249	fluid sampling site at the base of Casper				R627-098
06:07:43 7/26/01	1536	249	Tubeworms near Casper during vent sampling.				R627-099
06:07:43 7/26/01	1536	249	HFS Sterivex #12. Start 06:08. H2S=39.6; pH=6.09. Interrupted sample - lost power to the ROV. Restart 07:18 Stop 07:23 at near site, higher temp. Tave=43. (422997/5085346; 45 55.0422' 129 59.5786')	R627-HFS-12-0031	Huber (Baross)		
06:11:43 7/26/01	1536	252	Snails near Casper Vent.				R627-100
06:24:07 7/26/01	1462	338	ROPOS went down about 06:17. Looks serious.				
06:26:09 7/26/01	1462	342	Lost power to vehicle and whole system.				
06:28:17 7/26/01	1462	342	Bringing cage and ROPOS up on winch.				
06:33:59 7/26/01	1370	313	Power back on; a fuse blew. Trying to decide whether to continue or abort the dive.				
06:38:49 7/26/01	1327	230	ROPOS seems fixed; going back to the Casper mound.				
06:53:11 7/26/01	1535	11	ROPOS on the bottom. Dead tube worms around.				
06:56:51 7/26/01	1535	20	Casper in sight. A sight for sore eyes. Now we are going to look around.				
07:01:53 7/26/01	1536	272	Still looking around..				
07:04:43 7/26/01	1535	25	Highlights on for the approach to Casper				
07:06:13 7/26/01	1536	48	Casper, near Coquille				R627-101
07:07:23 7/26/01	1536	34	Highlights off.				
07:09:23 7/26/01	1536	55	Trying to find the site at the base of Casper for resuming fluid sampling.				
07:15:43 7/26/01	1536	19	Putting fluid sampler intake into a hole that looks familiar. It is 29 degrees				
07:21:23 7/26/01	1537	16	sampling near Casper				R627-102
07:24:23 7/26/01	1536	16	Heading for this sampling site at the base of Casper is 015				

Time (UTC)	Z (m)	Hdg	R627 Comments	Samples	Investigator	SubSamples	FrGrab
07:25:03 7/26/01	1537	15	Fluid sample: FISH filter #6. Start 07:25 Stop 07:34 1000ml. Tave=43.3 Tmax=43.6 (422997/5085346; 45 55.0422' 129 59.5786')	R627-HFS-6-0032	Huber (Baross)		
07:26:33 7/26/01	1536	16	Snails				R627-103
07:29:35 7/26/01	1536	15	Snails tower				R627-104
07:30:55 7/26/01	1536	16	Polynoid hanging				R627-105
07:35:15 7/26/01	1536	14	Fluid sample: RNA filter #3. Start 07:36 Stop 07:44 vol=077ml. Tave=43.2; Tmax=43.4 T2=26.7 (422997/5085346; 45 55.0422' 129 59.5786')	R627-HFS-3-0033	Mehta		
07:35:45 7/26/01	1536	15	Strange looking assemblage.				R627-106
07:45:55 7/26/01	1536	16	We are getting sensor data for this site (at the base of Casper) H2S=163 uM pH=5.39				
07:48:15 7/26/01	1537	14	Deploying a MTR at this site at the base of Casper.				
07:53:27 7/26/01	1536	48	MTR-4128 deployed				
07:55:47 7/26/01	1536	24	Positioning MTR-4128				R627-107
07:58:27 7/26/01	1495	219	ROPOS leaving the bottom. On the way up to the surface.				
08:58:51 7/26/01	2	166	ROPOS on deck at 08:58.				

6.10 R628 DIVE LOG

Area: southern NRZ and CASM (Imagenex survey, Shepherd, T&S Spires, Lamphere Chimneys)

R628 SUMMARY: Dive R628 began with geological traverses on the sNRZ - just north of the caldera wall, in the area surveyed earlier by Imagenex. Another Imagenex survey followed - up the wall to fill in the gaps. After the Imagenex survey, we proceeded to Shepherd Vent for suction sampling. Next we moved on to T&S Spires for more suctions and a sulfide grab. Lamphere Chimneys was located, where we sampled a sulfide. Accurate nav positions were acquired for all three of these vents at CASM, for the first time with acoustic navigation.

Bottom Times: 7/26(JD207) 1750 - 7/27(JD208) 0450

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
15:11:23 7/26/01	1	193	In the water at 16:49.				
16:55:17 7/26/01	53	50	Nav up; log entry info updating correctly now				
17:51:02 7/26/01	1510	344	Bottom in sight.				
17:56:12 7/26/01	1513	344	Flying NW towards the start of the first line.				
17:59:44 7/26/01	1514	89	Preparing to suck up some background sediment for Richard.				
18:01:54 7/26/01	1516	87	Flushing into jar #8 before suctioning up sediment into jar #5				
18:02:24 7/26/01	1516	88	Start suction near the start of line T1 at 18:03. Suctioning sediment on caldera floor at base of wall east of CASM. End suction at 16:12. (420344/5093857; 45 59.6193'/130 1.7163')	R628-SS-J5-0001	Leveille		
18:04:04 7/26/01	1516	86	Sampling site for sediment				R628-001
18:12:44 7/26/01	1514	87	Starting to move the ship 0.5 knot down the first traverse line (T1).				
18:13:24 7/26/01	1513	88	Starting traverse line T1. Moving from west to east. We are taking bottom video to ground-truth the Imagenex map.				
18:20:44 7/26/01	1513	82	Pillows at CASM				R628-002
18:23:06 7/26/01	1512	89	edge of first fissure				R628-003
18:23:56 7/26/01	1512	90	Fissure				R628-004
18:26:26 7/26/01	1514	88	Since crossing the first fissure we have been seeing lots of stubby pillars.				
18:28:16 7/26/01	1514	86	Lip of second fissure				R628-005
18:28:26 7/26/01	1516	91	Crossing over the second fissure.				
18:28:56 7/26/01	1515	88	Second fissure, far wall				R628-006
18:29:36 7/26/01	1517	85	Next fissure. We are on the west side of the rift zone. It will be one fissure after another for a hundred meters or so.				
18:29:36 7/26/01	1516	86	Next fissure				R628-007
18:30:26 7/26/01	1520	89	Next fissure near wall				R628-008
18:30:56 7/26/01	1519	85	No pillars on the edges of the fissures. This means that these fissures are probably eruptive rather than cracks.				
18:32:36 7/26/01	1519	83	Lava formation				R628-009
18:32:36 7/26/01	1519	89	Lava formation				R628-010
18:36:16 7/26/01	1521	87	In a collapsed area with jumbled flow and short pillars. Quite a bit of sediment.				
18:36:46 7/26/01	1523	80	framegrab				R628-011
18:37:06 7/26/01	1522	91	Thick sediment on the floor of the collapse.				
18:39:16 7/26/01	1522	81	High sedimentation				R628-012
18:39:16 7/26/01	1523	82	We are out of the collapsed area. Now on lobates with lots of sediments.				

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
18:39:56 7/26/01	1523	83	We are almost out of the fissure zone now. It looks like we have one more fault to cross.				
18:40:56 7/26/01	1522	78	Going over a fault - this is the last one. The west side is higher than the east side.				
18:41:06 7/26/01	1523	80	framegrab				R628-013
18:41:46 7/26/01	1523	80	Looks like the west side is 2m higher than the east side of the fault.				
18:42:26 7/26/01	1525	86	Before we had 100% sediment cover. Now we are into broken-up lobate flows without total sediment cover.				
18:42:56 7/26/01	1525	84	framegrab				R628-014
18:43:16 7/26/01	1525	80	Shallow drainouts in the lobate flows.				
18:44:26 7/26/01	1526	75	From sonar it looks like we are 40m east of the fault. Ok. Good fix. We are at the end of the first transect. End of T1. (420692/5093941)				
18:45:26 7/26/01	1525	178	Turning south. Moving 100m to the south end of T2 and then we're going to turn west. We are still seeing lobates covered in sediment.				
18:46:26 7/26/01	1523	176	framegrab				R628-015
18:50:16 7/26/01	1523	181	A white plastic bucket on the bottom.				
18:50:16 7/26/01	1523	182	bucket		Chadwick		R628-016
18:50:46 7/26/01	1523	244	bucket		chadwick		R628-017
18:51:06 7/26/01	1523	199	100% sediment. No bare rock showing through.				
18:51:06 7/26/01	1522	188	100%sediment in this area		Chadwick		R628-018
18:52:58 7/26/01	1522	179	Strange circular hole in the sediment.				
18:52:58 7/26/01	1522	179	divet		Chadwick		R628-019
18:54:08 7/26/01	1521	174	Moving over a sheet flow with sediment probably several centimeters thick.				
18:54:58 7/26/01	1521	178	A series of pits lying in the orientation of the fissures.				
18:55:08 7/26/01	1521	179	orientation of fissure zone		Embley		R628-020
18:55:38 7/26/01	1517	151	Some lava is peeking out from under the sediment.				
19:00:28 7/26/01	1497	166	ROPOS has been pulled up by the ship				
19:02:48 7/26/01	1492	264	We are about 70-80 m south of the line.				
19:06:28 7/26/01	1518	323	passing over a fissure, ~1 m wide		Embley		R628-021
19:06:38 7/26/01	1518	323	We are passing over the fissure.				
19:08:28 7/26/01	1517	319	Easterly most fissure				R628-022
19:08:28 7/26/01	1518	322	Easterly most fissure				R628-023
19:08:48 7/26/01	1517	319	Easternmost fissure; ROPOS is headed west on the second geological traverse line.				
19:09:18 7/26/01	1519	273	fissure with pillow lavas				R628-024
19:09:58 7/26/01	1517	279	Another 3m wide fissure. lobate flows outcropping here. 3-5 m deep fissures. We are in the main fissure zone again.				
19:09:58 7/26/01	1518	277	3 m wide fissure				R628-025
19:10:08 7/26/01	1518	276	other side of the fissure; lobate flows				R628-026
19:10:18 7/26/01	1518	272	other side of the fissure; lobate flows				R628-027
19:11:58 7/26/01	1516	282	fissure zone				R628-028
19:12:18 7/26/01	1515	272	IN between the fissures, surface is flat.				

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
19:13:08 7/26/01	1516	295	lobate and pillow lava on other side of fissure				R628-029
19:14:18 7/26/01	1517	253	Two fissures merging here				
19:14:58 7/26/01	1514	270	Ship is moving west on the second imagenex line				
19:18:28 7/26/01	1512	276	WE got a good fix. WE are right on the line				
19:19:28 7/26/01	1511	268	We are west of the 100m wide fissure zone. Pillows with lots of sediment				
19:19:48 7/26/01	1512	271	Same age terrain on the west side. Pillows. Same type of sediments; small fissure (less than a meter wide and deep)				
19:19:58 7/26/01	1513	275	in pillows with lots of sediment				R628-030
19:21:10 7/26/01	1514	268	Pillow lavas. Perhaps some small eruptions along this fissure.				
19:21:20 7/26/01	1514	269	small depression with pillow lava				R628-031
19:21:30 7/26/01	1514	269	small depression with pillow lava				R628-032
19:22:30 7/26/01	1515	268	Somewhat deeper fissure here. D101Outcropping lava.				
19:22:30 7/26/01	1515	269	another small fissure				R628-033
19:22:40 7/26/01	1515	268	other side of fissure; jumbled lava outcropping				R628-034
19:23:00 7/26/01	1515	270	Small sponges covering the sheet flow.				
19:23:40 7/26/01	1515	270	Sediment surface:lots of dark areas; glassy				
19:23:50 7/26/01	1515	270	sediment has salt texture				R628-035
19:24:00 7/26/01	1515	269	A deeper fissure ahead of us				
19:24:20 7/26/01	1515	269	sediment into the crack				R628-036
19:24:20 7/26/01	1515	270	Covered with sediment down into the fissure				
19:25:10 7/26/01	1515	269	Another fissure. Pillow lavas				
19:25:10 7/26/01	1515	270	another fissure; pillow lava				R628-037
19:25:50 7/26/01	1514	268	Another sedimented fissure. Some outcrops on the bottom. These fissures must be quite old given the sediment.				
19:25:50 7/26/01	1514	268	fissure; sediment almost all the way to the bottom				R628-038
19:26:40 7/26/01	1513	269	fissure				R628-039
19:26:50 7/26/01	1513	268	Another fissure: truncated pillows at the bottom; sediment				
19:27:30 7/26/01	1513	269	The bottom is exceptionally flat here				
19:28:20 7/26/01	1513	268	We are at an ideal location to study deformation away from a diking event				
19:28:20 7/26/01	1513	268	possible good location to look at deformation				R628-040
19:28:20 7/26/01	1513	269	possible good location to look at deformation				R628-041
19:28:50 7/26/01	1513	267	Another sedimented fissure; small rocks on the bottom of the fissure. 0.5-1 m deep				
19:29:20 7/26/01	1512	270	Another deep fissure.				
19:29:20 7/26/01	1512	268	fairly deep fissure & half meter wide; truncated lavas				R628-042
19:29:40 7/26/01	1512	268	Uniform sediments as we are out of the fissure zone				
19:30:20 7/26/01	1512	268	Zooming in on trails of melted glass				
19:30:20 7/26/01	1512	268	looks like trails in the sediment extruding glass				R628-043
19:30:50 7/26/01	1511	268	Couple pillows sticking up here				

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
19:31:10 7/26/01	1512	268	Approaching the end of the traverse line; rockier; exposure of pillow lavas. Still quite old; deep pockets of sediment in between the pillows. Not much sediment on the pillows. 0.5-1m long pillows				
19:31:40 7/26/01	1512	270	higher relief flows				R628-044
19:32:50 7/26/01	1507	179	We are at the western end of the second line. Turning south to go to the third line.				
19:33:50 7/26/01	1507	182	We will be headed east on the third line.				
19:35:40 7/26/01	1500	174	Pillows here as we go south. Pillows are not very glassy - but they are not covered with much sediment.				
19:35:50 7/26/01	1500	174	large pillows				R628-045
19:36:10 7/26/01	1498	176	pillows not very glassy; but not much sediment				R628-046
19:37:10 7/26/01	1492	120	We are the western end of the 3rd transect: turning east.				
19:38:30 7/26/01	1495	87	Pillow lavas right next to the rim				
19:42:00 7/26/01	1498	84	Pillow lavas down the slope. Small fissures up ahead				
19:42:00 7/26/01	1498	86	pillow lavas go across the path down the slope				R628-047
19:42:40 7/26/01	1499	83	Deformation associated with subsequent eruption events				
19:43:20 7/26/01	1502	89	future closeup				R628-048
19:43:40 7/26/01	1502	90	Zooming in the on the surface of the pillow lava. A few brittle starts. Not very glassy. Sediment between the pillow lava				
19:43:40 7/26/01	1502	90	looking at surface of pillow lava				R628-049
19:44:30 7/26/01	1502	89	Holothurian grazing through the sediment between the pillows				
19:45:00 7/26/01	1502	91	Thickness of the sediment is 5-10 cm according to ROPOS's lasers.				
19:45:10 7/26/01	1502	67	Life existing in the middle of geology.				R628-050
19:45:30 7/26/01	1502	68	Sediment variable thickness				R628-051
19:45:40 7/26/01	1502	74	Sediment is broken off; perhaps by rifting events				
19:49:02 7/26/01	1513	87	We are going over a really wide fissure				
19:50:12 7/26/01	1520	88	Crossing into the rift zone again. Large high pillow mound at the western end of this line				
19:51:22 7/26/01	1519	88	Truncated pillows on the fissure walls.				
19:51:52 7/26/01	1518	85	Really wide and deep fissure. 5 m deep				
19:53:22 7/26/01	1510	77	Between fissures. Again seeing pillows poking through pretty thick sediment cover.				
19:54:12 7/26/01	1514	90	All pillows on the walls of this fissure				
19:55:02 7/26/01	1516	90	Since we crossed that last fissure: 100 % sediment				
19:55:22 7/26/01	1516	95	Crossing another fissure..				
19:56:02 7/26/01	1520	92	There should be one more big fissure to cross.				
19:57:02 7/26/01	1518	85	Burrows in the sediment				
19:57:42 7/26/01	1517	87	Lavas under the sediment are now lobates with drain-out in them instead of pillows.				
20:00:02 7/26/01	1518	89	Not stopping at the end of this line: going directly to P3				
20:01:32 7/26/01	1520	90	We are at the end of the line.				
20:02:22 7/26/01	1520	87	Official end of imagenex line 3				

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
20:03:02 7/26/01	1518	89	Turning SW to go to the caldera rim				
20:03:22 7/26/01	1518	124	It is getting shallower by about 10 m				
20:04:52 7/26/01	1519	218	Pillows sloping.				
20:06:22 7/26/01	1512	220	An incredible jelly				
20:06:22 7/26/01	1512	219	life!				R628-052
20:06:42 7/26/01	1511	221	This pillow hill we're going up is chopped up by the caldera rim so it must be older				
20:09:12 7/26/01	1510	272	moving the ship 50 m south of target 3				
20:12:02 7/26/01	1510	304	North rim of the caldera. Truncated pillow lavas.				
20:12:42 7/26/01	1509	314	caldera rim near target P3				R628-053
20:13:32 7/26/01	1508	312	Looks like a fissure intersecting the caldera rim.				
20:15:52 7/26/01	1510	284	Caldera rim near target P4 (NE of CASM)				R628-054
20:16:14 7/26/01	1510	284	Going down about 20 m over the edge of the caldera rim				
20:16:54 7/26/01	1509	286	caldera rim near target P3				R628-055
20:17:32 7/26/01	1517	306	Looking north at the caldera wall (we are about 10 m below the caldera rim).				
20:19:04 7/26/01	1531	249	Now looking along the wall				
20:21:04 7/26/01	1529	338	we are about 20 m below the rim now				
20:23:54 7/26/01	1529	340	Will have the ship move halfway to target 2 (due west)				
20:26:44 7/26/01	1529	348	Lobate flows; looking directly at the wall of the caldera				
20:29:14 7/26/01	1530	337	Nearly vertical wall here				
20:29:56 7/26/01	1530	328	truncated pillows				R628-056
20:30:16 7/26/01	1529	324	We are at target P3				
20:32:06 7/26/01	1529	328	Stil moving along the caldera wall. Looking for evidence of diking events.				
20:35:36 7/26/01	1529	1	WE see what could be a dike				
20:36:26 7/26/01	1529	356	possible dike on caldera wall		Embley		R628-057
20:38:16 7/26/01	1530	3	Looking more closely at the putative dike				
20:40:36 7/26/01	1530	327	Having the ship move 50 m to the east				
20:42:56 7/26/01	1531	347	Yellow stains on the surface of the caldera wall				
20:50:16 7/26/01	1528	5	Back at the possible dike. Considering the feasibility of sampling it.				
20:52:56 7/26/01	1529	347	Going to try to sample this putative dike.				
20:54:16 7/26/01	1529	51	Looks like there is a crack in the putative dike.				
20:54:36 7/26/01	1528	19	Close-up of possible location to obtain sample		Embley		R628-058
20:57:36 7/26/01	1529	337	Have a good-sized chunk of the dike in ROPOS' claw				
20:57:46 7/26/01	1530	338	Sample obtained along caldera wall; possible diabase dike				R628-059
20:58:18 7/26/01	1530	338	Sampled a piece of a putative dike along the caldera wall. The sample is 10 cm across. Triangular section sticking out. Brown in color. (420615/5093552)	R628-RK-0002	Embley/Chadwick		
21:01:28 7/26/01	1531	301	Moving along the wall now again. Video of lava flows.				
21:02:28 7/26/01	1531	344	Looking at a piece of vesicular lava; quite different from the surrounding lava.				

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
21:04:38 7/26/01	1531	280	Moving along the wall.				
21:05:48 7/26/01	1531	18	Many overhangs along the caldera wall. Lots of crabs on the wall.				
21:07:28 7/26/01	1534	328	Going around another point jutting into the caldera				
21:17:38 7/26/01	1539	319	We are south; looking northward at the rib jutting out into the caldera				
21:19:48 7/26/01	1542	339	Vertical structure on a large feature on a wall.				R628-060
21:19:58 7/26/01	1541	323	We are looking at a vertical structure on the caldera wall.				
21:23:08 7/26/01	1542	277	Looking NW along the caldera wall. Long fractures breaking along off the wall				
21:25:08 7/26/01	1540	4	ridge along the wall				R628-061
21:33:20 7/26/01	1527	357	We are looking at fractures parallel to the caldera rim				
21:35:30 7/26/01	1530	25	columnar joints				R628-062
21:35:40 7/26/01	1530	16	Columnar joints. Contact between two flows				
21:36:00 7/26/01	1531	18	a nice contact between massive lava flow & ?				R628-063
21:36:50 7/26/01	1531	18	Looking north: massive lava flow; columnar jointed. Below that we see contact between two lava flows				
21:39:10 7/26/01	1532	310	Looking at the edge of ridge jutting out into the caldera.				
21:39:20 7/26/01	1532	305	Looking at another columnar joint				
21:41:20 7/26/01	1530	12	Moving west to target P2				
21:46:30 7/26/01	1518	328	Depth now 1517 m				
21:48:20 7/26/01	1513	289	Looking at the wall; moving laterally to west about 5 m below the rim				
21:55:12 7/26/01	1512	125	ROPOS headed up to the cage for Imagenex. Videos off.				
21:59:22 7/26/01	1479	159	ROPOS at the cage. Ship is ready to move to C1				
22:19:22 7/26/01	1476	246	At C1. ROPOS going to the bottom				
22:40:48 7/26/01	1553	0	Moving the ship 50 m north.				
22:49:00 7/26/01	1553	1	Getting bad nav because we're right up against the caldera wall				
22:50:00 7/26/01	1547	356	Starting Imagenex going north and up over the caldera wall				
23:10:42 7/26/01	1474	88	Moving ship so that the stern is 30m north of target #2.				
23:24:32 7/26/01	1554	136	finished going south to target 2; turning north from target 2 to go to rim.				
23:41:44 7/26/01	1511	358	ROPOS is 15m below the rim of the caldera wall, now ascending.				
23:44:24 7/26/01	1490	360	ROPOS is at the top of the rim and going to travel east to line 3 where ROPOS will then go back down the wall.				
23:53:44 7/26/01	1467	85	ROPOS is now due north of target 3 and heading south to it.				
00:05:30 7/27/01	1552	180	Moving the ship to 30m North of #4.				
00:15:02 7/27/01	1551	357	Starting Line 4 - heading North.				
00:24:22 7/27/01	1478	79	Finished line 4. Moving the ship east along the rim to line 5.				
00:27:12 7/27/01	1474	65	Animal coming at us.				R628-064
00:27:22 7/27/01	1474	81	Cool animal of some sort.				R628-065

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
00:27:22 7/27/01	1474	73	Close up of UFO (unidentified floating object).				R628-066
00:33:14 7/27/01	1482	174	ROPOS is now heading south to target 5.				
00:41:44 7/27/01	1554	76	Moving ship to 30m north of target 6.				
00:50:04 7/27/01	1554	80	ROPOS is now heading north from target 6.				
01:08:26 7/27/01	1491	89	Moving ship 30m north of target 7.				
01:19:08 7/27/01	1492	138	ROPOS is heading south to target 7.				
01:35:58 7/27/01	1556	85	Moving ship to target 8 with stern of the ship on the target.				
01:43:30 7/27/01	1557	358	ROPOS is now heading north from target 8.				
01:51:40 7/27/01	1504	28	ROPOS is at the rim and turning east; ship is moving to target 9.				
02:01:00 7/27/01	1503	92	Heading south.				
02:12:42 7/27/01	1558	165	ROPOS is heading to cage so that the ship can move to Shepherd vent. The weather is getting bad and we want to do some sampling of the vents before we have to pull out.				
02:58:04 7/27/01	1581	205	We are in site of the bottom.				
02:59:54 7/27/01	1583	192	Coming over the edge toward T&S.				R628-067
03:01:16 7/27/01	1582	191	Close up of base of T&S.				R628-068
03:01:46 7/27/01	1582	168	T&S				R628-069
03:03:34 7/27/01	1586	197	Shepherd vent				R628-070
03:04:04 7/27/01	1587	208	highlights on.				
03:04:04 7/27/01	1587	211	looking at Shepherd vent.				
03:04:54 7/27/01	1586	241	Shepherd vent.				R628-071
03:05:44 7/27/01	1585	274	looking at white bacterial mat at Shepherd vent.				R628-072
03:12:46 7/27/01	1588	272	Quantitative SS for limpets at the base of Shepherd vent. Begin slurping at 03:20; T=1-3. Stop 03:34. We were going across the flow at this site. T is ~1 C above ambient. (420446/5093324 45 59.3321' 130 01.6320')	R628-SS-J6-0003	Bates		
03:16:56 7/27/01	1587	274	The area where Amanda is going to slurp (before)				R628-073
03:20:36 7/27/01	1587	274	Vent fish (in upper left by crab) near Amanda's suction				R628-074
03:26:26 7/27/01	1587	272	disrupted site by creating a small slide.				R628-075
03:31:36 7/27/01	1587	269	Suction site for Amanda's limpet experiment.				R628-076
03:33:26 7/27/01	1587	267	Close-up of Amanda's site.				R628-077
03:33:36 7/27/01	1587	267	Amanda's suction site.				R628-078
03:36:18 7/27/01	1587	268	Amanda's second suction site.				R628-079
03:36:48 7/27/01	1587	268	Started SS Jar #7 at 03:37. Tmax=5 C above ambient. Alien temp file is 7 hours difference (i.e. 20:37). Stop 03:42. Sample was edgy. (420446/5093324 45 59.3321' 130 01.6320')	R628-SS-J7-0004	Bates		
03:36:58 7/27/01	1587	268	Suctioning for Amanda's second sample.				R628-080
03:40:18 7/27/01	1587	268	More suctioning for Amanda.				R628-081
03:44:08 7/27/01	1588	253	Shepherd vent area.				R628-082
03:45:38 7/27/01	1585	304	lotta limpets.				R628-083
03:45:48 7/27/01	1585	317	limpet gradient at Shepherd vent.				R628-084
03:46:58 7/27/01	1581	40	looking for bacterial mat at T & S.				

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
03:49:18 7/27/01	1582	184	T&S vent.				R628-085
03:49:28 7/27/01	1582	154	T&S Vent.				R628-086
03:49:38 7/27/01	1582	161	T&S Vent.				R628-087
03:49:38 7/27/01	1582	165	T&S Vent.				R628-088
03:49:38 7/27/01	1582	155	T&S Vent.				R628-089
03:50:18 7/27/01	1582	17	T&S Vent.				R628-090
03:50:38 7/27/01	1581	334	T&S vent.				R628-091
03:53:18 7/27/01	1582	316	Suction sample site for Craig at T&S vent.				R628-092
03:55:28 7/27/01	1582	316	Start SS #4 on top of T&S at 03:56. Stop 04:04. Bacterial mat. (420449/5093355 45 59.3492' 130 01.6301')	R628-SS-J4-0005	Moyer		
03:56:58 7/27/01	1582	317	Suctioning for Craig at T&S.				R628-093
03:58:18 7/27/01	1582	317	highlights on.				
03:58:58 7/27/01	1582	316	mat is holding on tightly to basalt.				R628-094
04:04:08 7/27/01	1583	303	SS Jar #3 for Moyer - bacterial mat. Start 04:06. Finish 04:10. (420449/5093355 45 59.3492' 130 01.6301')	R628-SS-3-0006	Moyer		
04:06:10 7/27/01	1582	303	The 2nd SS at base of T&S spire for bacterial mat.				R628-095
04:11:10 7/27/01	1582	314	Moving ROV to another site here at T&S vent.				
04:12:30 7/27/01	1582	305	T&S.				R628-096
04:15:10 7/27/01	1582	293	3rd SS at T&S.				R628-097
04:15:40 7/27/01	1582	292	SS Jar#2 at different T&S site than first two. Bacterial mat. Start 04:16. (420449/5093355 45 59.3492' 130 01.6301')	R628-SS-J2-0007	Moyer		
04:21:30 7/27/01	1582	292	SS Jar #1. Start 04:21. Stop 04:28. (420449/5093355 45 59.3492' 130 01.6301') Bacterial mat	R628-SS-J1-0008	Moyer		
04:22:30 7/27/01	1582	291	4th mat SS site at T&S.				R628-098
04:35:52 7/27/01	1582	303	Sulfide sample taken from T&S vent. (420449/5093355 45 59.3492' 130 01.6301')	R628-SF-0009	Leveille		
04:37:42 7/27/01	1582	302	We are going NE of T&S to look for potential sulfide samples for Leveille.				
04:39:42 7/27/01	1574	77	site NE of T&S.				R628-099
04:45:02 7/27/01	1574	278	crab on lamphere chimney.				R628-100
04:45:12 7/27/01	1573	296	Lamphere chimney.				R628-101
04:45:42 7/27/01	1570	317	Top of Lamphere chimney.				R628-102
04:46:12 7/27/01	1570	214	active vent w/ anhydrite.				R628-103
04:46:22 7/27/01	1572	225	Top of Lamphere chimney.				R628-104
04:48:22 7/27/01	1572	318	Close up of Lamphere chimneys.				R628-105
04:48:42 7/27/01	1572	313	sulfide to sample.				R628-106
04:48:52 7/27/01	1572	313	Sulfide looks like a chocolate easter bunny.				R628-107
04:50:22 7/27/01	1572	309	pre sample.				R628-108
04:50:32 7/27/01	1572	308	dismembering the chocolate bunny at Lamphere.				R628-109
04:51:32 7/27/01	1572	308	chocolate easter bunny from lamphere.				R628-110
04:52:22 7/27/01	1572	351	Sulfide sample from Lamphere chimney that looks like a chocolate bunny. (420496/5093375 45 59.3602' 130 01.5937')	R628-SF-0010	Leveille		

Time (UTC)	Z (m)	Hdg	R628 Comments	Samples	Investigator	SubSamples	FrGrab
04:53:02 7/27/01	1564	131	ROPOS is coming off the bottom at 04:53.				
04:54:12 7/27/01	1549	258	Lamphere chimneys position is: 420496/5093375; 45 59.3602/130 01.5937. Depth is 1572 meters.				
06:03:08 7/27/01	2	64	ROPOS off the bottom at 0604. At the surface 7/27 0653.				

6.11 R629 DIVE LOG

Area: 98 flow (Mkr-33, Cloud)

Dive Summary: ROPOS removed the larval settling arrays and array biobox from the elevator and placed them on the seafloor, then transited to Cloud (Mkr-N6) where larval settlement array-E was deployed. Larval traps 5-8 were recovered but only 5&7 were good samples as 6&8 had fallen. After putting larval traps in the "cadillac" for surface elevator recovery, larval settlement arrays H and G were deployed 8-10 meters from Cloud. Larval settling array-K was recovered and put into the array biobox which was then placed into the elevator. Two bacterial traps were recovered and two were deployed at Cloud. The red osmo was deployed in Cloud vent. Larval settling arrays E and F were then positioned near Cloud and the long term osmo was recovered. ROPOS then went to Mkr-33 where two bacteria traps were recovered. The final completed task of the dive was recovery of the iron osmo from Mkr-33.

Bottom Time: 7/27(JD208) 1653 - 2252

Time (UTC)	Z (m)	Hdg	R629 Comments	Samples	Investigator	SubSamples	FrGrab
14:20:05 7/27/01	1	94	Elevator over the side at 8:16am (PCT). Time is 15:16 UTM.				
15:54:33 7/27/01	1	47	In the water.				
16:00:55 7/27/01	109	26	Big Bob				R629-001
16:02:45 7/27/01	152	348	Who said ROPOS wasn't a manned submersible?				R629-002
16:53:03 7/27/01	1485	34	In the plume.				
16:54:53 7/27/01	1504	262	We think we saw the elevator.				
16:55:33 7/27/01	1510	263	Elevator in sight. X/Y=423859/5087055				
16:56:43 7/27/01	1512	330	Elevator with larval arrays; larval cadillac and biobox to recover arrays				R629-003
17:02:43 7/27/01	1513	343	First settlement array grabbed off the elevator. Setting it down on the ground below the elevator.				
17:12:15 7/27/01	1520	284	Grabbed a second settlement array off the elevator and placing it on the bottom.				
17:19:45 7/27/01	1516	268	Third settlement array in claw; placing on seafloor with the others.				
17:27:35 7/27/01	1513	184	Leaving the fourth settlement array on the elevator for now; otherwise it will be too light.				
17:30:55 7/27/01	1513	132	Grabbing the array biobox out of the elevator.				
17:33:25 7/27/01	1523	136	Placing array biobox on the seafloor at base of elevator.				
17:39:57 7/27/01	1523	167	Array biobox in claw. Note ophuroid underneath.				R629-004
17:40:37 7/27/01	1522	175	Picked up the array biobox in the 7 and picked up a settlement array in the 5 and heading to Cloud (N6).				
17:55:47 7/27/01	1522	12	We are at Cloud.				
17:55:47 7/27/01	1523	9	Cloud				R629-005
17:58:17 7/27/01	1524	16	Deploying a settlement array at Cloud (N6)				R629-006
18:02:37 7/27/01	1525	19	Opening the array biobox to get it ready to place the short term settlement array in it for recovery.				
18:03:29 7/27/01	1524	16	ROPOS struggles with the array retrieval box.				R629-007
18:08:09 7/27/01	1524	284	Gear at Cloud.				R629-008
18:08:49 7/27/01	1524	287	Capping all 4 larval traps. Will retrieve all four; but note that two fell over a couple days ago.				
18:10:39 7/27/01	1524	286	Capping larval trap number 7.				R629-009
18:11:09 7/27/01	1524	286	Successfully capped larval trap #7. This trap was NOT tipped - a good sample. (423901/5087116; 45 56.004' 129 58.896')	R629-LT7-0001	Metaxas/Tunnicliffe		
18:11:39 7/27/01	1524	286	My larval trap. Mine!				R629-010
18:13:09 7/27/01	1524	249	Successfully capped larval trap #5. This trap was NOT tipped - a good sample. (423901/5087116; 45 56.004'/ 129 58.896').	R629-LT5-0002	Metaxas/Tunnicliffe		
18:15:09 7/27/01	1524	248	Capping LT5				R629-011

Time (UTC)	Z (m)	Hdg	R629 Comments	Samples	Investigator	SubSamples	FrGrab
18:18:29 7/27/01	1524	238	Capping LT6; with LT8 in the background. Both were tipped over when found.				R629-012
18:19:39 7/27/01	1524	238	Successfully capped larval trap #6. This trap was tipped - NOT a good sample. (423901/5087116; 45 56.004' 129 58.896')	R629-LT6-0003	Metaxas/Tunnicliffe		
18:22:19 7/27/01	1524	232	Successfully capped larval trap #8. This trap was tipped - NOT a good sample. (423901/5087116; 45 56.004' 129 58.896')	R629-LT8-0004	Metaxas/Tunnicliffe		
18:23:59 7/27/01	1518	215	Flying back to the elevator.				
18:28:29 7/27/01	1516	194	Larval trap dropped out of the seven function arm on the way to the elevator.				
18:31:09 7/27/01	1512	114	Returning LT to box				R629-013
18:35:01 7/27/01	1512	153	Larval traps #8 and #6 put in the larval cadillac on the elevator for recovery.				
18:44:01 7/27/01	1522	239	Picking up two settlement arrays (H and G by the elevator) to place about 8-10m away from Cloud vent (N6).				
18:55:01 7/27/01	1522	40	Array G placed				
18:56:41 7/27/01	1521	50	Array H placed.				
18:57:01 7/27/01	1521	68	Placement of arrays at "far" position.				
18:57:01 7/27/01	1521	56	larval arrays with Cloud in the background				R629-014
18:57:01 7/27/01	1521	59	larval settlement arrays				R629-015
18:57:11 7/27/01	1520	57	larval settlement arrays near Cloud				R629-016
19:01:13 7/27/01	1520	16	Arrays H and G are S-SW of N6 marker; about 8 meters				
19:09:43 7/27/01	1524	268	Larval traps 5 and 7 picked up by ROPOS				
19:12:13 7/27/01	1518	210	Taking larval traps 5 and 7 to the elevator				
19:14:53 7/27/01	1512	278	ROPOS at the elevator				
19:16:13 7/27/01	1512	205	Positioning larval trap 7 over the larval cadillac on the elevator				
19:16:53 7/27/01	1512	212	Larval trap 7 successfully dropped into the larval cadillac on the elevator				
19:18:33 7/27/01	1511	190	Positioning larval trap 5 over the elevator				
19:19:23 7/27/01	1511	216	Larval trap 5 dropped into the larval cadillac on the elevator, but it didn't drop in all the way				
19:22:33 7/27/01	1512	210	Trap 5 dropped in all the way. Closing the lid on the larval cadillac				
19:23:53 7/27/01	1513	216	Securing the lid of the cadillac				
19:25:23 7/27/01	1512	216	Going to take the last settlement array out of the elevator				
19:30:15 7/27/01	1512	91	Grabbing onto settlement array F				
19:30:35 7/27/01	1513	124	Got array F out of the elevator				
19:32:45 7/27/01	1498	101	Headed back to Cloud				
19:37:05 7/27/01	1524	78	Dropping array F next to array E at Cloud. Both will be positioned before we leave.				
19:39:45 7/27/01	1524	289	Getting ready to put array K into the array biobox				
19:43:05 7/27/01	1524	280	Grabbed array K. Was deployed at Mkr-N6 Cloud vent for one week. (423901/5087116 45 56.004' 129 58.896')	R629-LA-K-0010	Metaxas/Tunnicliffe		
19:44:05 7/27/01	1524	280	Larval trap K at Cloud (which is immediately to the left ~1 ft)				R629-017
19:44:15 7/27/01	1524	280	Rotated array K and put it back down				

Time (UTC)	Z (m)	Hdg	R629 Comments	Samples	Investigator	SubSamples	FrGrab
19:44:35 7/27/01	1524	281	Larval array K being picked up and put into box; cloud on left; shown for proximity of original placement to vent				R629-018
19:46:15 7/27/01	1524	280	Slowly lowering array K into the array biobox				
19:46:55 7/27/01	1524	280	Successfully placed array K into the array biobox				
19:48:26 7/27/01	1524	342	Closing the array biobox				
19:51:05 7/27/01	1524	320	Pulling the lid down.. squashing the array..				
19:52:08 7/27/01	1524	320	Secured the lid of the array biobox				
19:53:26 7/27/01	1524	332	Array biobox is closed and fully secure. We are now bringing it back to the elevator.				
20:02:38 7/27/01	1511	132	Elevator is in sight				
20:03:28 7/27/01	1512	117	Sliding the array box into the elevator..				
20:04:38 7/27/01	1521	211	Pulled it out again.. put it on the ground				
20:06:38 7/27/01	1524	177	Picking up the box again				
20:15:08 7/27/01	1512	181	Headed up to the elevator with box in hands				
20:16:58 7/27/01	1512	150	Trying to get the box into the elevator..				
20:18:28 7/27/01	1512	203	Array biobox is in the elevator; but it is on it's side. Trying to reposition it				
20:25:10 7/27/01	1513	128	Array biobox is now diagonal; but still not flat				
20:32:00 7/27/01	1513	194	Picked up the array box again. Having some trouble getting it flat.				
20:39:20 7/27/01	1512	225	Pulled it out again. Trying another angle.				
20:40:52 7/27/01	1512	151	Uh oh: ROPOS lost console link.				
20:46:12 7/27/01	1523	278	Console link back. Still taking care of ROPOS business				
20:50:32 7/27/01	1524	208	Found the array box on the bottom. Trying to pick it up.				
20:59:01 7/27/01	1523	261	Picked up the array box				
21:02:14 7/27/01	1513	283	Array box finally placed into elevator!!				
21:13:54 7/27/01	1513	213	Trying to fasten the array biobox to the elevator				
21:19:04 7/27/01	1513	326	The array biobox is successfully fastened to the elevator				
21:30:56 7/27/01	1510	355	Headed back to Cloud to retrieve and deploy bact traps				
21:34:08 7/27/01	1523	1	We are at Cloud				
21:39:48 7/27/01	1525	337	Picked up one bact trap out of Cloud pit				
21:41:08 7/27/01	1525	334	Recovered Bact trap #57 from Cloud pit. Starboard biobox. (423901/5087116; 45 56.004' 129 58.896')	R629-BT-57-0005	Moyer		
21:42:58 7/27/01	1525	333	Deployed bact trap #60 into Cloud pit. It disappeared into the pit. Can barely see the end of the meter long cord.				
21:44:28 7/27/01	1525	334	Deploying bact trap #59 into Cloud pit.				
21:44:58 7/27/01	1525	333	Could not find the one other bact trap which was supposed to be recovered.				
21:45:40 7/27/01	1525	332	Placing bac trap 59 with 60 in background				R629-019
21:45:40 7/27/01	1525	332	Bac trap 59 about to be put into Cloud				R629-020
21:46:00 7/27/01	1525	334	Bac trap 59 falling into Cloud hole				R629-021
21:46:10 7/27/01	1525	333	final position: bac traps 59&60				R629-022
21:46:50 7/27/01	1525	6	Going to redeploy the nozzle for the Red osmo				
21:52:30 7/27/01	1525	321	Osmo sampler about to be dropped in the Cloud hole				R629-023

Time (UTC)	Z (m)	Hdg	R629 Comments	Samples	Investigator	SubSamples	FrGrab
21:53:00 7/27/01	1525	321	In the process of deploying the nozzle for the osmo; the cords of the bact traps disappeared further into the pit. May be difficult to recover.				
21:55:00 7/27/01	1525	319	Next up: position larval settlement arrays E and F near Cloud				
21:58:30 7/27/01	1525	69	There is a crab near arrays E and F				
21:58:50 7/27/01	1525	90	tug of war between crab and ROPOS for the larval array				R629-024
21:59:30 7/27/01	1525	26	Picked up array F and going to put it at the edge of Cloud near the tube worms.				
22:01:30 7/27/01	1524	226	Larval array placed at cloud next to osmo				R629-025
22:02:10 7/27/01	1523	306	larval array next to cloud				R629-026
22:03:20 7/27/01	1524	337	Array F is in position.				
22:06:50 7/27/01	1524	293	Picked up array E				
22:09:50 7/27/01	1524	237	Put array E down (not quite level) a bit further away from Cloud pit				
22:10:10 7/27/01	1523	252	closer picture of the two larval traps and osmo next to cloud; cloud on left				R629-027
22:10:10 7/27/01	1523	263	Larval traps and osmo next to cloud; osmo is on the left side of the left hand larval array				R629-028
22:14:42 7/27/01	1520	233	Recovered osmo (long term) from Cloud/N6. (423901/5087116; 45 56.004' 129 58.896')	R629-osmo-0006	Wheat/Moyer		
22:17:52 7/27/01	1513	141	Dropped osmo into the elevator.				
22:22:22 7/27/01	1504	174	Headed to Marker 33.				
22:28:42 7/27/01	1523	246	We are at Marker 33.				
22:28:42 7/27/01	1522	228	bacteria traps recovered from Mkr-33				R629-029
22:29:52 7/27/01	1523	233	Picked up Bact Trap #55 and put it into the port side of the biobox. (423901/5087116; 45 56.004' 129 58.896')	R629-BT-55-0007	Moyer		
22:31:42 7/27/01	1523	233	framegrab				R629-030
22:31:52 7/27/01	1523	233	recovering bactrap 56				R629-031
22:34:02 7/27/01	1523	224	Picked up Bact Trap #56 (it is inverted) and put it in the biobox. (423901/5087116; 45 56.004' 129 58.896')	R629-BT-56-0008	Moyer		
22:36:02 7/27/01	1523	225	recovering the iron-osmo at Mkr-33 for MBARI				R629-032
22:36:12 7/27/01	1523	247	Picked up the iron osmo from Marker 33. (423850/5087101 45 55.99600' 129 58.93500')	R629-osmo-0009	Wheat/Moyer		
22:38:42 7/27/01	1524	20	marker-33 in 2001				R629-033
22:39:22 7/27/01	1523	114	more mkr-33				R629-034
22:41:22 7/27/01	1521	112	Could not find the other osmo at Marker 33.				
22:43:34 7/27/01	1514	271	Headed back to the elevator with the iron osmo.				
22:47:34 7/27/01	1514	258	The iron osmo is in the cage which is now being closed.				
22:50:04 7/27/01	1514	284	End work on seafloor - ROPOS is now coming up.				
00:12:12 7/28/01	1	70	ROPOS is on deck -- end of dive 629.				

6.12 R630 DIVE LOG

Area: 98 flow and nSRZ (Mrk-33, Cloud, Mkr-113, Casper, Vixen, Snail)

R630 SUMMARY: ROPOS deployed RAS for its one-year NeMO Net experiment at Cloud/Mkr-N6. Two bacteria traps were deployed at Mkr-33, as well as an osmosampler. Four suction samples for biology and particulates were taken at Mkr-33. Next task was a video survey of the lava pillars at the rumbleometer site. Two bacteria traps were recovered at Mkr-113. The plankton net was stowed on arrival at Casper and Vixen. Two gastight samples were taken at Vixen and two suction samples at Casper. Two hobos were deployed at Vixen, which was bubbling!! After finishing up at the Coquille vent field we returned to Mkr-33/Cloud to look for the missing osmo. We didn't find it.

Bottom Time: 7/28(JD209) 0414 - 1900

Time (UTC)	Z (m)	Hdg	R630 Comments	Samples	Investigator	SubSamples	FrGrab
03:13:26 7/28/01	1	119	ROPOS is in the water at 03:16.				
04:11:50 7/28/01	1493	7	Cage is stationary at 1482 m.				
04:13:40 7/28/01	1522	85	ROPOS is on the bottom at 04:14.				
04:16:10 7/28/01	1524	344	We are looking for the RAS.				
04:22:40 7/28/01	1524	220	We're now at Mkr-33.				R630-001
04:26:30 7/28/01	1524	217	Setting the OSMO down to free up the 7-function arm.				
04:33:22 7/28/01	1524	234	Setting the plankton net down to free the 5-function.				
04:39:52 7/28/01	1524	232	A bit of a tangle between the plankton net and the osmo.				R630-002
05:09:24 7/28/01	1520	82	Pillars and roof near Mkr-33.				R630-003
05:10:24 7/28/01	1516	31	We found the RAS ~20 meters north of Mkr-33.				
05:11:34 7/28/01	1519	28	RAS landed near a collapsed pit- a bit precarious.				R630-004
05:12:24 7/28/01	1519	335	RAS in its dropped position.				R630-005
05:13:14 7/28/01	1519	348	The RAS where it landed.				R630-006
05:15:54 7/28/01	1519	270	Top of RAS on the bottom				R630-007
05:16:04 7/28/01	1520	257	Pointer looks a bit crooked and was wrapped around the bar.				R630-008
05:20:24 7/28/01	1520	258	ROPOS is picking up the RAS to take to N6.				R630-009
05:31:06 7/28/01	1521	167	Larval arrays at N6.				R630-010
05:32:36 7/28/01	1520	110	The hole at N6.				R630-011
05:34:56 7/28/01	1525	334	potential site for RAS deployment.				R630-012
05:37:46 7/28/01	1524	8	1st shot at deployment of the RAS.				R630-013
05:37:46 7/28/01	1524	15	larval array.				R630-014
05:46:26 7/28/01	1521	340	1st deployment site for RAS.				R630-015
05:51:18 7/28/01	1525	28	underside of RAS.				R630-016
06:15:28 7/28/01	1524	155	Side of RAS.				R630-017
06:15:58 7/28/01	1522	95	top view of the RAS.				R630-018
06:20:20 7/28/01	1524	184	RAS is not totally level.				R630-019
06:34:10 7/28/01	1525	71	ROPOS night shift is coming on.				
06:40:00 7/28/01	1525	71	We are trying to decide if we should bring in a weight to balance the RAS.				
06:43:42 7/28/01	1522	221	RAS sampler.				R630-020
06:48:12 7/28/01	1522	68	We are going to the west to see if we can find a weight to help balance the RAS.				
06:49:42 7/28/01	1521	251	Lump fish take 2				R630-021
06:49:52 7/28/01	1522	239	Lump fish take 1				R630-022

Time (UTC)	Z (m)	Hdg	R630 Comments	Samples	Investigator	SubSamples	FrGrab
06:52:22 7/28/01	1522	308	Looking at Marker N8				R630-023
06:52:42 7/28/01	1523	232	We are at Snail looking for a weight of some sort.				
06:54:22 7/28/01	1523	304	We've located a bunch of rope and stuff but no weights so far.				
06:58:42 7/28/01	1522	154	We can see the elevator weight but it is to big.				
06:58:42 7/28/01	1522	156	Elevator weight				R630-024
07:01:22 7/28/01	1523	91	We've found a bunch of chains and weights but it all looks too big.				
07:03:02 7/28/01	1523	104	Big elevator weigth that have been there for years				R630-025
07:05:12 7/28/01	1523	93	We are cutting off a piece of rope that is attached to a chain to possibly take to the RAS.				
07:18:04 7/28/01	1522	113	We have some chain and are now going back to Cloud to see if we can help weigh down the RAS with it.				
07:21:24 7/28/01	1523	8	We are now back at the RAS.				
07:29:44 7/28/01	1524	256	We are placing the chain links on one corner of the RAS.				
07:35:54 7/28/01	1524	270	We are still trying to position this chain on the RAS.				
07:47:26 7/28/01	1524	257	We have looped the chain over the corner of the RAS.				
07:51:36 7/28/01	1524	244	We have decided that the RAS is in place and okay. We will now deal with the placing the intake in the hole.				
07:56:06 7/28/01	1524	357	We are positioning T1 into the hole at Cloud N6.				
08:00:26 7/28/01	1524	355	T1 into the hole at Cloud N6.				R630-026
08:00:46 7/28/01	1524	356	T1 and array.				R630-027
08:03:36 7/28/01	1525	358	T1 final position				R630-028
08:04:36 7/28/01	1524	55	We are now positioning T2 into the hole at Cloud N6.				
08:06:16 7/28/01	1524	354	T2 has been dropped into the hole				R630-029
08:07:56 7/28/01	1524	344	The probes have disappeared into the hole at Cloud N6.				
08:07:56 7/28/01	1524	344	T1 has been moved directly into the hole				R630-030
08:08:26 7/28/01	1525	1	Highlights on to see what Cloud N6 looks like.				
08:09:16 7/28/01	1524	29	larval traps and intake from RAS at N6.				R630-031
08:09:36 7/28/01	1524	38	RAS intake and larval array at N6.				R630-032
08:09:46 7/28/01	1523	14	RAS and larval array at N6.				R630-033
08:10:08 7/28/01	1523	352	RAS and larval array at N6.				R630-034
08:10:38 7/28/01	1523	7	RAS at N6.				R630-035
08:13:18 7/28/01	1522	247	RAS and larval array at N6.				R630-036
08:15:08 7/28/01	1523	280	RAS at N6.				R630-037
08:15:48 7/28/01	1523	285	We are done positioning the RAS.				
08:17:28 7/28/01	1520	275	We are now going to Mkr-33.				
08:19:28 7/28/01	1522	312	Highlights off.				
08:22:18 7/28/01	1522	187	Crab taking osmo and plankton sample				R630-038
08:22:28 7/28/01	1522	188	We are deploying bac traps first at Mkr-33.				
08:26:58 7/28/01	1522	260	Deploying bacteria trap 62 at Mkr-33.				
08:28:18 7/28/01	1523	223	bactrap 62 being deployed at Mkr-33.				R630-039

Time (UTC)	Z (m)	Hdg	R630 Comments	Samples	Investigator	SubSamples	FrGrab
08:29:58 7/28/01	1522	228	Deploying bacteria trap 61 at Mkr-33.				
08:33:18 7/28/01	1522	228	BT 61 & 62 deployed at Mkr-33.				R630-040
08:34:18 7/28/01	1522	228	BT 61 & 62 deployed at Mkr-33.				R630-041
08:35:28 7/28/01	1522	195	Deploying an osmosampler (green) at Mkr-33.				
08:42:40 7/28/01	1522	232	Osmo being placed at Mkr-33.				R630-042
08:47:00 7/28/01	1522	243	OSMO deployed at Mkr-33.				R630-043
08:47:40 7/28/01	1523	242	OSMO intake emplaced at Mkr-33.				R630-044
08:47:50 7/28/01	1523	242	Green osmosampler has successfully been deployed at Mkr-33.				
08:53:00 7/28/01	1524	16	We are now looking for a place to slurp at Mkr-33.				
08:54:30 7/28/01	1522	324	OSMO etc at Mkr-33.				R630-045
08:56:30 7/28/01	1523	314	We are suctioning white bacterial mat into Jar 7 at Mkr-33. Start suctioning at 0858. Stopped suctioning at 0914. (423855/5087092; 45 55.9906'/129 58.9318' 2001 location).	R630-SS-J7-0001	Moyer		
08:58:21 7/28/01	1523	308	Suction sample for Craig				R630-046
09:09:33 7/28/01	1524	63	Slurping mat near Mkr-33 into Jar 7.				R630-047
09:14:33 7/28/01	1524	64	We are suctioning the same white bacterial mat into Jar 6 at Mkr-33. Start 0915. Stop 0922. (423855/5087092; 45 55.9906'/129 58.9318' 2001 location).	R630-SS-J6-0002	Moyer		
09:15:43 7/28/01	1524	62	Suction sample at Mkr-33. (bottle 6)				R630-048
09:25:23 7/28/01	1523	30	We are now looking for a place to suction particulate matter at Mkr-33.				
09:30:53 7/28/01	1523	332	Suctioning particulates over fauna into Jar 1. Start 0932. Stop 0947. The temperature log is ANT01. (423855/5087092; 45 55.9906'/129 58.9318' 2001 location)	R630-SS-J1-0003	Page/Leveille		
09:32:23 7/28/01	1523	337	Suctioning for particulates at Mkr-33 over a mass of limpets				R630-049
09:39:25 7/28/01	1523	340	Sucking particulates (suspended)		Antoine/Kim		R630-050
09:48:45 7/28/01	1523	358	We are moving 8 meters east of Mkr-33 to suction sample.				
09:49:35 7/28/01	1522	303	Suctioning peripheral fauna into Jar 2. Start 0956. Stop 1002.(423855/5087092; 45 55.9906'/129 58.9318' 2001 location).	R630-SS-J2-0004	Marcus		
09:52:25 7/28/01	1522	233	8m east of Mkr-33				R630-051
09:54:35 7/28/01	1523	243	Jean's suction location				R630-052
09:56:15 7/28/01	1523	242	Fauna away of vent suction sampling				R630-053
10:04:17 7/28/01	1523	243	Post suction sampling				R630-054
10:06:47 7/28/01	1523	193	We are now going to the rumbleometer due southwest.				
10:12:17 7/28/01	1519	222	View during transit from Mkr-33 to the Rumbleometer site.				R630-055
10:20:17 7/28/01	1519	238	Lava pillars (needs video interlace correction)				R630-056
10:20:37 7/28/01	1520	231	Lava pillars				R630-057
10:20:47 7/28/01	1520	237	Lava pillars				R630-058
10:21:07 7/28/01	1520	238	Lava pillar				R630-059
10:34:19 7/28/01	1522	230	Edge of jumbled and lineated lava				R630-060

Time (UTC)	Z (m)	Hdg	R630 Comments	Samples	Investigator	SubSamples	FrGrab
10:41:29 7/28/01	1520	273	We are at the chain anchor (with short line) that held down the rumbleometer (before it was released).				
10:43:29 7/28/01	1522	272	We are looking for the railroad wheel that was attached to the rumbleometer.				
10:50:41 7/28/01	1522	204	Niskin bottle				R630-061
10:50:41 7/28/01	1522	206	We just found a niskin we knocked off ROPOS in 1998!				
10:54:11 7/28/01	1522	359	We are still looking for the rumblemeter railroad weight.				
10:55:31 7/28/01	1519	358	We have found the railroad wheel. (423706/5086763)				
10:55:51 7/28/01	1520	340	Rumbleometer wheel weight				R630-062
10:56:41 7/28/01	1522	332	Rumbleometer's wheel				R630-063
10:59:31 7/28/01	1522	346	Looking north at the rumbleometer's wheel. This view shows that the lava got pilled up on the north end of the rumbleometer during drainback.				R630-064
11:02:11 7/28/01	1520	243	Getting into position for first set of framegrabs (series # 1) from top to bottom on a lava pillar. We are ~5 m SW of the rumbleometer anchor looking SW at the NE side of a small pillar wall. ROPOS is on the bottom and we are just panning the camera				R630-065
11:04:51 7/28/01	1521	217	First lava framegrab series # 1a				R630-066
11:05:21 7/28/01	1521	218	First lava framegrab series # 1b				R630-067
11:05:31 7/28/01	1521	218	First lava framegrab series # 1c				R630-068
11:05:31 7/28/01	1522	218	First lava framegrab series # 1d				R630-069
11:05:41 7/28/01	1521	217	First lava framegrab series # 1e				R630-070
11:05:51 7/28/01	1522	218	First lava framegrab series # 1f.				R630-071
11:07:41 7/28/01	1520	228	Now ROPOS is off the bottom to get some frame grabs of the top of the pillar wall (with lobate morphology on top).				
11:08:01 7/28/01	1520	220	Lobate top of lava pillar where framegrab series # 1 was taken.				R630-072
11:09:31 7/28/01	1522	60	ROPOS now repositioned to take pictures of the same pillar wall but from the opposite side looking NE (instead of SW).				
11:10:51 7/28/01	1521	55	Second lava framegrab series # 2a				R630-073
11:11:01 7/28/01	1521	58	Second lava framegrab series # 2b				R630-074
11:11:11 7/28/01	1522	57	Second lava framegrab series # 2c				R630-075
11:11:31 7/28/01	1522	55	Second lava framegrab series # 2d				R630-076
11:12:31 7/28/01	1522	56	Backing off to take pictures of the entire pillar structure.				
11:14:31 7/28/01	1521	52	View of entire lava pillar looking to the north east.				R630-077
11:14:53 7/28/01	1521	52	Now heading W to do a few more framegrab series at other pillars.				
11:19:43 7/28/01	1521	302	Reached a new set of pillars after driving ~15 m W/SW. Examing the top part of pillars that do not have "shelves" at the top - only in the middle and bottom. View looking NW.				
11:19:43 7/28/01	1521	302	View of lava pillar with top without shelves.				R630-078
11:20:13 7/28/01	1521	302	Zoom in to top of pillar with "droopy" texture where the lava remobilized before it was quenched.				R630-079
11:22:23 7/28/01	1522	304	Third lava framegrab series # 3a.				R630-080

Time (UTC)	Z (m)	Hdg	R630 Comments	Samples	Investigator	SubSamples	FrGrab
11:22:53 7/28/01	1521	304	Third lava framegrab series # 3b.				R630-081
11:23:13 7/28/01	1521	304	Third lava framegrab series # 3c.				R630-082
11:23:23 7/28/01	1521	304	Third lava framegrab series # 3d.				R630-083
11:23:53 7/28/01	1521	304	Position: 45 55.8114' 129 59.0444'.				
11:23:53 7/28/01	1521	304	We have now moved a little. Going to take additional framegrabs but not part of a series that can be mosaiced.				R630-084
11:25:03 7/28/01	1521	304	Zoomed in on shelves and lava drips.				R630-085
11:25:13 7/28/01	1521	304	Examining lava drips on the lava pillar; heading 308.				
11:25:13 7/28/01	1521	304	Zoomed in on pillar shelves and lava drips.				R630-086
11:25:33 7/28/01	1522	304	Zoom in of lava drip.				R630-087
11:25:53 7/28/01	1521	304	Rattail fish with lava pillar in background.				R630-088
11:27:03 7/28/01	1522	216	Another view from the same area of pillar wall with no shelves in the upper few 10s of cm. Must have been a cavity there that seawater had not entered for a little while.				R630-089
11:31:43 7/28/01	1522	312	Fourth lava framegrab series # 4a.				R630-090
11:31:43 7/28/01	1522	312	Now we have changed position and we are looking at the other side of the pillar wall without the shelves on top. But there are shelves on this side all the way to the top.				
11:32:33 7/28/01	1522	312	Fourth lava framegrab series # 4b.				R630-091
11:33:13 7/28/01	1522	312	Zoom in on lava drips.				R630-092
11:34:03 7/28/01	1522	312	Fourth lava framegrab series # 4c; view further left than frames 4a and 4b.				R630-093
11:34:13 7/28/01	1522	312	Taking framegrabs in a series from top to bottom. We are looking at the other side of the structure with the lava drips.				
11:34:13 7/28/01	1522	312	Fourth lava framegrab series # 4d.				R630-094
11:34:43 7/28/01	1522	312	Fourth lava framegrab series # 4e.				R630-095
11:35:13 7/28/01	1522	317	Framegrab series done. Now trying to sample a piece of one of the shelves of the lava pillar.				
11:41:33 7/28/01	1522	298	Piece of lava pillar; heading 312, into the biobox. Now done with lava pillar measurements. (Rumbleometer position: 423713/5086766; 45 55.8136' 129 59.0384')	R630-RK-005	Chadwick		
11:42:35 7/28/01	1520	331	Moving the ship at 1 knot back to Mkr-33. Turning tapes off for transit.				
11:59:35 7/28/01	1518	28	Color video on - but SIT camera off for rest of night.				
12:04:05 7/28/01	1523	157	Arrived Mkr-33 to retrieve plankton net.				
12:07:55 7/28/01	1500	99	Returning to cage for tether management.				
12:08:45 7/28/01	1485	74	Colour video back off during water transit to Mkr 113.				
12:10:37 7/28/01	1456	35	Plankton net out and in transit from Mkr-33 to Mkr-113. Depth is 1446m; approx 80 m from bottom. Speed: 1 knot.				
12:44:09 7/28/01	1434	249	Still transitting to Mrk-113; depth 1434.				
13:16:43 7/28/01	1525	114	Dead tubeworms near Mkr-113				R630-096
13:16:53 7/28/01	1526	130	Dead tubeworms near Mkr-113				R630-097
13:17:03 7/28/01	1526	175	Back to the bottom; near Mkr-113.				
13:30:55 7/28/01	1525	61	Mkr-113				R630-098

Time (UTC)	Z (m)	Hdg	R630 Comments	Samples	Investigator	SubSamples	FrGrab
13:31:37 7/28/01	1525	60	Searching for Mkr-113.				
13:32:25 7/28/01	1525	154	collapse near Mkr-113				R630-099
13:33:47 7/28/01	1527	105	clambed				R630-100
13:33:57 7/28/01	1527	102	Checking out clambed at Mkr-113.				
13:35:27 7/28/01	1526	173	pillar below crust near Mkr-113				R630-101
13:37:17 7/28/01	1523	274	Highlights turned on for previous 2 minutes.				
13:38:37 7/28/01	1524	116	Plankton net is up for duration of Mkr-113.				
13:40:07 7/28/01	1525	31	tube worm bush Mkr-113				R630-102
13:40:27 7/28/01	1526	21	Sighted two Bac traps at Mkr-113.				
13:44:27 7/28/01	1526	349	Bac trap recovery				R630-103
13:45:07 7/28/01	1526	348	Recovering Bac traps				R630-104
13:45:57 7/28/01	1526	348	Putting BT-4 into biobox. (45 55.35960' 129 59.29020'; 5085929/423377)	R630-BT-4-0006	Moyer		
13:47:57 7/28/01	1526	348	Recovering BT-19				R630-105
13:48:37 7/28/01	1526	350	Recovering BT-19; putting it in the biobox. (45 55.35960' 129 59.29020'; 5085929/423377)	R630-BT-19-0007	Moyer		
13:52:07 7/28/01	1526	0	Picking up plankton net and moving to the cage for transit to Caspar, VHS archive turned off for transit.				
13:56:17 7/28/01	1476	44	Coming up to the cage; proceeding at 1.25 knots to Caspar.				
14:33:31 7/28/01	1444	201	Flipping the plankton net up.				
14:34:01 7/28/01	1445	210	Closing the plankton net; depth 1445m; above Caspar/Coquille. (45 55.0422' 129 59.5786'; 422997.3/5085346.0)	R630-net-0008	Metaxas/Tunnicliffe		
14:38:01 7/28/01	1446	211	Plankton net is successfully synched.				
14:40:31 7/28/01	1453	266	Moving to the sea floor.				
14:50:21 7/28/01	1538	122	On the seafloor. Stowing the plankton nest in the purse.				
14:56:53 7/28/01	1538	123	Plankton net is successfully stowed.				
15:00:23 7/28/01	1538	122	Trying to get a good fix to figure out where we are. We are trying to get to Casper.				
15:01:53 7/28/01	1536	101	Heading to the east. Just got an ok fix.				
15:04:23 7/28/01	1538	171	Highlights on. Approaching Casper. Tubeworms here.				
15:05:43 7/28/01	1537	200	Older tubeworms somewhere around Casper				R630-106
15:07:53 7/28/01	1537	80	Vixen				R630-107
15:08:33 7/28/01	1537	24	Casper				R630-108
15:08:33 7/28/01	1537	24	framegrab				R630-109
15:10:13 7/28/01	1537	28	Checking out Casper to find a good place for Amanda to suction.				
15:15:13 7/28/01	1537	20	Before suction sampling into Jar #5				R630-110
15:15:43 7/28/01	1537	20	Highlights off.				
15:16:03 7/28/01	1537	20	Suctioning into jar #5. Start at 15:17. Alien temp file Al630. Suctioning in the Provanna patch - pseudo 'far'. Tave=~0.5 degrees above ambient. Stopped for a while; repositioned sub. Stop 15:26. (422997/5085346; 45 55.0422'/129 59.5786')	R630-SS-J5-0009	Bates/Tunnicliffe		
15:26:05 7/28/01	1537	11	Post-suction shot of suction into Jar#5				R630-111
15:34:05 7/28/01	1538	309	Near SS site- before.				R630-112

Time (UTC)	Z (m)	Hdg	R630 Comments	Samples	Investigator	SubSamples	FrGrab
15:35:25 7/28/01	1537	309	Positioning to suction into Jar#4. The 'in flow' suction for Amanda next to prior sample.				
15:37:05 7/28/01	1538	309	Suction of limpets; Provanna into jar #4. Amanda - look at the video to estimate density. Maxed out at 13 degrees above ambient. Same temp file as R630-10. (422997/5085346; 45 55.0422'/129 59.5786')	R630-SS-J4-0010	Bates		
15:37:15 7/28/01	1537	309	After shot of suction into jar#4				R630-113
15:43:55 7/28/01	1538	334	Casper vent; we think				R630-114
15:44:05 7/28/01	1538	334	We think we are at Casper. We are trying to figure out whether we're at Casper or Vixen.				
15:48:25 7/28/01	1537	341	Ok. Figured out where we are. We are heading to Vixen to take a gas tight and deploy at HOBO.				
15:51:07 7/28/01	1537	344	Grabbing the gas tight wand and moving in to Vixen.				
15:53:27 7/28/01	1537	8	Port side gas tight fired at 15:57. Positioned right in flow at Vixen. (422995/5085336; 45 55.0368' 129 59.5802')	R630-GTB-0011	Evans		
15:53:47 7/28/01	1537	8	Gas tight sampling at Casper				R630-115
15:57:37 7/28/01	1537	5	Stbd gas tight fired at 18:59; right down in the hole. Positioned at Vixen; same vent at R630-11. (422995/5085336; 45 55.0368' 129 59.5802')	R630-GTB-0012	Evans		
15:58:07 7/28/01	1537	6	Starboard gastight in flow at Vixen.				R630-116
15:59:07 7/28/01	1537	359	Vixen is BUBBLING!!! Highlights on.				
15:59:07 7/28/01	1537	359	Bubbles from Vixen				R630-117
15:59:17 7/28/01	1537	357	More bubbles from Vixen				R630-118
16:01:47 7/28/01	1537	320	Highlights off.				
16:03:37 7/28/01	1538	323	Putting the gas tight wand back it's holster.				
16:05:27 7/28/01	1537	324	Preparing to deploy two HOBO's (#152 and #153) at Vixen.				
16:12:57 7/28/01	1537	317	Placing HOBO-152 into high flow hole at Vixen.				
16:16:39 7/28/01	1537	324	HOBO-152 in position				R630-119
16:17:37 7/28/01	1537	325	HOBO-152 is positioned				
16:27:49 7/28/01	1537	325	Highlights on.				
16:28:09 7/28/01	1537	325	Deploying probe (HOBO-153) into Vixen's orifice.				
16:29:59 7/28/01	1537	326	HOBO's 152 and 153 in flow at Vixen				R630-120
16:32:59 7/28/01	1537	328	Redeploying/repositioning HOBO-152.				
16:33:59 7/28/01	1537	326	Highlights off.				
16:34:49 7/28/01	1537	329	HOBO art				R630-121
16:36:59 7/28/01	1537	6	HOBO's 152 and 153 at Vixen				R630-122
16:37:09 7/28/01	1536	9	HOBO's 152 and 153 positioned at Vixen				R630-123
16:39:09 7/28/01	1533	66	Heading to Snail vent through the water column. Ship moving at 1 knot.				
16:47:51 7/28/01	1443	65	Same				R630-124
16:48:01 7/28/01	1443	64	Unknown jelly				R630-125
16:49:11 7/28/01	1445	72	Another flavour of jelly				R630-126
17:37:25 7/28/01	1441	35	Funky jelly				R630-127
18:10:19 7/28/01	1452	47	Going to bottom after ship transit to Snail vent.				
18:12:59 7/28/01	1516	46	ROPOS on bottom somewhere near Snail.				

Time (UTC)	Z (m)	Hdg	R630 Comments	Samples	Investigator	SubSamples	FrGrab
18:14:49 7/28/01	1522	30	ROPOS at Cloud moving to Snail.				
18:19:19 7/28/01	1523	359	ROPOS is at Snail vent - at the depot. We are going to pick up the OSMO that was at Mkr-33.				
18:21:39 7/28/01	1523	352	ROPOS back at depot at Snail (can't find OSMO)...				
18:29:09 7/28/01	1523	292	framegrab				R630-128
18:29:39 7/28/01	1523	295	framegrab				R630-129
18:31:59 7/28/01	1523	61	Message from the Bosun - other side.				R630-130
18:32:29 7/28/01	1523	61	Zoomed in on Bosun's sign.				R630-131
18:37:01 7/28/01	1519	47	Looking around Mkr-33 for OSMO (it was moved from here on dive R622).				
18:37:41 7/28/01	1519	43	Mkr-33 from afar				R630-132
18:39:31 7/28/01	1522	59	Mkr-33 from afar again				R630-133
18:40:21 7/28/01	1523	84	Snail vent				R630-134
18:40:21 7/28/01	1523	85	We are back to Snail. We are not finding it and nobody knows where it is. It was moved slightly from the Mkr-33 vent but then no one has seen it since.				
18:40:31 7/28/01	1523	96	Snail again				R630-135
18:41:31 7/28/01	1523	259	...wondering if it might have been recovered already - 3 have been recovered. Back at Mkr-33. Have looked all around.				
18:43:51 7/28/01	1522	26	Giving up on OSMO. At Mkr-33 - have looked all around. Now driving to Cloud to get the relay transponder. Looking for OSMO as we go.				
18:46:41 7/28/01	1521	348	ROPOS at Cloud looking at RAS. Getting some more frame grabs.				
18:46:41 7/28/01	1521	350	Downward look of RAS				R630-136
18:46:51 7/28/01	1521	334	Far look of RAS				R630-137
18:47:21 7/28/01	1524	328	RAS				R630-138
18:47:31 7/28/01	1524	325	RAS				R630-139
18:47:31 7/28/01	1524	328	RAS closeup				R630-140
18:49:01 7/28/01	1524	312	We are at Cloud; getting ready to grab the relay transponder				
18:56:31 7/28/01	1524	311	Just pulled the relay transponder off the RAS (the transponder that was not turned on)				
19:00:51 7/28/01	1521	343	End of dive - ROPOS headed up to the cage and then up to surface				
20:12:47 7/28/01	2	139	ROPOS on deck at 2010.				

6.13 R631 DIVE LOG

Area: CASM (Imagenex)

R631 SUMMARY: More Imagenex lines were attempted at CASM. We did make it up the wall (positioned at C11). When we got close to the caldera rim we lost navigation, possibly due to a deckset problem. The seas began to rise at the same time, so it was decided to pull up the sub and swap out the CSSF PS8000 with the NOAA PS8000.

Bottom Times: 7/29(JD210) 0324 - 0405

Time (UTC)	Z (m)	Hdg	R631 Comments	Samples	Investigator	SubSamples	FrGrab
02:19:06 7/29/01	28	154	ROPOS was in the water at 02:16.				
03:25:26 7/29/01	1556	358	Imagenex started recording at 03:25.				
03:38:58 7/29/01	1557	1	Starting plankton net at 3:40 while imagenex is being run. Plankton net held in the 7-function arm.				
03:46:18 7/29/01	1557	2	Starting Imagenex at point C11 at 03:47. (well not at point C11 - but will head there)				
03:49:48 7/29/01	1557	3	Just came South to a point and now we're heading North.				
03:55:50 7/29/01	1546	3	Northern caldera wall in sight.				R631-001
04:12:50 7/29/01	1496	183	Just figured out that we haven't been logging. Turning around and doing the line from the north.				
04:15:20 7/29/01	1496	182	SERIAL DRIVER NOT SENDING INFO NOW. Having problems with navigation for ROPOS. ROPOS is stationary while working out problems.				
04:15:20 7/29/01	1496	182	Going to try and drive south and redo the line. Only getting one range to the cage.				
04:15:20 7/29/01	1496	182	Still working on navigation problem.				
04:15:20 7/29/01	1496	182	PS 8000 on cage appears to not be working so we're not going to be getting any acoustic navigation for the rest of the dive 04:54.				
04:15:20 7/29/01	1496	182	ROPOS is going back to the cage, then we're going to move the ship. We won't have any navigation for the rest of the dive.				
04:15:20 7/29/01	1496	182	We're at the cage. Moving ship to Lamphere chimneys.				
04:15:20 7/29/01	1496	182	Discussing plan for rest of dive. Switching to GPS only for navigation.				
04:15:20 7/29/01	1496	182	Ending dive here. Stopping ship and pulling up ROPOS.				
04:15:20 7/29/01	1496	182	Stowing plankton net in purse. Start 0340. End 0418. Made one pass up the wall - 1556 meters to 1495. Start position: (420800/5093470 45 59.4136' 130 1.3591')	R631-net-0001	Tunnicliffe		
04:15:20 7/29/01	1496	182	Plankton net being recovered at 05:18.				
06:22:00 7/29/01	2	38	ROPOS on deck at 6:22.				

6.14 R632 DIVE LOG

Area: ASHES (Virgin, ROPOS, Gollum, Virgin'sDaughter, Medusa, Hell, Phoenix, Inferno, Crack)

R632 SUMMARY: Two larval traps were recovered from Virgin (10 and 11), and two from ROPOS (2 and 3). Four larval traps were capped and left on bottom (1, 2, 9, 12). One larval settling array was placed at each of the following vents: ROPOS, Gollum, Virgin, Virgin's Daughter. Limpets were suctioned for live-collection at ROPOS and Medusa. Other suction samples at Hell and Phoenix. Sulfide samples were taken at Hell, Phoenix and Inferno. Two gastights were taken at Virgin. Two bacteria traps were recovered at Gollum, and two more were deployed. A bacteria trap was also recovered from ROPOS. Two hobos were deployed at Virgin. The H.Paul Johnson flow/temp meter that was deployed in 2000 was recovered near Crack vent, a bit worse for the ware by the time it made it on board.

Bottom Times: 7/31(JD212) 0030 - 0810

Time (UTC)	Z (m)	Hdg	R632 Comments	Samples	Investigator	SubSamples	FrGrab
20:46:58 7/30/01	1	225	No video at the start of the dive; someone is taping highlights.				
21:06:22 7/30/01	1	134	ROPOS in the water				
21:10:26 7/30/01	41	329	ROPOS came out of the cage.				
21:50:40 7/30/01	896	218	Anna's larval trap box is no longer attached to the cage.				
22:27:02 7/30/01	1469	236	We are at 1500m				
22:27:22 7/30/01	1459	245	The rope that the larval trap box used to be attached to looks like it is caught in a dangerous spot on the cage.				
22:28:42 7/30/01	1424	247	We are bringing the cage back up to the surface.				
23:18:26 7/30/01	49	130	The cage is now at the surface and the deck crew will attempt to remove the rope while the cage remains in the water.				
23:25:38 7/30/01	4	85	The rope has been cleared from the cage and it is now heading back down.				
00:30:53 7/31/01	1505	184	ROPOS has reached the bottom.				
00:37:23 7/31/01	1544	178	We have found Annas dropped arrays....wow; is she ever lucky.				
00:37:33 7/31/01	1544	178	Arrays and larval trap box - package dropped from cage.				R632-001
00:37:43 7/31/01	1545	172	Spider crab on package.				R632-002
00:38:53 7/31/01	1545	120	Spider crab on package.				R632-003
00:41:13 7/31/01	1546	115	Crab's smilling face.				R632-004
00:41:33 7/31/01	1546	114	Arm removing crab from package.				R632-005
00:45:45 7/31/01	1543	37	ROPOS has removed one of the arrays from the larval box and now moving it to Virgin.				
00:49:25 7/31/01	1545	322	Virgin mound with surrounding larval traps.				R632-006
00:53:45 7/31/01	1546	11	The array has been put down and ROPOS is capping the larval traps.				
01:02:25 7/31/01	1545	354	capping larval trap-11				R632-007
01:05:35 7/31/01	1545	351	Larval trap-11 has been capped. Deployed R624 (421430/5087174 45 56.0185' 130 00.8090')	R632-LT-11-0001	Metaxas		
01:14:16 7/31/01	1546	62	Larval trap-10 has been capped. Deployed R624 (421430/5087174 45 56.0185' 130 00.8090')	R632-LT-10-0002	Metaxas		
01:15:36 7/31/01	1546	61	Virgin mound				R632-008
01:34:06 7/31/01	1546	246	Larval traps 9 & 12 have been capped and brought to Crack Vent near Johnson meter (eventually). NOT SAMPLES - THEY WILL STAY HERE TILL NEXT YEAR.				
01:44:18 7/31/01	1546	229	Heading to Virgin with a larval array in hand.				
01:46:38 7/31/01	1546	223	Going in to place array at Virgin				R632-009
01:46:38 7/31/01	1546	223	Placing larval array in flow at Virgin				R632-010
01:52:39 7/31/01	1545	300	Placement of array at Virgin				R632-011

Time (UTC)	Z (m)	Hdg	R632 Comments	Samples	Investigator	SubSamples	FrGrab
01:53:19 7/31/01	1546	16	Array-M at Virgin				R632-012
01:53:39 7/31/01	1546	28	Placed array-M in flow at Virgin				
02:08:20 7/31/01	1546	342	Array-N being placed at Virgin's Daughter.				R632-013
02:08:30 7/31/01	1546	340	Deployed array-N at Virgin's daughter.				
02:09:40 7/31/01	1546	341	Perfect placement of Array-N at Virgin's Daughter.		Metaxas/Tunnicliffe		R632-014
02:10:50 7/31/01	1546	300	Octopus				R632-015
02:11:20 7/31/01	1546	286	Octopus - zoom view.				R632-016
02:11:50 7/31/01	1547	286	Octopus eye.				R632-017
02:12:40 7/31/01	1546	286	Octopus siphon.				R632-018
02:19:00 7/31/01	1546	254	HOBO probes have been removed out of biobox for later placement in Virgin vent.				
02:20:10 7/31/01	1546	254	Now taking larval traps 10 & 11 to the other cadillac.				
02:31:20 7/31/01	1546	223	Larval trap-10 has been placed into the larval cage.				
02:43:02 7/31/01	1548	272	Larval trap-2 has been capped at 0239. Approaching larval trap-3.				
02:48:02 7/31/01	1548	279	LT-3 has been capped at ROPOS vent. Will come to the surface. Deployed R624. (421386/5087134 45 5.997' 130 0.843')	R632-LT3-0003	Metaxas		
02:50:42 7/31/01	1547	170	Taking LTs #2 and #3 back to larval cage containing LTs #10 and #11.				
03:00:04 7/31/01	1547	99	The box that is coming up is between ROPOS and CRACK vent.				
03:00:14 7/31/01	1547	99	closing lid with 4 larval traps inside.				R632-019
03:03:24 7/31/01	1547	223	Rattail fish near larval arrays and box.				R632-020
03:06:34 7/31/01	1547	220	The array is poised..				R632-021
03:13:14 7/31/01	1546	359	Taking Larval Array-I to ROPOS vent.				
03:20:14 7/31/01	1547	229	Capping larval trap-1 at ROPOS.				R632-022
03:28:14 7/31/01	1547	260	LT-4 has been capped from ROPOS vent. Deployed on R624 (421386/5087134 45 5.997' 130 0.843')	R632-LT-4-0004	Metaxas		
03:28:54 7/31/01	1546	177	Taking LTs #4 and #1 back to larval box.				
03:35:16 7/31/01	1548	192	We're about to position larval array-I on ROPOS vent.				
03:36:16 7/31/01	1548	168	ROPOS vent				R632-023
03:36:56 7/31/01	1547	202	picture of other larval settling array (LSA) at ROPOS vent				R632-024
03:38:16 7/31/01	1547	200	LSA-I at ROPOS vent.				R632-025
03:38:36 7/31/01	1547	199	LSAs I and L at ROPOS vent.				R632-026
03:38:36 7/31/01	1547	199	LSAs at ROPOS vent.				R632-027
03:39:06 7/31/01	1547	199	Settlement already occurring on larval array-L				R632-028
03:39:56 7/31/01	1546	179	2 LSA's at ROPOS vent.				R632-029
03:43:16 7/31/01	1547	230	Amanda's SS site before suctioning at ROPOS vent.				R632-030
03:44:26 7/31/01	1547	230	SS into Jar#2 for fauna (limpets for live sample) beginning at 03:45. Stopping at 03:45. Finished at 03:48. (421386/5087134 45 5.997' 130 0.843')	R632-SS-J2-0005	Bates		
03:47:56 7/31/01	1547	228	Amanda's SS site post suctioning.				R632-031
03:49:06 7/31/01	1546	227	Both larval arrays at ROPOS.				R632-032
03:49:16 7/31/01	1546	225	Larvae settled on array?				R632-033
03:51:06 7/31/01	1544	126	Going to put 4 larval traps (9;12;1;4) back into cadillac and will stay on bottom. They are positioned near the flow meter at Crack.				

Time (UTC)	Z (m)	Hdg	R632 Comments	Samples	Investigator	SubSamples	FrGrab
03:59:38 7/31/01	1547	132	All 4 larval traps are placed into cadillac.				
04:02:08 7/31/01	1547	28	Taking LSA-J to Gollum vent.				
04:04:48 7/31/01	1545	76	large fish in the distance.				R632-034
04:05:38 7/31/01	1547	302	Bactraps, MTRs, Gollum, oh my!				R632-035
04:07:18 7/31/01	1546	284	LSA at Gollum				R632-036
04:07:28 7/31/01	1546	286	LSA at Gollum				R632-037
04:07:38 7/31/01	1546	279	LSA at GOLLUM				R632-038
04:07:48 7/31/01	1546	281	LSA-J at Gollum				R632-039
04:11:18 7/31/01	1544	336	Perspective shot of Gollum				R632-040
04:11:38 7/31/01	1546	305	Equipment at Gollum				R632-041
04:11:58 7/31/01	1547	301	MTR at Gollum				R632-042
04:15:38 7/31/01	1547	293	BT-63 being deployed at Gollum.				
04:15:58 7/31/01	1547	294	BT-63 being placed on top of MTR-3041.				
04:19:08 7/31/01	1547	292	BT-64 being placed on top of MTR-3334.				
04:19:38 7/31/01	1547	292	Bactraps 63 & 64 placed at GOLLUM.				R632-043
04:21:28 7/31/01	1543	294	Going straight to Hell vent for SS and looking at a piece of flange.				
04:24:48 7/31/01	1544	251	Hell				R632-044
04:32:00 7/31/01	1545	180	Doing worm observations at Hell vent.				
04:35:30 7/31/01	1546	168	Worms on flange at Hell - site of previous observations.				R632-045
04:46:30 7/31/01	1545	169	Venting at Hell				R632-046
04:56:22 7/31/01	1546	189	Preparing to suction sample sulfide worms - near base of Hell.				R632-047
04:57:52 7/31/01	1546	190	Doing temperature measurements at Hell vent with probe on 5-function arm.				
04:59:52 7/31/01	1546	189	Suction sampling - J1.				R632-048
05:00:22 7/31/01	1546	189	Started SS Jar#1 for sulfide worms at 05:00. Stopped suctioning at 05:03. (5087135/421372 45 55.998' 130 0.854')	R632-SS-J1-0006	Juniper		
05:04:42 7/31/01	1546	189	Starting SS Jar#7 for sulfide worms at same site at 05:05. Finished at 05:07. (5087135/421372 45 55.998' 130 0.854')	R632-SS-J7-0007	Juniper		
05:07:22 7/31/01	1546	189	Looking for a site to collect a SF.				
05:09:32 7/31/01	1545	186	Hell				R632-049
05:09:42 7/31/01	1545	169	Hell				R632-050
05:10:22 7/31/01	1545	155	Hell				R632-051
05:12:52 7/31/01	1544	163	Top of Hell, which is about 3 meters in height.				R632-052
05:13:52 7/31/01	1544	200	Hell				R632-053
05:14:22 7/31/01	1546	218	Hell				R632-054
05:14:32 7/31/01	1546	217	Hell				R632-055
05:14:42 7/31/01	1544	235	Hell				R632-056
05:15:02 7/31/01	1544	241	Hell				R632-057
05:15:52 7/31/01	1544	354	Hell				R632-058
05:20:44 7/31/01	1546	197	Just before sampling sulfide at Hell.				R632-059
05:22:44 7/31/01	1545	185	Looking for sulfide sample at Hell.				R632-060
05:24:04 7/31/01	1546	188	Sampling sulfide at Hell.				R632-061

Time (UTC)	Z (m)	Hdg	R632 Comments	Samples	Investigator	SubSamples	FrGrab
05:24:14 7/31/01	1545	188	Collected sulfide sample in biobox from Hell vent. (5087135/421372 45 55.998' 130 0.854')	R632-SF-0008	Juniper		
05:24:14 7/31/01	1545	186	Sampling sulfide at Hell.				R632-062
05:26:24 7/31/01	1544	169	Going to Phoenix vent for additional worm and sulfide sampling.				
05:27:44 7/31/01	1546	142	Phoenix				R632-063
05:28:44 7/31/01	1548	121	Phoenix				R632-064
05:33:14 7/31/01	1548	129	SS for sulfide worms and fauna into Jar #6 starting at 05:33. Stopped at 05:36. (5087130/421391 45 55.995' 130 0.839')	R632-SS-J6-0009	Juniper		
05:33:34 7/31/01	1548	127	Suction sampling J6 at Phoenix.				R632-065
05:43:14 7/31/01	1548	125	worm pic at Phoenix.				R632-066
05:43:44 7/31/01	1547	152	Phoenix				R632-067
05:43:54 7/31/01	1547	157	Phoenix				R632-068
05:43:54 7/31/01	1546	158	Phoenix				R632-069
05:45:54 7/31/01	1548	128	a lone bag creature.				R632-070
05:52:36 7/31/01	1547	126	Collecting sulfide sample into biobox from Phoenix vent. (5087130/421391 45 55.995' 130 0.839')	R632-SF-0010	Juniper		
05:57:26 7/31/01	1546	51	a very old marker at Phoenix vent.				R632-071
05:58:16 7/31/01	1544	117	highlights on.				
05:59:46 7/31/01	1545	150	Moved to Inferno and looking for sulfide worms.				
06:01:26 7/31/01	1545	150	slurp sample area; pre-slurp				R632-072
06:02:36 7/31/01	1545	148	beautiful area on Inferno Vent. Area of slurp (before slurp. Taking the chimney on left.				R632-073
06:04:06 7/31/01	1545	147	SS started at 05:03 of sulfide chimney at Inferno. (5087162/421397 45 56.013' 130 0.834)	R632-SS-J5-0011	Juniper		
06:04:36 7/31/01	1545	147	Section of sulfide attached to suction sampler.				R632-074
06:04:46 7/31/01	1545	147	Section of sulfide that was broken off and placed into biobox.				R632-075
06:06:26 7/31/01	1539	135	Part of SS was a large section of SF chimney that glommed on to the side of SSampler. SF was placed into Biobox.	R632-SF-0012	Juniper		
06:08:06 7/31/01	1540	110	Collecting sample of limpets for Amanda at Inferno.				
06:10:56 7/31/01	1548	146	Old UVic biobox probably NE of ROPOS.				R632-076
06:12:26 7/31/01	1548	146	Limpets to be SS in #4,				R632-077
06:12:56 7/31/01	1548	145	Limpet SS in Jar#4, likely near Medusa (but no NAV). We can see the larval trap box in the distance at a heading of 140. The larval trap box is between Crack and ROPOS. The UVIC biobox is still at this site. (45 56.001/130 0.836 ; 5087141/421395)	R632-SS-J4-0013	Bates		
06:17:28 7/31/01	1548	134	Framegrab during mid SS for Amanda.				R632-078
06:22:28 7/31/01	1544	72	Back at Inferno to look for SF.				
06:26:58 7/31/01	1544	148	worms; sulfide chimney at Inferno.				R632-079
06:28:28 7/31/01	1545	148	Collecting Sulfide with SS#3. (5087162/421397 45 56.013' 130 0.834')	R632-SS-J3-0014	Juniper		
06:29:38 7/31/01	1545	147	Sample site with SS#3.				R632-080
06:33:18 7/31/01	1545	149	Possible flasher at Inferno				R632-081
06:34:18 7/31/01	1545	149	We're off to Gollum to collect some bac traps.				
06:43:00 7/31/01	1545	102	Arrived at Gollum				R632-082
06:43:50 7/31/01	1546	114	BT 33 & 50 to be collected at Gollum				R632-083
06:45:50 7/31/01	1546	116	BT being put into biobox.				R632-084

Time (UTC)	Z (m)	Hdg	R632 Comments	Samples	Investigator	SubSamples	FrGrab
06:46:00 7/31/01	1546	117	Bacteria Trap #50 being put into biobox. (5087166/421422 45 56.015' 130 0.815')	R632-BT-50-0015	Moyer		
06:47:50 7/31/01	1546	111	BT33 being placed into biobox from Gollum				R632-085
06:48:20 7/31/01	1546	111	Bacteria Trap #33 being collected from Gollum. (5087166/421422 45 56.015' 130 0.815')	R632-BT-33-0016	Moyer		
06:50:30 7/31/01	1546	111	New BTs at Gollum				R632-086
06:50:40 7/31/01	1546	111	site of BTs that were recovered.				R632-087
06:51:40 7/31/01	1546	120	repositioning BT-64.				
06:53:10 7/31/01	1546	119	Repositioned BT-64 at Gollum.				R632-088
06:53:40 7/31/01	1545	78	Going to Virgin to deploy 2 HOBOS.				
06:57:40 7/31/01	1546	342	Worm in background near Virgin.				R632-089
06:58:30 7/31/01	1546	343	Port gastight fired at Virgin. (5087174/421430 45 56.019' 130 0.809')	R632-GT-0017	Evans	Butterfield/Evans	
07:01:00 7/31/01	1546	40	Starboard gastight fired at Virgin. (5087174/421430 45 56.019' 130 0.809')	R632-GT-0018	Evans	Butterfield/Evans	
07:01:40 7/31/01	1546	41	We are now positioning to deploy HOBOs at Virgin.				
07:04:20 7/31/01	1546	4	Deploying HOBO-126 at Virgin at 0709.				
07:08:30 7/31/01	1546	272	Hobo deployment at Virgin				R632-090
07:09:40 7/31/01	1546	13	Deploying HOBO-130 at Virgin at 0716. It is in the same place as HOBO-126.				
07:15:52 7/31/01	1546	301	temperature recording at Virgin				R632-091
07:17:42 7/31/01	1546	301	We are now going to ROPOS vent.				
07:21:42 7/31/01	1546	276	We are looking for ROPOS and the bacterial traps there.				
07:25:42 7/31/01	1547	157	We can see the bacterial traps at ROPOS vent.				
07:27:22 7/31/01	1547	121	BT-49 recovery				R632-092
07:27:32 7/31/01	1547	120	We are recovering bacterial trap #49 into starboard side of biobox from ROPOS vent. It is crusty and covered with limpets. (5087134/421386 45 55.997' 130 0.843')	R632-BT-49-0019	Moyer		
07:30:32 7/31/01	1546	81	We are now going to Crack vent to deal with the Johnson flow meter.				
07:34:32 7/31/01	1545	201	We have the cement box at Crack in view.				
07:37:22 7/31/01	1546	200	We are looking at the Johnson flow meter to figure out what to do with it.				
07:38:02 7/31/01	1546	201	Johnson flow meter				R632-093
07:38:42 7/31/01	1546	201	We are taking the Johnson flow meter over to the larval trap box.				
07:40:32 7/31/01	1546	264	We are examining the Johnson flow meter next to the larval trap box.				
07:42:24 7/31/01	1546	266	Flow meter				R632-094
07:44:24 7/31/01	1547	264	We have ripped apart the Johnson flow meter. Recovering the flow meter for Paul Johnson. (5087135/421424; 45 55.998' 130 0.813')	R632-0020	H Paul Johnson		
07:44:44 7/31/01	1547	263	taken apart flow meter				R632-095
07:50:14 7/31/01	1546	267	We are still fiddling with the flow meter.				
07:56:04 7/31/01	1546	266	We are picking up the Johnson flow meter.				
07:58:54 7/31/01	1546	111	We are now picking up the larval trap box.				
08:03:04 7/31/01	1540	115	We have the larval trap box and the Johnson flow meter in our arms.				
08:06:54 7/31/01	1546	117	We are readjusting the stuff in our arms.				

Time (UTC)	Z (m)	Hdg	R632 Comments	Samples	Investigator	SubSamples	FrGrab
08:09:44 7/31/01	1546	114	We are done readjusting the larval trap box and Johnson flow meter.				
08:10:56 7/31/01	1546	205	We are now leaving the bottom and going back to the cage.				