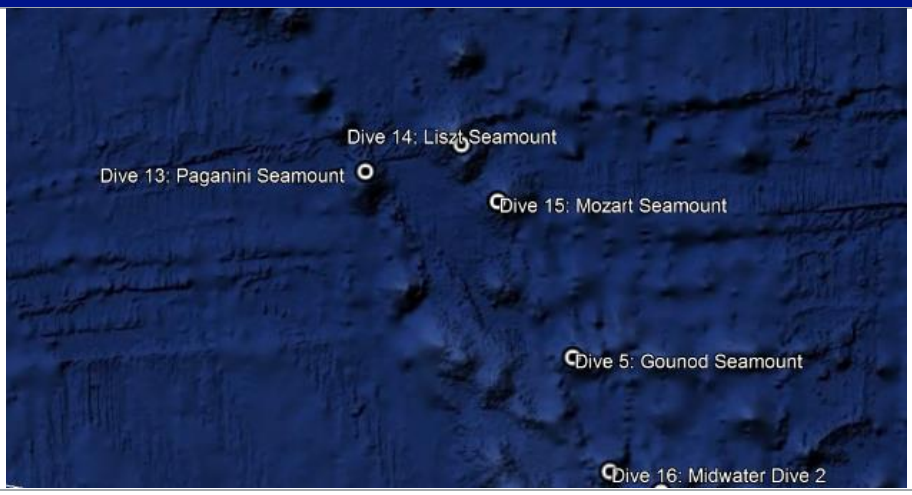
Ocean Exploration and Research

Okeanos Explorer ROV Dive Summary

Dive Information			
General Location			
General Area Descriptor	Musicians Seamounts		
Site Name	Paganini Seamount		
Science Team Leads	John R. Smith/Meagan Putts		
Expedition Coordinator	Kasey Cantwell		
ROV Dive Supervisor	Karl McLetchie		
Mapping Lead	Mike White		
ROV Dive Name			
Cruise	EX1708		
Leg	-		
Dive Number	DIVE13		
Equipment Deployed			
ROV	Deep Discoverer		
Camera Platform	Seirios		
ROV Measurements	☒ CTD	☒ Depth	☒ Altitude
	☒ Scanning Sonar	☒ USBL Position	☒ Heading
	☒ Pitch	☒ Roll	☒ HD Camera 1

	☒ HD Camera 2	☒ Low Res Cam 1	☒ Low Res Cam 2
	☒ Low Res Cam 3	☒ Low Res Cam 4	☒ Low Res Cam 5
Equipment Malfunctions			
ROV Dive Summary (from processed ROV data)	Dive Summary: EX1708_DIVE13 ^^^ In Water: 2017-09-19T18:47:04.510000 28°, 40.776' N ; 162°, 36.829' W Out Water: 2017-09-20T04:22:51.556000 28°, 40.937' N ; 162°, 36.497' W Off Bottom: 2017-09-20T01:47:00.533000 28°, 40.920' N ; 162°, 36.529' W On Bottom: 2017-09-19T20:05:43.979000 28°, 40.709' N ; 162°, 36.585' W Dive duration: 9:35:47 Bottom Time: 5:41:16 Max. depth: 1812.2 m		
Special Notes			

Scientists Involved (please provide name, location, affiliation, email)

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Purpose of the Dive	The primary objective for this dive was to characterize the distribution and abundance of benthic fauna. A comparison of the diversity and distribution of coral and sponge communities across the seamounts to the north and to the Hawaiian Ridge and the broader North Pacific is of particular importance to understanding biogeography and connectivity of communities in the Pacific. The dive satisfies the CAPSTONE science theme to "Identify and map vulnerable marine habitats – particularly high-density deep-sea coral and sponge communities."
Description of the Dive	**Benthic Exploration** The dive plan was to ascend from the middle of a rift zone ridge to the Paganini Seamount summit peak. The ROV Deep Discoverer (D2) arrived on bottom at 1812 m in field of jagged and angular talus surrounding a massive, almost columnar outcrop. This outcrop originated either from an intrusive complex such as a sill or large dike, or extrusively as the core of a very thick lava flow, cooling slowly and developing cleavage planes. A small, blocky (square-ish) brick size rock was collected from the base of this outcrop. The outcrop was also covered with many large coral colonies including *Hemicorallium* sp., *Stauropathes* sp., *Rhodaniridogorgia* sp., unbranched bamboo corals, and *Walteria* sp. glass sponges. A chute filled with angular talus (slope ~30°) was observed at 1805 m with massive outcrops/walls to either side. A nearly vertical wall of massive outcrop was traversed at 1797 m after which a transition to talus and sediment covered slope with rounded pillows occurred at 1792 m. Reversion to a massive wall and blocky talus was observed at 1790 m. D2 came

across an isolated large block with a variety of large octocorals including *Paracalyptrophora* sp., *Narella* sp., *Chrysogorgia* sp. and some glass sponges. Notation was made that the corals were lining the edges with none on top nor in the middle, presumably because the colonies ringing the edge were usurping the food flowing around the block. A flow edge of ~one-meter-thick with small Chrysogorgid corals covering it was observed at 1779 m. Talus, along with blocks and slabs, was evident on top of the flow. A mix of intact flows, fractures, talus, slabs, blocks, and sediment were observed from 1780 m to 1764 m. An *Antipathes* sp. black coral growing on a large vase sponge was collected at 1764 m. At the same depth, a large constructional pinnacle presenting various lava morphologies, and hosting large primnoid corals, was observed. An *Acanthogorgia sp.* was collected at 1766 m. Massive outcrops, walls, and some pinnacles or pillow cones continued upslope to 1771 m, often hosting large corals. A transition to a more rubble covered slope of angle 10° to 15° with some low relief flow outcrops occurred at 1769 m. Numerous smaller corals were present, although no or few large ones were apparent. The pilots reported a strong 0.5 knot current from the NE. A second rock was collected from a pillow outcrop, this one being larger and much rounder than the first rock sample. Mostly talus was observed on the ~flat ridge top with some pillowed flow outcrops at 1772 m. Transition to large outcrops, boulders, and talus took place at 1766 m. Overall, this was a low, broadly sloping area. A large *Poliopogon* sp. sponge ~one meter across was imaged at this same depth. An *Iridogorgia* sp. coral was collected because of the associated pelagic jellies attached to several of its branches. D2 left bottom from this depth and location at time 01:45. In summary, the dominant coral family observed on Paganini Seamount summit area was the Chrysogogiidae, although there were numerous large colonies of *Hemicorallium* sp. pink coral, huge *Paracalyptrophora* sp. coral, massive *Poliopogon* sp. glass sponges. We collected two rock samples, and *Antipathes* sp. black coral growing on a glass sponge that might be new and a colony of *Acanthogorgia* sp. Some *Aeginona* sp. jelly fish feeding on the *Iridogorgia* coral were collected, and one actually made it into the lab for splitting and preservation.

Mid-water Exploration

The midwater portion of the dive began following completion of the benthic exploration. For this dive, transects took place at 800, 700, 500, and 300 m. Three vertical transects of the water column were made during the dive. The first was a steady oblique descent with optimal lighting conditions met from around 344m depth to 1000m, the second was a series of horizontal transects of 10 minutes duration each at depths of 300, 400, 500, 600, 700 and 800m, and the third descent with horizontal transects of 13 minutes each at 550, 650, 750, 850 and 900m depth.

The most frequently encountered members of the mesopelagic fauna at this site, after perhaps the many Cyclothone fishes and chaetognath arrow worms, were the two-tentacled Narcomedusa Solmundella bitentaculata (600-950m) and doliolid nurse colonies (550-900m). The many-tentacled narcomedusa Solmissus (300-800m) occurred predominantly in the 600-650m layer. An undescribed narcomedusa of the genus Bathykorus and with 4 tentacles (600-850m) was observed mostly in the 700-800m layer, while the 8-tentacled Aeginura grimaldii was observed only between 845-900m, suggesting these jelly-eating predators divide up the water column by depth but that most of their prey is distributed in the lower mesopelagic zone where the highest abundances of doliolids occurred as well as many other gelatinous species.

Members of the trachymedusae family Halicreatidae were found throughout the water column (400-990m) with Halicreas minimum at 600, 842, 900 and 990m

depths. The animal at 900m had a hyperiid amphipod attached to the rim of its bell and had eaten several of its tentacles. The rhopalonematid trachymedusa genus Arctapodema (525-900m) was quite abundant, particularly between 650-900m depth, with at least two colour morphs observed. Other rhopalonematid trachymedusae that were observed included Colobonema sericeum (600-682m), Pantachogon haeckelli (650-1000m), Crossota rufobrunnea (650-1000m) and what seemed to be an undescribed genus observed at 900m depth.

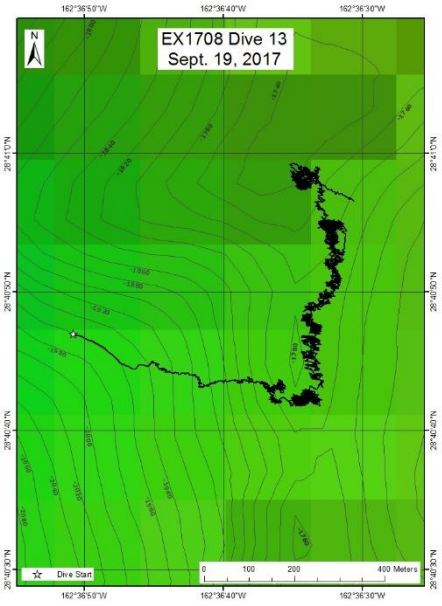
Scyphomedusae that were observed included Atolla spp. (686-850m), Periphylla periphylla (885 & 988m) and Poralia rufescens (881m).

Very high diversity and biomass of siphonophores was apparent with positive IDs made of Desmophyes annectens (301m), Forskalia asymmetrica (672m), Frillagalma vityazi (700m), Chuniphyes multidentata (625m)

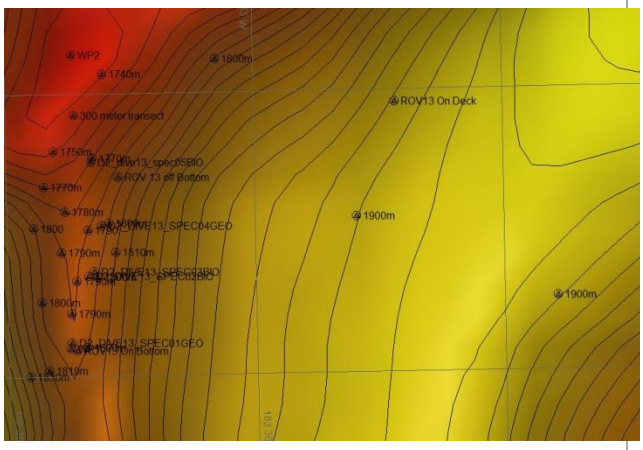
Cephalopod highlights included Helicocranchia at 700m depth and Thysanoteuthis at 510m depth. Fish highlights were Alepiosaurus ferox at 900m depth, some very clear imagery of a myctophid fish (?Myctophum) at 500m depth, what was possibly Stylephorus chordatus also filmed at 500m depth, and a huge leptocephalus eel larva also at 500m depth. Several good shots of the resident Cyclothone species were also obtained.

A spiny crustacean larva/postlarva was observed at 550m depth holding a phaeodarian protist in its claws.

Overall Map of the ROV Dive Area



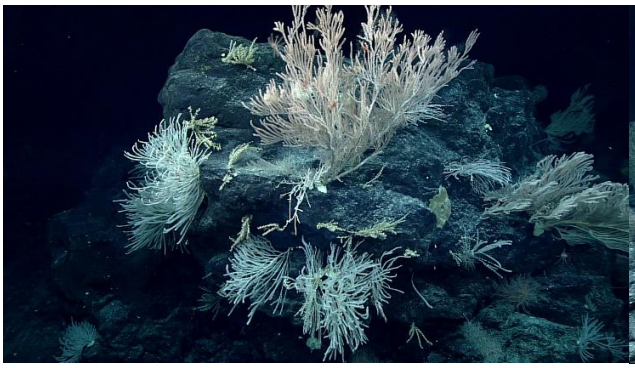
Close-up Map of Main Dive Site



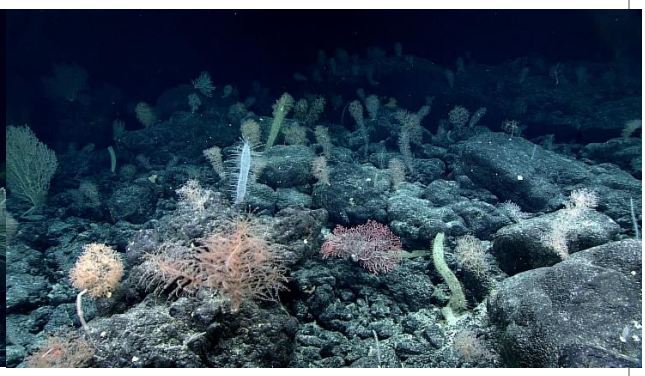
Representative Photos of the Dive

Iridigorgia sp., likely a new species currently being described

Dual headed “turbocharger” glass sponge (Family Farreidae) on a rock outcrop



Dense assemblage of *Narella* sp. and *Paracalyptrophora* sp. primnoid coral colonies on a large boulder



Dense and diverse octocoral with some glass sponges on upper slope near summit

Samples Collected

Sample

Sample ID	EX1708_D2_DIVE13_SPEC01GEO
Date (UTC)	9/19/2017
Time (UTC)	20:31
Depth (m)	1812.7
Temperature (°C)	2.2
Field ID(s)	Mn-crusted blocky basalt from base of massive outcrop
Commensal ID and Field Identification	EX1708_D2_DIVE13_SPEC01GEO_A01 Egg sac?
Comments	

Sample		
Sample ID	EX1708_D2_DIVE13_SPEC02BIO	
Date (UTC)	9/19/2017	
Time (UTC)	22:54	
Depth (m)	1764.9	
Temperature (°C)	2.2	
Field ID(s)	*Antipathes* sp.	
Commensal ID and Field Identification	EX1708_D2_DIVE13_SPEC02BIO_A01 Hexactinellida	
Comments		

Sample		
Sample ID	EX1708_D2_DIVE13_SPEC03BIO	
Date (UTC)	9/19/2017	
Time (UTC)	23:09	
Depth (m)	1766.3	
Temperature (°C)	2.2	
Field ID(s)	*Acanthogorgia* sp.	
Commensal ID and Field Identification	EX1708_D2_DIVE13_SPEC03BIO_A01 Crinoid	
	EX1708_D2_DIVE13_SPEC03BIO_A02 Polychaeta	
	EX1708_D2_DIVE13_SPEC03BIO_A03 Polychaeta	
	EX1708_D2_DIVE13_SPEC03BIO_A04 Amphipod	
	EX1708_D2_DIVE13_SPEC03BIO_A05 Aplacophora	
Comments	Iridogorgia w/ *Aeginona* sp. was placed in same biobox on top of *Acanthogorgia*; cannot be sure which associates came from each.	

Sample		
Sample ID	EX1708_D2_DIVE13_SPEC04GEO	
Date (UTC)	9/20/2017	
Time (UTC)	00:09	
Depth (m)	1769.3	
Temperature (°C)	2.1	
Field ID(s)	"Darth Vader" shaped Mn-crusted rounded basalt from base of pillow outcrop	
Commensal ID and Field Identification		

Comments	

Sample		
Sample ID	EX1708_D2_DIVE13_SPEC05BIO	
Date (UTC)	9/20/2017	
Time (UTC)	01:43	
Depth (m)	1762.1	
Temperature (°C)	2.0	
Field ID(s)	*Aeginona* sp.	
Commensal ID and Field Identification	EX1708_D2_DIVE13_SPEC05BIO_A01 *Iridogorgia magnispiralis*	
Comments		

Please direct inquiries to:

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