

## Okeanos Explorer ROV Dive Summary

Dive Information	
General Location	
General Area Descriptor	Musicians Seamounts
Site Name	Shostakovich 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	DIVE10
Equipment Deployed	
ROV	Deep Discoverer



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Purpose of the Dive	<p>One purpose of Dive 10 was to explore the summit of a volcanic elongate ridge known as Shostakovich Seamount, providing clues as to the origin of the lineament and surrounding seamounts. Thus, it satisfies the CAPSTONE theme to “investigate the geologic history of Pacific seamounts.” Secondly, this dive endeavored to contribute to the knowledge of biogeographic patterns of benthic fauna throughout the Musicians Seamounts. A comparison of the diversity and distribution of biological communities (namely, corals and sponges) across the seamounts and to the Hawaiian Ridge and the broader North Pacific will help describe the biogeography and connectivity of communities in the Pacific. This dive satisfies the CAPSTONE science theme to "Identify and map vulnerable marine habitats – particularly high-density deep-sea coral and sponge communities." The third objective of this dive was to explore and characterize the water column, the largest and least known biome on the planet.</p>		
Description of the Dive	<p><b>Benthic Dive:</b></p> <p>This dive was carried out at our northernmost site, Shostakovich Seamount, approximately 800 nm from Oahu. The feature was another volcanic elongate ridge, and the dive plan was to climb the upper slope of the summit ridge and then transect along it. ROV Deep Discoverer (D2) landed on a flat bottom at 2853 m in the saddle between an ancillary volcanic cone and the base of a summit volcanic ridge. Amazingly little sediment was evident on the rounded pillow talus with no apparent intact lava flow outcrops in view. Some large isolated corals were observed, along with sponges, eels, and a slime star. Contact with the base of the summit ridge at 2863 m became apparent when the slope increased and more rounded talus of variable sizes was observed. After contact with a ~2-meter-thick intact flow (estimated at a broken edge) at 2858 m, a mix of talus, small rubble, and intact low relief flows with low sediment cover were observed on a 25-30° slope at 2856 m. This alternating pattern continued upslope to 2812 m where more consistent and extensive pillow/lobate flows and more sediment cover were observed at 2812 m. A small, slab-like rock was collected from the front of a sheet flow at 2806 m, although it was not obviously in place. The first biological specimen,</p>		



a segment of one of the large *Eknomisis* sp. bamboo coral colonies that were characteristic of the area, was collected at 2781 m. Moderate relief with intact and undulating pillow/lobate flows with some talus and sediment were observed at 2276 m. A bamboo coral with a full-on house party of associates including a sea spider actively feeding on an anemone, was encountered at time stamp 22:37 and 2769 m. The slope steepened to 35-40° at 2744 m with many corals and sponges observed. A shrimp with an unknown and unusual parasite was encountered time stamp 23:11 and 2742 m. Corbitellinae glass sponge and *Chrysogorgia* sp. coral collections took place shortly after, from depths of 2742 m and 2737 m, respectively. Upon arriving the summit edge at 2725 m near the dogleg at waypoint 2, dense corals and sponges along with a mix of lava morphologies including talus, indeterminate flow types, sediment, slabs, and lobes with fractures were observed on a moderate slope of 25-30°. Here, a dense community of huge bamboo coral (some as wide and tall as D2) were observed. A piece of large angular talus was collected near a pillow flow, although not in place. More pronounced lava flows, lobes and pillows along with some talus/rubble and sediment between were observed at 2695 m. A codling, *Antimora* sp. fish in the family Moridae, was observed at time stamp 00:08 and 2697 m. Large massive, isolated outcrops/blocks and intact flow units along with a high density of corals and sponges were observed at 2700 m. A final push was made to achieve the northwestern high where extensive and intact smooth flows with fractures and sediment between were observed, along with some large slabs, just prior to leaving bottom at ~2700 m.

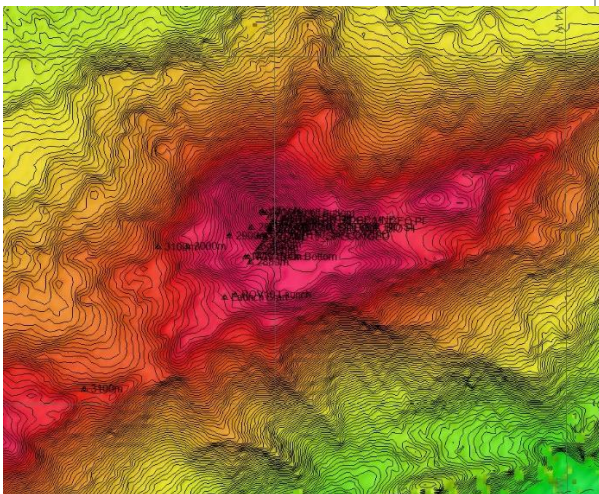
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**Mid-water Dive:**

A series of midwater transects at 800, 700, 600, 500, 400, and 300 m water depth were carried out at the completion of the benthic portion of the dive. During the mid-water dive, Organisms that were observed at depths deeper than the first transect at 800m included the narcomedusae *Aeginura grimaldii*, *Solmundella bitentaculata*, *Solmissus incisa* (purple morph), and a 4-tentacled narcomedusae. The coronate scyphomedusa *Atolla* was also observed in addition to the rhopalonematid trachymedusa *Crossota rufobrunnea*. At least one lobate ctenophore (with no auricles?), the hyperiid amphipod *Cystisoma* and several protists (incl. *Coelodendrid* phaeodarians) were also present. During the 800m transect a large, black? Ophidiiformes fish was observed in addition to another *Atolla* that had an associated amphipod on its bell, a tomopterid polychaete worm and a calycophoran siphonophore with a bright orange somatocyst belonging to the genus *Lensia*. Good footage of the ulmarid scyphomedusa *Poralia rufescens* was also captured. Between 800m and 700m large numbers of *Solmundella bitentaculata* were apparent, in addition to several tuscaroid radiolarian protists, *Aeginura grimaldii*, *Crossota rufobrunnea*, a hatchetfish, the hyperiid amphipod *Scina borealis*, a cydippid ctenophore and what seemed to be a gymnosome mollusc, related to *Clione*. At the beginning of the 700m transect we encountered a very strange looking lobate ctenophore (an undescribed species of *Lampocteis*?), with several halicreatid trachymedusae, a shrimp of the genus *Lucifer*, and *Scina borealis* also being observed. On the way to 600m the biomass and diversity was very high with many chaetognaths and the gonostomiid fish *Cyclothone* extremely abundant. Organisms observed in this layer included *Scina borealis*, tuscaroid radiolarians and a *coelodendrid* phaeodarian, halicreatid trachymedusae (incl. *Halicreas minimum*), polychaete worms such as *Tomopteris* and *Peobius*, lobate ctenophores (incl. several *Bathocyroe*), several narcomedusan species and doliolid "nurse" colonies. During the 600m transect several more doliolid "nurse" colonies were observed as well as narcomedusae that may prey on them (eg. *Solmissus* and *Solmundella*.) *Physonect* and praid siphonophores, the halicreatid trachymedusa *Halitrephes*

maasi and the rhopalonematid trachymedusa *Colobonema* were some of the other gelatinous predators present. Two coelodendrid phaeodarians were also observed, still attached to each other presumably after reproduction. On the way to 500m depth several white horned cydippid ctenophores, a prayid siphonophore and the lobate ctenophore *Bathocyroe* were sighted, as well as the hyperiid amphipod *Phronima sedentaria*, which makes its home in a barrel it fashions from the tunic of a pelagic tunicate. Some pretty neat footage of the bristlemouth fish *Cyclothone* was also filmed. Beginning at 500m depth it seemed that planktonic biomass decreased, though our speed through the water was suboptimal at this depth so the transect was not directly comparable with those below it. This layer contained *Cyclothone* with a calycophoran siphonophore and a solitary salp zoid belonging to the genus *Salpa* also being observed. On the way to 400m depth several sergestid shrimp, some rhopalonematid hydromedusae and several radiolarians were sighted. During the 400m transect biomass was again low. Some good behavioural sequences of sergestid shrimp in vertical, heads up orientation and some Nematobranchion-type krill swimming in spirals were filmed. Radiolarians, hydromedusae, diphyomorph and prayomorph calycophorans, and lobate ctenophores also inhabited this layer. The only largish organisms observed in the 300m layer were a couple of krill, chaetognaths and protists, with both biomass and diversity remaining very low. It was hypothesized that the abundant community of organisms observed below 500m depth may have been horizontally transported in water subducted from the more highly productive region to the north. A very high abundance of larvacean houses was observed in the pycnocline at around 100m depth and it seemed like the supply of food to the upper mesopelagic in the form of large sinking particles may have been limited due to entrapment within the pycnocline.

Overall Map of the ROV Dive Area

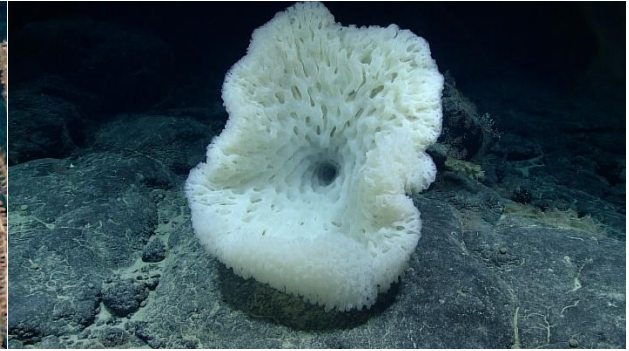


Close-up Map of Main Dive Site



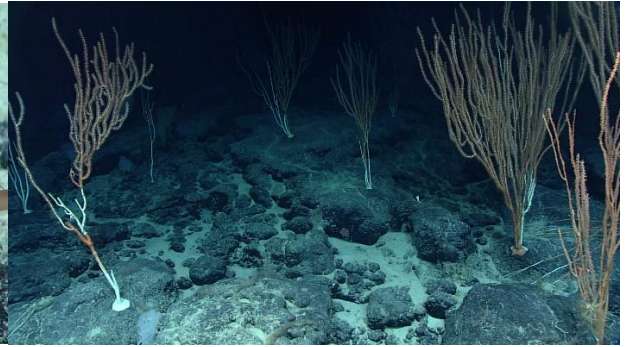
Representative Photos of the Dive





Smorgasbord on a large *Eknomisis* sp. bamboo coral! Numerous associates were spotted including a Colossendeidae sea spider feeding on an anemone, along with crinoids, many anemones, brittle stars, and two feeding sea stars, *Circeaster arandae*

Huge vase-like Corbitellinae glass sponge on manganese crusted, intact lobate lava flow



*Nematocarcinus* sp. shrimp with a mysterious ventral parasite that has scientists stumped as to its identity




Forest of especially wise and tall *Eknomisis* sp. bamboo coral trees near summit of ridge

### Samples Collected

#### Sample

Sample ID	EX1708_D2_DIVE10_SPEC01G EO
Date (UTC)	9/16/2017
Time (UTC)	21:56
Depth (m)	2806.2
Temperature (°C)	1.6
Field ID(s)	Manganese crusted basalt



Commensal ID and Field Identification		
Comments		
<b>Sample</b>		
Sample ID	EX1708_D2_DIVE10_SPEC02BIO	
Date (UTC)	9/16/2017	
Time (UTC)	22:27	
Depth (m)	2781.6	
Temperature (°C)	1.6	
Field ID(s)	<i>Eknomisis</i> sp.	
Commensal ID and Field Identification		
Comments		
<b>Sample</b>		
Sample ID	EX1708_D2_DIVE10_SPEC03BIO	
Date (UTC)	9/16/2017	
Time (UTC)	23:16	
Depth (m)	2738.0	
Temperature (°C)	1.6	
Field ID(s)	Corbitellinae	
Commensal ID and Field Identification	EX1708_D2_DIVE10_SPEC03BIO_A01 Ophiuroidea EX1708_D2_DIVE10_SPEC03BIO_A02 Aplacophoran?	
Comments		
<b>Sample</b>		
Sample ID	EX1708_D2_DIVE10_SPEC04BIO	
Date (UTC)	9/16/2017	
Time (UTC)	23:25	
Depth (m)	2738.0	
Temperature (°C)	1.6	
Field ID(s)	<i>Chrysogorgia</i> sp. "planar"	
Commensal ID and Field Identification	EX1708_D2_DIVE10_SPEC04BIO_A01 Ophiuroidea	
Comments		

Sample	
Sample ID	EX1708_D2_DIVE10_SPEC05GE O
Date (UTC)	9/17/2017
Time (UTC)	00:04
Depth (m)	2701.5
Temperature (°C)	1.6
Field ID(s)	Manganese crusted basalt
Commensal ID and Field Identification	
Comments	



**Please direct inquiries to:**

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