

Okeanos Explorer ROV Dive Summary

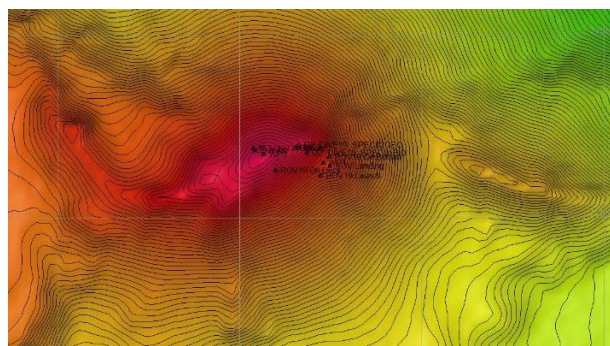
Dive Information			
General Location			
	General Area Descriptor	US EEZ around Hawaii, South of Musicians / North of Hawaiian Islands	
Site Name	Mendelsohn Seamount		
Science Team Leads	John R. Smith/Meagan Putts		
Expedition Coordinator	Kasey Cantwell		
ROV Dive Supervisor	Karl McLetchie		
Mapping Lead	Mike White		
ROV Dive Name			
Cruise	EX1708		
Leg	-		
Dive Number	DIVE19		
Equipment Deployed			
ROV	Deep Discoverer		
Camera Platform	Seirios		
ROV Measurements	<input checked="" type="checkbox"/> CTD	<input checked="" type="checkbox"/> Depth	<input checked="" type="checkbox"/> Altitude

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Purpose of the Dive	<p>Mendelsohn Seamount is a bit of an enigma. Is it part of the Musicians Seamounts or a separate second parallel chain of seamounts to the Hawaiian chain? The offset bunch of seamounts located between the Hawaiian Ridge and the Liliokalani Ridge are enigmatic. The fork at the end of the Liliokalani seamount chain is also enigmatic (<i>i.e.</i>, How does a hot spot create a fork?). One potential explanation is they are an endpoint for a hot spot plume that originated in the Liliokalani hot spot trace but much later, thus explaining the forked nature of the latter. Additional rock samples could be very useful in determining if this hypothesis is correct. This could also help inform general plate tectonic questions that linger with the Hawaiian hot spot chain regarding where the plate actually changed direction, or rather, did the Hawaiian plume drifted to form the bend? In other words, if a second trace recorded a similar bend, then the plate must have changed direction.</p> <p>Biologically, this seamount also sits at a pivotal point. It could serve as a biological stepping stone for benthic communities. Data from this dive will help establish the connection between the NWHI and the Musicians Seamounts. A comparison of the diversity and distribution of coral and sponge communities across the Musicians Seamounts to the north and to the Hawaiian Ridge and the broader North Pacific is of particular importance to understanding the biogeography and connectivity of communities in the Pacific.</p>		
Description of the Dive	<p>The ROV Deep Discover (D2) reached bottom at the base of a conical feature at time 19:37 UTC and at a water depth of 1793 m, right into the midst of a high density, low diversity community dominated by large <i>Hemicorallium</i> sp. pink corals, some of the largest pinks we have ever seen. The corals were oriented in the same direction, stacked in front of each other, and lining ridge edges and shear walls. By time 19:59, D2 had moved outside of the dense pink and into a small community with more diversity and a variety of corals including: Chrysogorgiidae, <i>Hemicorallium</i> sp., Isididae (bamboo), and possibly some primnoids. Although somewhat less dense, higher diversity ruled the day in this portion of the slope. A sea spider was observed in a bamboo coral covered by yellow parazoanthids at time 20:02 (1793 m) along with some talus beginning to appear. By time 20:20 (1786 m) coral dominance shifted to bamboos although a single Bolosominae sponge was found holding its ground, which consisted of a smooth featureless substrate of ~20° slope likely composed of thin lava flows. The slope increased to 30-40° at 1774 m, after which a benthic jellyfish whose tentacle was seemingly caught by a coral polyp was observed</p>		

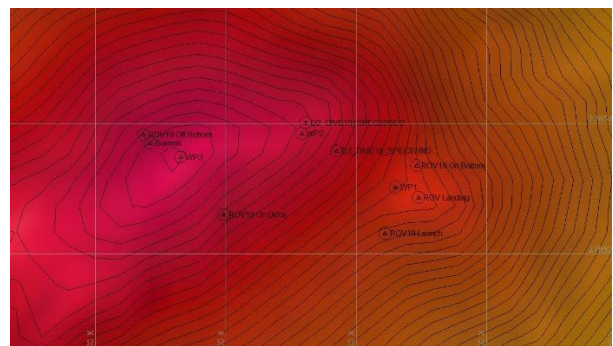


at time 20:26 (1773 m) followed by a Halosaur at time 20:30 (1770 m). It became unclear at 1756 m if the substrate was really featureless lava flows or tuff, given that this cone atop a guyot's carbonate cap was suspected to be the result of secondary volcanism. The first biological specimen, a section from a large Isidid bamboo branch, was collected at 1749 m. Some pillow lava forms with a lumpy look were finally seen at 1718 m. D2 set down to prepare for rock sampling when a the freshly broken face of a talus piece was observed with a yellowish matrix inside. Because of the general lack of any loose and available rocks to this point, a collection of angular talus from the open slope was made at time 21:59 (1713 m). The same nearly featureless substrate and bamboo forest continued upslope along with the imaging of a large anemone at time 22:33 (1677 m). A spider crab and sea spider were seen in close proximity to each other sharing a coral tree at time 22:47 (1673 m), followed by an extremely large bamboo coral perched atop an isolated boulder at time 22:51 (1668 m). Then, D2 entered a majestic bamboo forest that turned out to be an incredibly dense community of massive colonies two to three meters tall, likely one of the densest communities we have ever surveyed. The incredible size of the colonies observed suggests that these corals are hundreds of years old, and that the community has had an extremely long history. Four *Hemicorallium* sp. trees were observed on an isolated boulder elevating them above the bamboo forest at time 23:00 (1665 m). At this time, the slope was found to decrease as D2 neared the summit. Some small random sponges were observed at time 23:06 (1659 m). A ding out of some basement rock in this area showed the infamous yellowish matrix material, although a zoom was not taken. This observation was confirmed for the area by a zoom on another dinged outcrop at time 23:09 (1660 m). More coral diversity was observed near the summit at 1654 m with *Iridigorgia* and *Hemicorallium* (pink) corals, the latter with a six to eight-inch-wide base. The pink coral was covered with crinoids. More topographic relief was finally observed, in this case a talus chute running between elevated massive outcrops at 1650 m. The first instance of a true *Metalagorgia* sp. coral on this expedition was observed at time 23:27 (1653 m), and soon more of the same became apparent at time 23:31 (1654 m). The first coral whip of the dive, "Bamboo long bones," was imaged at 23:40 (1654 m). Another gulley depression between massive outcrops was observed at 1653 along with a different bamboo coral, this one a very wide candelabra at time 23:42. After searching with the vehicles' scanning sonars, it was realized that this area was the summit point, conveniently marked by this candelabra shaped bamboo coral, Keratoisidinae I4 clade, at time 23:48 (1651 m). As such, it was sampled from 1654 m as the second biological specimen at time 00:04. D2 then left bottom at 00:06 from a water depth of 1654 m.

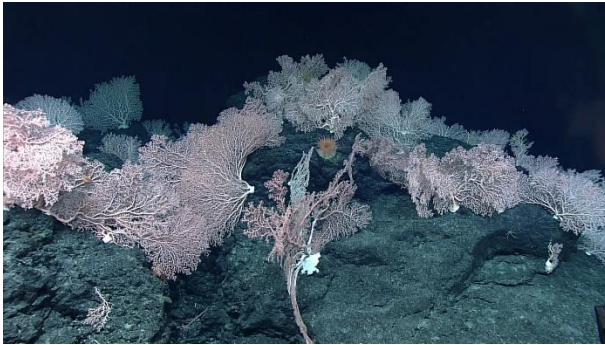
Overall Map of the ROV Dive Area



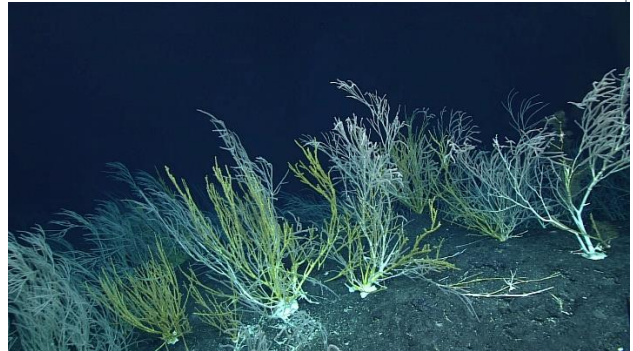
Close-up Map of Main Dive Site



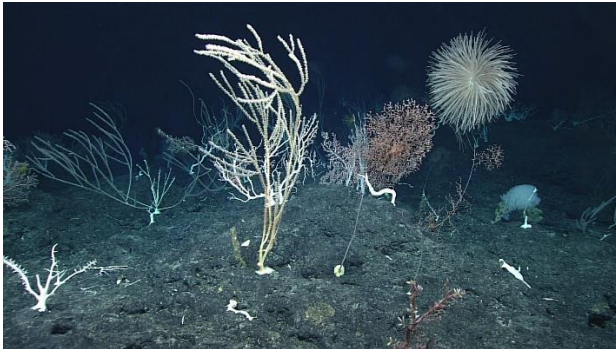
Representative Photos of the Dive



Dense *Hemicorallium* sp. pink corals festooned about a massive rock outcrop near the beginning of the dive



Isididae bamboo coral forest farther upslope on the volcanic cone. The white coral trees have parazoanthids overgrowing the bamboo.



Bamboo, *Metalogorgia* sp., and *Iridogorgia* sp. corals showing the diversity of the summit colonies



The “Big Moose” at the top of the hill. This large Candelabra bamboo, Keratoisidinae I4 clade, marked the very summit.

Samples Collected

Sample

Sample ID	EX1708_D2_DIVE19_SPEC01BIO	
Date (UTC)	9/25/2017	
Time (UTC)	21:17	
Depth (m)	1749.5	
Temperature (°C)	2.1	
Field ID(s)	"Keratoisidinae" "internodal"	
Commensal ID and Field Identification		
Comments		

Sample	
Sample ID	EX1708_D2_DIVE19_SPEC02GEO
Date (UTC)	9/25/2017
Time (UTC)	22:00
Depth (m)	1713.2
Temperature (°C)	2.3
Field ID(s)	Angular scoriaceous basalt talus from open slope. Vesicles on 2/3, massive/solid the other 1/3.
Commensal ID and Field Identification	
Comments	



Sample	
Sample ID	EX1708_D2_DIVE19_SPEC03BIO
Date (UTC)	9/26/2017
Time (UTC)	00:05
Depth (m)	1654.2
Temperature (°C)	2.3
Field ID(s)	Keratoisidinae I4 clade
Commensal ID and Field Identification	
Comments	



Please direct inquiries to:

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