

## Okeanos Explorer ROV Dive Summary

Dive Information			
General Location			
General Area Descriptor	Musicians Seamounts		
Site Name	Mozart 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	DIVE15		
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
	<input checked="" type="checkbox"/> Scanning Sonar	<input checked="" type="checkbox"/> USBL Position	<input checked="" type="checkbox"/> Heading
	<input checked="" type="checkbox"/> Pitch	<input checked="" type="checkbox"/> Roll	<input checked="" type="checkbox"/> HD Camera 1



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Purpose of the Dive	<p>This dive was the second of two dives to investigate the interaction between hotspot volcanism and fracture zones. Mozart Seamount is near the Murray Fracture zone, but not directly intersecting it. Specifically, the purpose of this dive was to investigate the geomorphology and to target rock collections to look for evidence of different magma types or rock composition at areas close to the Murray Fracture Zone, along with any differences between Mozart Seamount and observations made at Liszt Seamount (Dive 14). Another goal was to seek evidence of post-emplacement deformation of the volcanic edifice due to continuing motion across the fracture zone. This dive also surveyed the biologic communities present on the seafloor to characterize their distribution and abundance.</p>
Description of the Dive	<p>This dive took place on a seamount that lies near, but not on, fracture zone lineaments. ROV <i>Deep Discoverer</i> (D2) arrived on bottom at 3853 m water depth on a talus slope of ~20° inclination with a single stalked sponge in view. Contact was soon made with a pillow flow front consisting of two or three thin layers at 3850 m. Here, the slope steepened to ~50°, and thick Mn-crusting was evident. The first coral of the dive, a <i>Pleurogorgia</i> sp., was observed at 3847 m. The slope increased again to greater than 60° at 3843 m. The first rock sample was collected at time 21:42 (3794 m), a piece of angular talus, with a nubbin on the side that was later determined to be a separate fragment welded on with Mn-crust. Examination of the main piece revealed a break in the crust with consolidated brownish tan material exposed, suggesting the rock is some sort of sediment conglomerate or perhaps, less likely, of carbonate origin. Low relief sheet flows and talus were observed at 3786 m along with sponges, sea stars, anemones, and corals. A sharp, linear contact between a shallow talus slope and a flat gravelly surface with long wavelength ripples was observed. The area was mostly devoid of biology except for a few sponges, corals, and sea stars. Transition back to angular talus occurred shortly after, at 3769 m. A large <i>Synaphobranchus</i> sp. cutthroat eel was observed at time 22:43 (3771 m) and a <i>Caulophacus</i> sp. glass sponge garden shortly after at time 22:53. Flow front edges &lt;1 m thick were seen at 3765 m. Things got a little weird at time 23:10 (3765 m) when contact was made with a field of nearly spherical intact “pillow balls” that seemingly rolled downslope intact. Little evidence of slide activity was observed on the &gt;20° slope. The overhead <i>Serios</i> view showed a distinct contact between the “pillow balls” and a featureless slope at 3761 m. Intact pillow talus was observed farther upslope at 3752 m where the slope was steeper at &gt;30°. Some in place, low relief outcrops may have been</p>



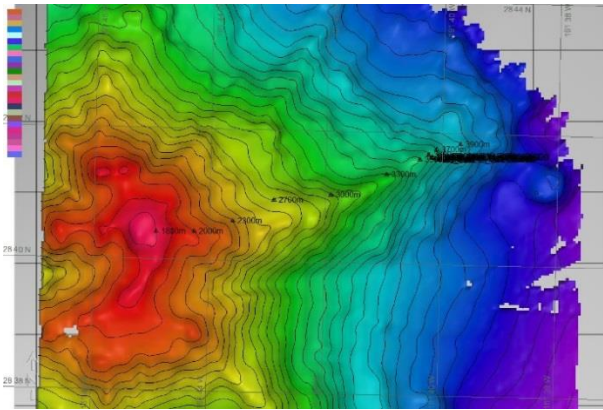
poking through the talus. This area was barren of obvious large biology except for isolated stalked sponges. The slope increased again to  $>50^\circ$  at 3730 m where low relief pillow flows presented. Broken pillows, truncated and/or collapsed, were observed at 3723 m followed by a sudden slope break to a flat step at 3714 m. Above this step, thin sheet flows overriding pillows were seen at  $\sim 3705$  m. An odd Mn-crust rind(?) was observed at time 23:55 (3700 m), as if a boulder had been lifted off and the basal rind cementing it to the seafloor had been left. Other possibility was that it was an old glass sponge skeleton, although no consensus was reached at the time and the material appeared too thin and friable to successfully collect. A sunburst Cladorhizidae carnivorous sponge was observed at time 00:01 (3697 m). A white *Anthomastus* sp. coral was collected at 3691 m followed by a *Bathypathes* sp. coral at 3682 m. The talus slope continued with some intact flows in and around it on the consistent  $\sim 30^\circ$  slope. Pink and white *Anthomastus* sp. corals were observed at time 00:40 (3678 m). A Primnoid coral was collected at 3659 m while lava flows and talus persisted. The slope leveled off to low relief pillow flows and talus with little sediment cover, perhaps on a local high at 3650 m. A contact between a pillow talus flow field with lava flows on a  $\sim 10^\circ$  slope to a flat gravelly plain was observed at 3650 m, similar to the one earlier in the dive. Some time was spent here lighting up the area and viewing it from the overhead *Serios* camera. It appeared to be a north-south oriented saddle, or low point, of gravel surrounded by pillow talus fields. A rock was collected at 3645 m, one of the spherical intact "pillow talus balls" previously seen during this dive. It later weighed in at 62.8 lb., possibly a new record for D2! Upon further examination in the lab, a portion of the Mn-crust had flaked off and a similar brownish material was observed beneath, suggesting these spherical oddities may be of similar material origin as sample #1. A Foraminifera xenophyophorea was observed at time 01:47 (3630 m) with the never-ending pillow talus field continuing up the  $\sim 30^\circ$  slope. Contact with the broken edge of a flow front and the talus deposit it generated was observed at time 01:59 (3618 m), along with a long linear intact pillow tube, fractured pillow faces, and thin flows on top of talus. A swimming *Chaunacops* sp. with its lure bobbling all along the way was see at time 02:05 (3611 m). D2 left from the same talus and thin flow field covered bottom at time 02:34 (3580 m).

A summary of the biological observation highlights and samples follows. There were various kinds of stalked glass sponges spotted throughout the dive such as *Caulophacus* sp., *Saccocalyx* sp., and *Hyalostylus* sp. Four coral specimens were collected of a *Bathypathes* sp. black coral, *Anthomastus* sp. mushroom coral, Primnoidae coral, and Keratoisidinae D clade bamboo coral. Four geological specimens were collected as well, two with our biological collections.

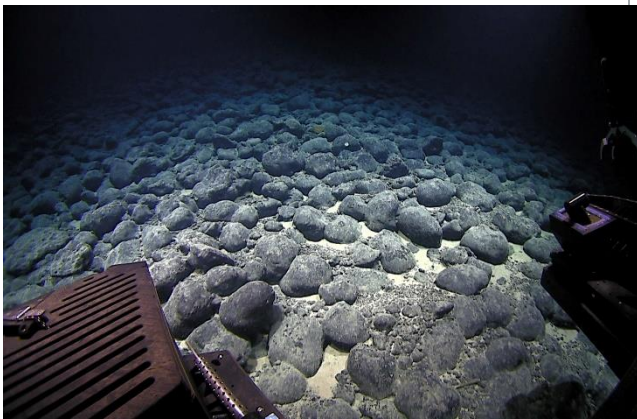
Overall Map of the ROV Dive Area

Close-up Map of Main Dive Site





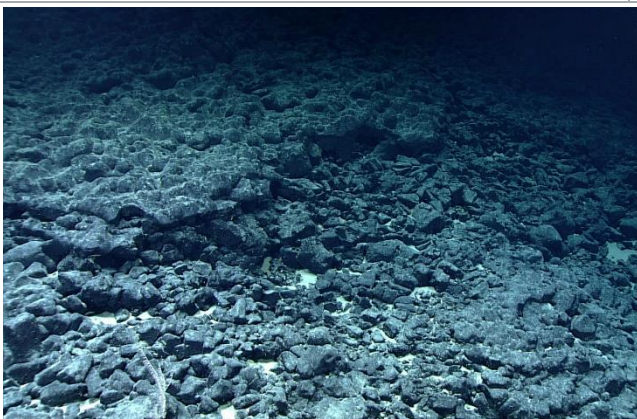
Representative Photos of the Dive



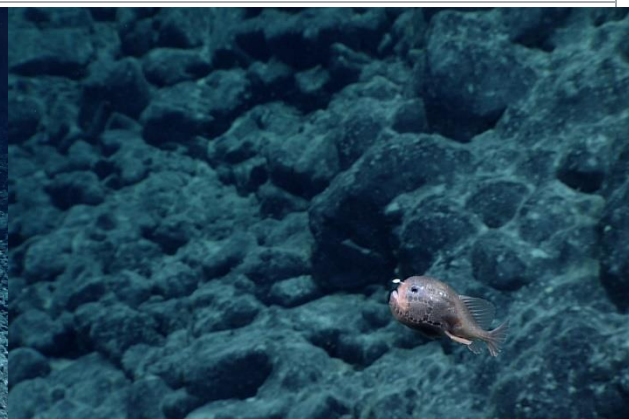
Boulder field of large rounded talus initially thought to be “pillow balls” of some sort



Corbitellinae glass sponge occupying a mixed talus field




Contact between a lava flow edge and talus field resulting from breakup of the flow




Swimming *Chaunacops* sp. toad fish with its lure bobbing along

Samples Collected


Sample

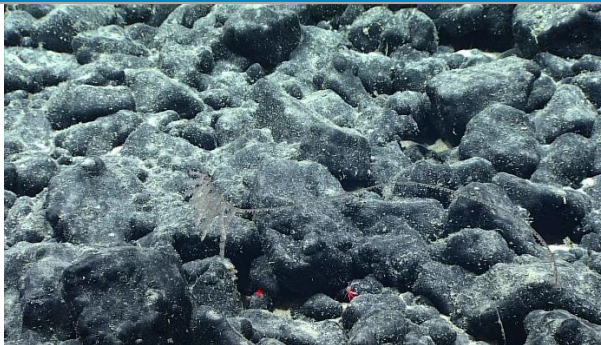
Sample ID	EX1708_D2_DIVE15_SPEC01GEO	
Date (UTC)	9/21/2017	
Time (UTC)	21:42	
Depth (m)	3794.1	
Temperature (°C)	1.5	
Field ID(s)	Mn-crusted angular rock with additional piece cemented on with Mn-crust. Possible lagoonal sedimentary rock.	
Commensal ID and Field Identification	EX1708_D2_DIVE15_SPEC01GEO_A01 Porifera?	
Comments	Rock broke open on its own once it dried out. Revealed tan color featureless matrix. Mn-crust thickness is 1 mm on bottom, 2 mm on top. Extremely fragile sample.	


### Sample


Sample ID	EX1708_D2_DIVE15_SPEC02BIO	
Date (UTC)	9/21/2017	
Time (UTC)	22:18:47	
Depth (m)	3775.7	
Temperature (°C)	1.5	
Field ID(s)	Keratoisidinae D clade?	
Commensal ID and Field Identification	EX1708_D2_DIVE15_SPEC02BIO_A01 Rock piece. Mn-crusted rock broke open upon collection and is a tan to brown platy rock on bottom, bulbous on top. Appears to have three different types of inclusions. Possible marine conglomerate and/or lagoonal sedimentary rock. Mn-crust thickness is <1 mm on bottom, ~3.5 mm on top.	
	EX1708_D2_DIVE15_SPEC02BIO_A02 Unknown Isididae base	
	EX1708_D2_DIVE15_SPEC02BIO_A03 Porifera?	
	EX1708_D2_DIVE15_SPEC02BIO_A04 Aplacophora?	
Comments		

### Sample

Sample ID	EX1708_D2_DIVE15_SPEC03BIO	
Date (UTC)	9/22/2017	
Time (UTC)	00:10	
Depth (m)	3691.8	
Temperature (°C)	1.5	
Field ID(s)	<i>Anthomastus</i> sp.	
Commensal ID and Field Identification	EX1708_D2_DIVE15_SPEC03BIO_A01 Rock. Mn-crusted basalt hand sample. Triangular in shape. No edges exposed.	

Comments		
<b>Sample</b>		
Sample ID	EX1708_D2_DIVE15_SPEC04BIO	
Date (UTC)	9/22/2017	
Time (UTC)	00:24	
Depth (m)	3682.2	
Temperature (°C)	1.5	
Field ID(s)	<i>Bathypathes</i> sp.	
Commensal ID and Field Identification		
Comments		

<b>Sample</b>		
Sample ID	EX1708_D2_DIVE15_SPEC05BIO	
Date (UTC)	9/22/2017	
Time (UTC)	01:01	
Depth (m)	3659.4	
Temperature (°C)	1.5	
Field ID(s)	Primnoidae	
Commensal ID and Field Identification	EX1708_D2_DIVE15_SPEC05BIO_A01 Actinaria	
Comments		

<b>Sample</b>		
Sample ID	EX1708_D2_DIVE15_SPEC06GEO	
Date (UTC)	9/22/2017	
Time (UTC)	01:38	
Depth (m)	3645.4	
Temperature (°C)	1.5	
Field ID(s)	Mn-cruste pumpkin-size and shape (62.8 lb) talus ball. Breaking a piece off later revealed a core of massive angular (columnar?) basalt with a thin Mn-crust (<1 mm) surrounded by two layers of clay or other marine sediment, each separated by layers of Mn-crust.	

	Outer layer of Mn-crust thickness is 4 mm on bottom, 2 mm to ~1 cm on top.
Commensal ID and Field Identification	EX1708_D2_DIVE15_SPEC06GEO_A01 Bryozoa
	EX1708_D2_DIVE15_SPEC06GEO_A02 Cladorhizidae 1
	EX1708_D2_DIVE15_SPEC06GEO_A03 Cladorhizidae 2
	EX1708_D2_DIVE15_SPEC06GEO_A04 Cladorhizidae 1
	EX1708_D2_DIVE15_SPEC06GEO_A05 Porifera?
Comments	

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