

ROV Dive Summary, EX-21-04, Dive 15, July 20, 2021

General Location Map



Dive Information

Site Name	Allegheny Seamount
General Area	Easterm end of the New England Seamount Chain
Descriptor	
Science Team	Rhian Waller, Jason Chaytor
Leads	
Expedition	Kasey Cantwell, Kimberly Galvez (Expedition Coordinator in Training)
Coordinator	
ROV Dive	Chris Ritter
Supervisor	
Mapping Lead	Shannon Hoy
Dive Purpose	Explore deep Allegheny seamount

Was the dive No restricted for Underwater Cultural Heritage? **ROV** Dive Dive Summary: EX2104 DIVE15 ^^^^^^ Summary Data Dive Type: Normal In Water: 2021-07-20T13:00:38.203983 36.9321420421547;-58.86100929882872 On Bottom: 2021-07-20T15:03:04.960454 36.93040644101286; -58.8585935839148 Off Bottom: 2021-07-20T18:37:18.894673 36.92930048474664; -58.8574432995497 Out Water: 2021-07-20T20:37:38.805163 36.91903531625265; -58.869469617860574 Dive Duration: 7:37:0 Bottom Time: 3:34:13 Max Vehicle Depth: 3446.6 m Min Seafloor Depth: 3336.5 m Distance Travelled: 558.8 m

Dive Description

The geology and substrate morphology of the deep NW section of Allegheny Seamount was perhaps some of the most varied and diagnostic of the construction and destruction processes that have acted on the seamounts seen during the expedition so far. The dive began on a rock debris apron with a mix of sediment and both small and large (as big or bigger than the ROV) blocks of FeMn-coated volcanic material that had moved downslope, perhaps only a small distance. The patchy sediment in this area had distinct, but limited ripple development and appeared primarily biogenic/volcanoclastic in origin. Two samples were collected at the landing site, both of which were fully encrusted with FeMn. Moving upslope, the debris apron transitioned into a series of blocky sheet flow outcrops with sharp angles that formed a prominent step in the overall slope. Above this step, and for most of the remainder of the dive, the ROV crossed over mixed pavement, rock debris, sediment and tabular failure substrate on an overall moderate-gradient sloped bottom. Upslope propagating tabular failure of thin-to-moderate-thickness sheet flows produced an extremely dynamic bottom that switched between continuous pavement and blocky debris (with thin interspersed sediment), all of which provided suitable substrate to host extensive benthic communities. A third sample was collected in this region. Smoother FeMn crust textures were noted, suggesting a higher current flow regime, although botryoidal textures were present as well. For the last ~ 1 hour of the dive, a spectacular downslope-dipping outcrop of stacked sheet flows of different thicknesses was traversed, providing the opportunity to investigate an extensive cross section of the volcanic flow morphologies from a perspective only seen in a few small outcrops on other seamounts during the expedition. Differential erosion of the dipping layers created an extended overhang, with broken rock and sediment accumulated below.



	Biological observations were much more diverse than expected given the depth of this dive. Coral morphology sponges (<i>Stelodoryx</i> sp.) were send throughout the divetrack and were particularly abundant towards the end of the dive. <i>Hylanomena</i> spp. sponges were also observed (both stalked and unstalked), barrel sponges, encrusting sponges and a collection of an unusual (not observed before on this expedition) creme colored sponge that is thought to be a hexactinellid. Multiple feeding traces were observed on rocks throughout the dive, and on one zoom we discovered a slitlimpet similar to that discovered (and collected) in a previous dive. Corals were well represented, particularly by Anthomastus, which was observed in large aggregations (20+ individuals), and bamboo corals thought to be of the J1 clade. There were also potential <i>Bathygorgia</i> whip corals, <i>Stauropathes</i> black corals, small Primnoid, stoloniferous and Anthothelid octocorals, and a small clustered yellow anemone. In deep cracks within the final sloped overhang we observed a potentially new and unusual <i>Chrysogorgia</i> coral, however it was unable to be collected due to its position in the crack. Fish were sparse but we did observe one cusk eel and two <i>Synaphobranchus kaupi</i> . Overall this dive showed a surprising diversity for one of the deeper dives during this expedition.
Notable	Unusual J1 clade Jasonisis Bamboo corals
Observations	Unusual Chrysogorgia
20301 14410113	
Community and	Corals and Sponges - (Present)
habitat	Chemosynthetic Community - (Absent)
observations	High biodiversity Community - (Present - for a deep community this was high biodiversity)
	Active Seep or Vent - (Absent)
	Extinct Seep or Vent - (Absent)
	Hydrates - (Absent)
CMECS Feature	Rock, Sediment (Fine & coarse unconsolidated)
Type(s)	
SeaTube Link	https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&resourceId=2383
(science annotation	
system)	
Jystemy	

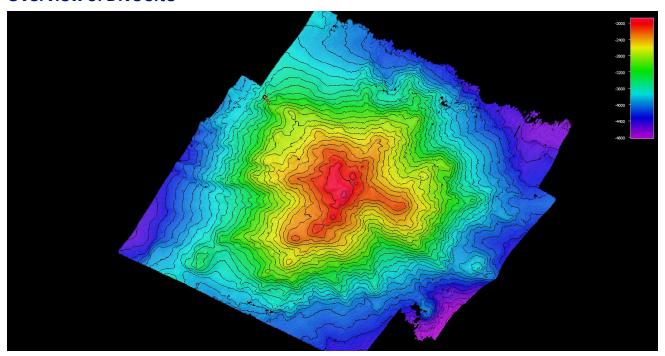
Equipment Deployed

ROV	Deep Discoverer
Camera Platform	Seirios
ROV Measurements	The following ROV measurements, data streams and equipment are used on each ROV deployment: CTD, depth, scanning sonar, USBL position, altitude, heading, attitude, high-resolution cameras, low resolution cameras, manipulator arms, suction sampler, sample drawers and thrusters. The section below notes if any of these sensors were malfunctioning or not operational
Equipment	none
Malfunctions	



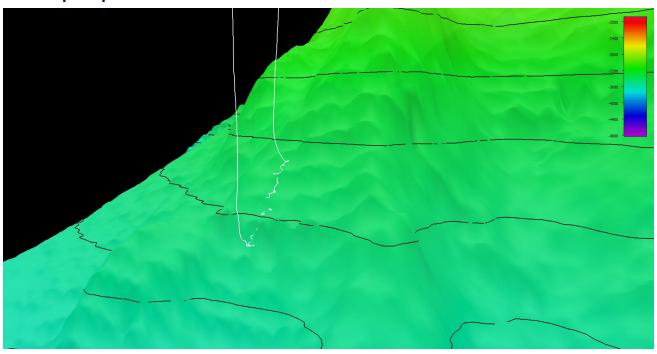


Overview of Dive Site



Smoothed ROV dive track (orange) on an overview bathymetry of the seamount, 3x vertical exaggeration.

Close-up Map of Main Dive Site



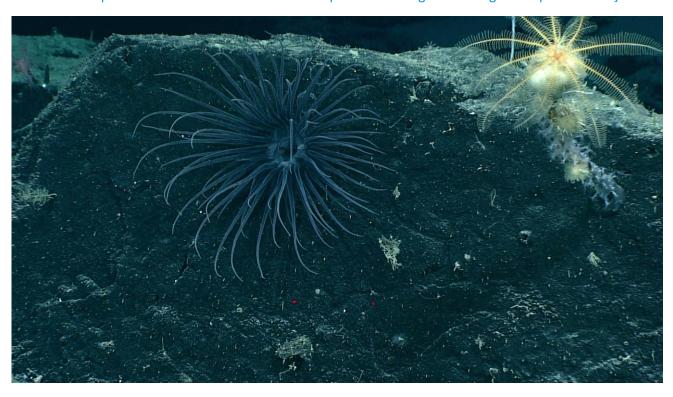
Smoothed ROV dive track in white on 25x25 cell size bathymetry, 3x vertical exaggeration, depth in meters, 100 meter contours



Representative Photos of the Dive



[The second of two rock samples collected at the beginning of the dive being placed in the port rock box. These rock samples were taken from within a debris apron containing a wide range of displaced rocks]





[The large black cerianthid was seen in multiple locations during this dive, and was collected using the suction sampler.]



[Dipping sheet flow layers with multiple Stelodoryx sp. and other sponges. On the bottom side of the underhang we discovered brisingid (Freyella sp.) seastars, an unusual form of Chrysogorgia, stoloniferous octocoral, and an unusual yellow sponge that formed colonies]



Samples Collected -





Sample ID	EX2104_D15_01G
Date (UTC)	20210720
Time (UTC)	151654



Depth (m)	3448.577
Latitude (decimal degrees)	36.930140
Longitude (decimal degrees)	-58.858000
Temp. (°C)	2.509
Field ID(s)	Large rock FeMn Coated
	fissile (crumbly), botryoidal, underlying rock is coarse grained, not heavily cemented, tan-beige in color, 28 cm long, 13.5 cm wide, 8cm tall, potentially a hyaloclastite

Associates Sample ID	Field Identification	Count
NA	NA	NA







Sample ID	EX2104_D15_02G
Date (UTC)	20210720
Time (UTC)	151738
Depth (m)	3447.374
Latitude (decimal degrees)	36.930470

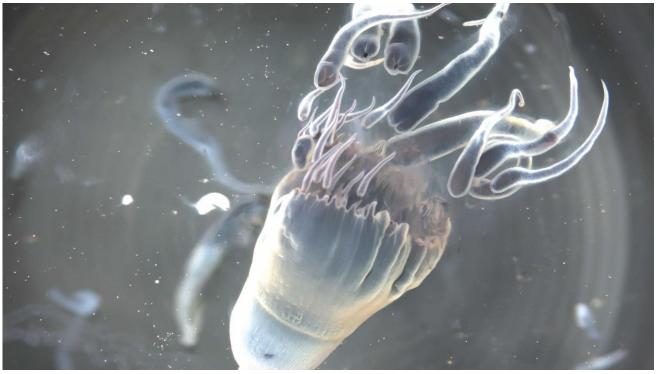


Longitude (decimal degrees)	-58.858290
Temp. (°C)	2.51
Field ID(s)	Flatter FeMn coated Rock
	15cm long, 14cm wide, 11 cm tall, broken to pieces, potentially "altered basalt" with FeMn crust

Associates Sample ID	Field Identification	Count
NA	NA	NA







Sample ID	EX2104_D15_03B
Date (UTC)	20210720
Time (UTC)	153355
Depth (m)	3443.716
Latitude (decimal degrees)	36.930340

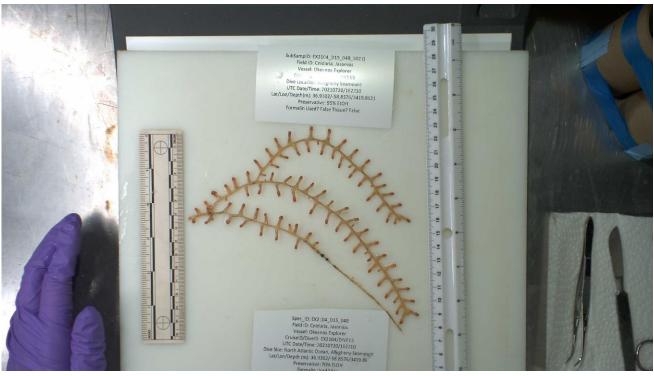


Longitude (decimal degrees)	-58.858500
Temp. (°C)	2.512
Field ID(s)	Cerianthidae
	black Cerianthidae, images taken with specimen suspended in water to show shape, most tentacles have detached, 7 cm

Associates Sample ID	Field Identification	Count
NA	NA	NA







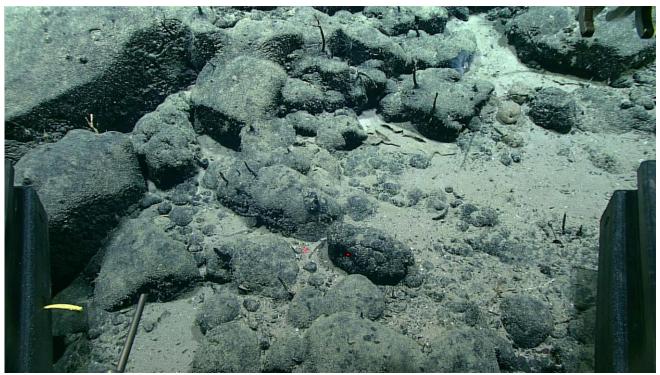
Sample ID	EX2104_D15_04B
Date (UTC)	20210720
Time (UTC)	162210
Depth (m)	3419.862
Latitude (decimal degrees)	36.930210



Longitude (decimal degrees)	-58.857600
Temp. (°C)	2.584
Field ID(s)	Jasonisis
Comments	under 20 cm

Associates Sample ID	Field Identification	Count
NA	NA	NA







Sample ID	EX2104_D15_05G	
Date (UTC)	20210720	
Time (UTC)	171830	
Depth (m)	3388.389	
Latitude (decimal degrees)	36.929630	



Longitude (decimal degrees)	-58.857640
Temp. (°C)	2.604
Field ID(s)	Rounded FeMn rock
Comments	20 cm long, 13cm wide, 10.5 cm tall, botryoidal, fissile, with encrusting worm tubes

Associates Sample ID	Field Identification	Count
NA	NA	NA







Sample ID	EX2104_D15_06B
Date (UTC)	20210720



Time (UTC)	174202
Depth (m)	3370.703
Latitude (decimal degrees)	36.929300
Longitude (decimal degrees)	-58.857680
Temp. (°C)	2.639
Field ID(s)	Hexactinellidae
	soft and spongy, 20cm, sample was yellow and peach in color, ethanol turned pink in reaction to sample

Associates Sample ID	Field Identification	Count
NA	NA	NA

Scientists Involved (provide name, email, affiliation)

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