

OKEANOS EXPLORER ROV DIVE SUMMARY

Site Name	North of Pioneer Bank			
ROV Lead/Expedition Coordinator	Karl Mcletchie/ Brian RC Kennedy			
Science Team Leads	Daniel Wagner and Jonathan Tree			
General Area Descriptor	Papahānaumokuākea Marine National Monument			
ROV Dive Name	Cruise Season	Leg	Dive Number	
	EX1603	1	DIVE04	
Equipment Deployed	ROV:	Deep Discoverer		
	Camera Platform:	Seirios		
ROV Measurements	<input checked="" type="checkbox"/> D2 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	
	<input checked="" type="checkbox"/> HD Camera 2	<input checked="" type="checkbox"/> ROV HD 2	<input checked="" type="checkbox"/> Seirios CTD	
	Temperature Probe	<input checked="" type="checkbox"/> D2 DO Sensor	<input checked="" type="checkbox"/> Seirios DO sensor	
Equipment Malfunctions	The Seirios CTD data had some erroneous spikes in the data.			
ROV Dive Summary (From processed ROV data)	Dive Summary: EX1603_DIVE04			
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	In Water:	2016-03-04T19:08:54.210000 26°, 09.100' N ; 173°, 22.035' W		
	Out Water:	2016-03-05T02:33:21.199000 26°, 09.595' N ; 173°, 21.850' W		
	Off Bottom:	2016-03-05T01:53:37.405000 26°, 09.274' N ; 173°, 21.877' W		
	On Bottom:	2016-03-04T20:47:20.393000 26°, 09.204' N ; 173°, 21.792' W		
	Dive duration:	7:24:26		
	Bottom Time:	5:6:17		
Max. depth:	1518.1 m			
<b>Special Notes</b>				
<b>Scientists Involved (please provide name / location / affiliation / email)</b>	<b>Name</b>	<b>Affiliation</b>	<b>Email Address</b>	
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#### **Purpose of the Dive**

This dive was located on a headwall scarp on the north side of Pioneer Bank, which included a steep pinnacle with a vertical relief of ~400 m. The objective of the dive was to survey along the flanks and summit of the pinnacle for high-density communities of corals and sponges. Additionally, the ROV planned to opportunistically collect rock samples, as the geological age of Pioneer Bank has not yet been determined. The target start point of the dive was on a flat surface located at the bottom of the headwall scarp at 1532 m. The plan was for the ROV to move west and up the wall until a depth of 1300 m. At this point, the ROV would move north towards the pinnacle and climb up the flanks of the pinnacle until reaching its summit at 1145 m.

#### **Description of the Dive:**

The ROV landed on the wall of the scarp at a depth of 1513 m. The substrate consisted of Mn-encrusted volcanic ledges with patches of light sediment. There was no current at the landing site and few animals were present. Animals present included a dead stalked-crinoid that was overgrown with hydroids and a bubblegum coral. As the ROV moved up the wall, the density of benthic invertebrates remained low and included sponges, as well as chrysogorgid, primnoid and bamboo corals. Several fish were observed along the wall including halosaurids, rattails and a slickhead. At 1503 m, the ROV collected an unidentified glass sponge, which had a commensal crinoid on it. At a depth of 1490 m, an outcrop of a volcanic dike ~ 0.5 m in width was observed. This dike had an apparent strike of W-NW and a steep dip angle of ~75° to the N-NE. Given this orientation, this dike was most likely an intrusion along Pioneer's eastern rift zone. Outcrops of similarly oriented dike outcrops were observed as the ROV ascended the cliff face. Further up the slope, the terrain became near vertical with large undercuts, causing the ROV to have to be pulled off the bottom to avoid entanglement of the umbilical cord. The ROV remained ~30 min in midwater, during which shrimp and crown jellyfish were observed. The ROV was then moved

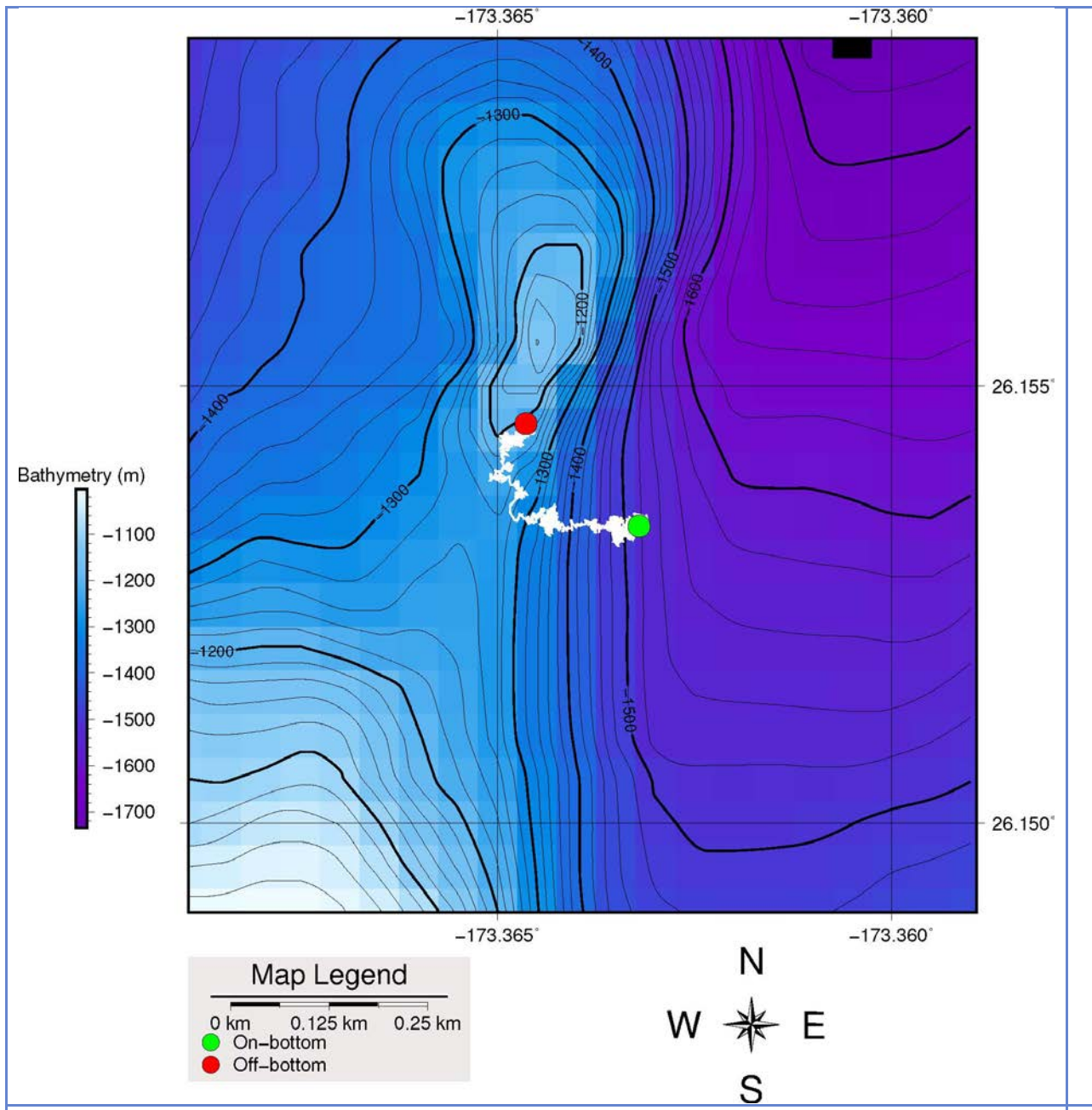
closer to the pinnacle and lowered back onto the bottom at 1320 m. As the ROV continued surveying the cliff face, a sharp, discordant contact between lava flow and igneous intrusion was observed. The dense rock body was interpreted to be a small boss due to the irregularity of the sharp contact. As the ROV moved north towards the pinnacle, the substrate contained a moderate density of animals and included sponges, crinoids and corals. The cliff face showed little lava flow differentiation or primary flow structures. Close to the base of the pinnacle the ROV collected a flat and angular Mn-crust basalt sample at 1222 m. The sample was taken from a sedimented pocket under a rock ledge with interspersed volcanic rubble. On the flanks of the pinnacle the density of animals increased substantially and included patches of close to 100% benthic cover. These communities were dominated by the glass sponges *Atlantisella* sp., and *Farrea* cf. *occa erecta*, and also included dense aggregations of small corallimorpharians. At 1156 m, the ROV collected an unidentified *Iridogorgia* sp., as well as a second rounded Mn-crust basalt sample, which was taken from a sedimented pocket under a rock ledge with interspersed volcanic rubble. Lava flow differentiation was clearly seen as layers dipped to the NW. The excavation and over-steepening of the cliff face, as well as the exposure of dikes which were intruded into the volcanic flank sub-surface and lava flow dip angles to the NW (away from the E-SE facing wall) suggest that the cliff face was formed due to a submarine landslide. Similar morphologies and headwall scarps also characterized the landscape of the surrounding cliffs to the south. The ROV left the bottom at a depth of 1156 m after a total bottom time of 5:12. While the ROV did not reach the summit as originally planned, it did document the high-density communities that were expected to be found given the steep topography of the terrain.

#### Animals observed during dive

Phylum	Group	Species
Anellida	Polychaetes	Sabellida
Arthropod	Crab	<i>Strobopagurus gracilipes</i>
Arthropods	Pycnogonids	Colosseneidae
Arthropods	Shrimp	<i>Bathypalaemonella</i> sp.
Arthropods	Shrimp	<i>Nematocarcinus tenuistrostris</i>
Arthropods	Shrimp	Unidentified shrimp in water column
Arthropods	Squat lobsters	<i>Gastroptychus</i> sp. <i>iaspis</i>
Arthropods	Squat lobsters	<i>Uroptychus</i> sp.
Arthropods	Squat lobsters	<i>Munidopsis</i> sp.
Cnidarians	Actinarians	<i>Exocoelactis</i> sp.
Cnidarians	Actinarians	<i>Phelliactis</i> sp.
Cnidarians	Actinarians	<i>Relacanthis</i> sp.
Cnidarians	Alcyonaceans	<i>Anthomastus</i> sp.
Cnidarians	Antipatharians	<i>Bathypathes</i> sp.
Cnidarians	Ceriantharian	Ceriantharian
Cnidarians	Corallimorpharian	Corallimorpharian?
Cnidarians	Gorgonians	<i>Calyptrophora wyvillei</i>
Cnidarians	Gorgonians	<i>Chrysogorgia geniculata</i>
Cnidarians	Gorgonians	<i>Chrysogorgia stellata</i>
Cnidarians	Gorgonians	<i>Hemicorallium</i> sp.
Cnidarians	Gorgonians	<i>Iridogorgia</i> sp.
Cnidarians	Gorgonians	<i>Lepidisis</i> sp.

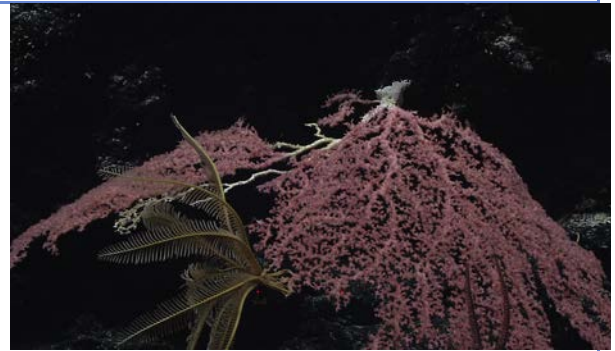
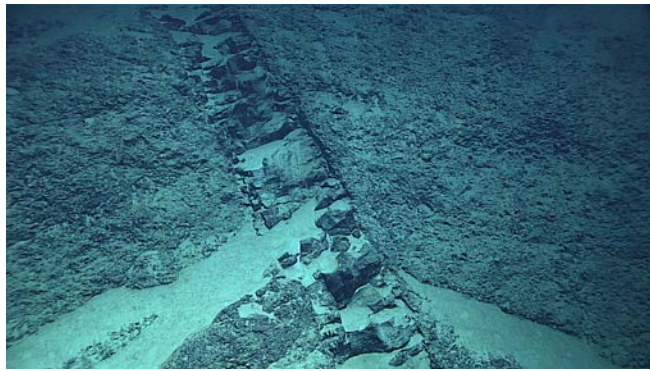
Cnidarians	Gorgonians	Narella dichotoma
Cnidarians	Gorgonians	Narella sp.
Cnidarians	Gorgonians	Paragorgia sp.
Cnidarians	Gorgonians	Paramuricea sp.
Cnidarians	Gorgonians	Plexauridae sp.
Cnidarians	Gorgonians	Primnoidae
Cnidarians	Gorgonians	Victorgorgia nuttingi
Cnidarians	Hydrozoans	Paraphyllina (ID by Dhugal Lindsay)
Cnidarians	Hydrozoans	Hydroidolina
Cnidarians	Hydrozoans	Corymorphidae
Cnidarians	Pennatulaceans	Kophobelemnon? sp. (ID from Tina Molodtsova)
Cnidarians	Zoanthids	Parazoanthidae
Echinoderms	Asteroids	Apollonaster kelleyi?
Echinoderms	Crinoids	Antedonidae
Echinoderms	Crinoids	Atelocrinus sp.
Echinoderms	Crinoids	Glyptometra sp.
Echinoderms	Crinoids	Stalked crinoid
Echinoderms	Crinoids	Unidentified comatulids
Echinoderms	Holothurians	Peniagone/Amperina sp.
Echinoderms	Ophiuroids	Asteroschematidae
Echinoderms	Ophiuroids	Ophiuridae
Echinoderms	Ophiuroids	Gorgonocephalidae
Fishes	Halosauridae	<i>Halosauropsis</i> sp. (ID by Ken Sulak)
Fishes	Argentiniiformes	Alepocephalidae
Fishes	Eels	Ilyophinae
Fishes	Macrourids	Kumba sp.
Fishes	Macrourids	<i>Coryphaenoides longicirrus</i>
Fishes	Macrourids	Unidentified macrourid
Fishes	Ophidiidae	<i>Bassogigas</i> sp.
Fishes	Ophidiidae	Ophidiid
Mollusks	Gastropods	Brachiopod
Sponges	Hexactinellids	Atlantisella sp.
Sponges	Hexactinellids	Corbitellinae new genus
Sponges	Hexactinellids	Euretidae sp.
Sponges	Hexactinellids	Farrea sp.
Sponges	Hexactinellids	Farrea nr occa erecta
Sponges	Hexactinellids	Saccocalyx sp.
Sponges	Hexactinellids	Tretopleura sp1A
Sponges	Hexactinellids	Tretopleura sp1B

Map of ROV Dive Area



**Representative Photos of the Dive**








**Samples Collected**

<b>Sample ID</b>	EX1603_20160304T212428_D2_DIVE04_S PEC01BIO
<b>Date (UTC)</b>	20160304
<b>Time (UTC)</b>	21:24:28
<b>Depth (m)</b>	1502
<b>Temperature (°C)</b>	2.4
<b>Field ID(s)</b>	Hexactinellida
<b>Comments</b>	<i>Commensal crinoid</i>



<b>Sample ID</b>	EX1603_20160305T002754_D2_DIVE04_S PEC02GEO
<b>Date (UTC)</b>	20160305
<b>Time (UTC)</b>	00:27:54
<b>Depth (m)</b>	1220

<b>Temperature (°C)</b>	3.2	
<b>Field ID(s)</b>	Mn-encrusted volcanic	
<b>Comments</b>		
<b>Sample ID</b>	EX1603_20160305T014415_D2_DIVE04_S PEC03BIO	
<b>Date (UTC)</b>	20160305	
<b>Time (UTC)</b>	01:44:15	
<b>Depth (m)</b>	1155	
<b>Temperature (°C)</b>	3.2	
<b>Field ID(s)</b>	Iridogorgia sp.	
<b>Comments</b>		
<b>Sample ID</b>	EX1603_20160305T015249_D2_DIVE04_S PEC04GEO	
<b>Date (UTC)</b>	20160305	
<b>Time (UTC)</b>	01:52:49	
<b>Depth (m)</b>	1154	
<b>Temperature (°C)</b>	3.1	
<b>Field ID(s)</b>	Mn-encrusted volcanic	

<b>Comments</b>	
<b>Please direct inquiries to:</b>	NOAA Office of Ocean Exploration & Research 1315 East-West Highway (SSMC3 10 th Floor) Silver Spring, MD 20910 (301) 734-1014