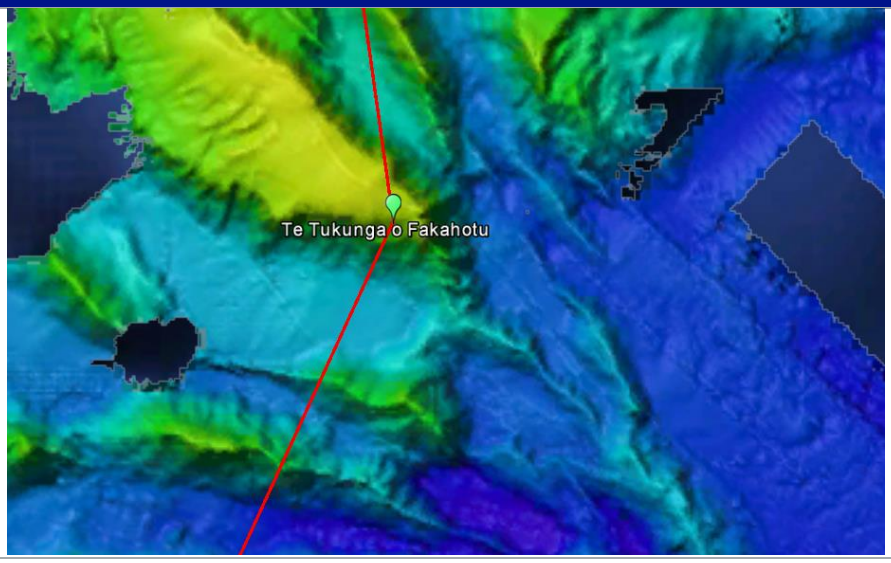
Ocean Exploration and Research

Okeanos Explorer ROV Dive Summary

Dive Information			
General Location			
General Area Descriptor	Northern Manihiki Plateau		
Site Name	Te Tukunga o Fakahotu (Te Tuku)		
Science Team Leads	Scott France/ Del Bohnenstiehl		
Expedition Coordinator	Kasey Cantwell		
ROV Dive Supervisor	Bobby Mohr		
Mapping Lead	Mike White		
ROV Dive Name			
Cruise	EX1705		
Leg	-		
Dive Number	DIVE 02		
Equipment Deployed			
ROV	Deep Discoverer		
Camera Platform	Seirios		
ROV	☒ CTD	☒ Depth	☒ Altitude

Measurements	☒ Scanning Sonar	☒ USBL Position	☒ Heading
	☒ Pitch	☒ Roll	☒ HD Camera 1
	☒ HD Camera 2	☒ Low Res Cam 1	☒ Low Res Cam 2
	☒ Low Res Cam 3	☒ Low Res Cam 4	☒ Low Res Cam 5
Equipment Malfunctions	Dive was completed without an LSS sensor on Seirios as it showed signs of pressure damage. Ship lost Dynamic Positioning approximately halfway through the dive. Vehicles moved into the water column above the height of the nearest feature. DP was recovered, but the dive was terminated early to allow for DP testing and troubleshooting.		
ROV Dive Summary (from processed ROV data)	Dive Summary: EX1705_DIVE02 ^^ In Water: 2017-04-30T21:47:52.227000 05°, 51.824' S ; 164°, 42.034' W Out Water: 2017-05-01T02:47:26.520000 05°, 51.555' S ; 164°, 41.751' W Off Bottom: 2017-05-01T01:10:58.590000 05°, 51.592' S ; 164°, 41.856' W On Bottom: 2017-04-30T23:18:45.328000 05°, 51.648' S ; 164°, 41.850' W Dive duration: 4:59:34 Bottom Time: 1:52:13 Max. depth: 2495.1 m		
Special Notes			

Scientists Involved (please provide name, location, affiliation, email)

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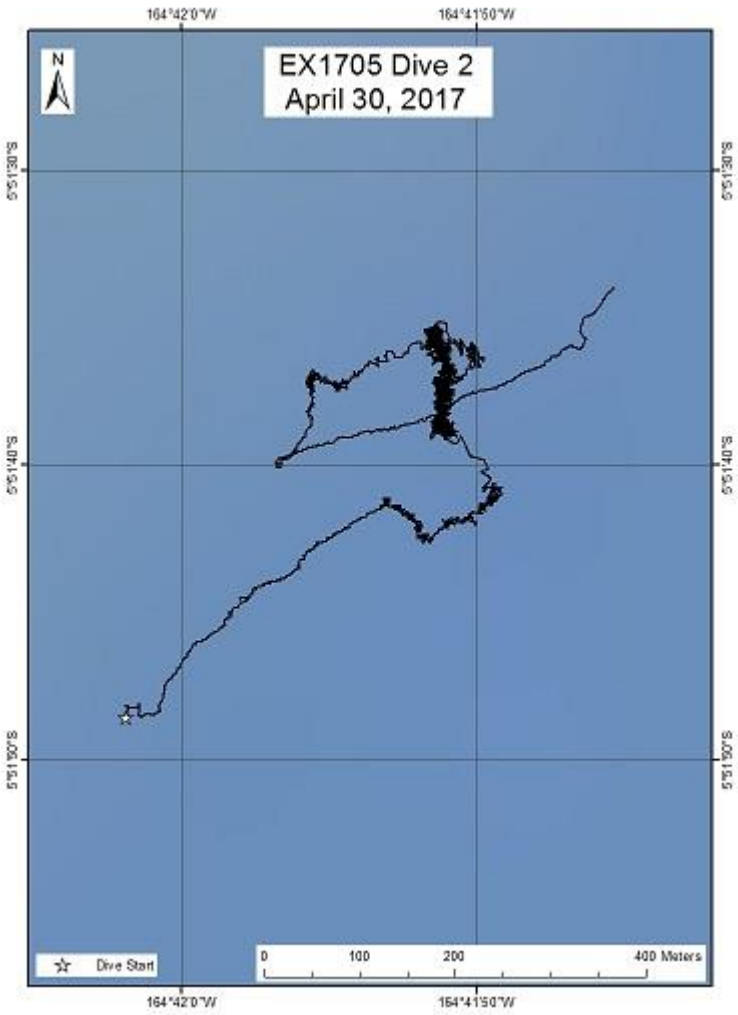
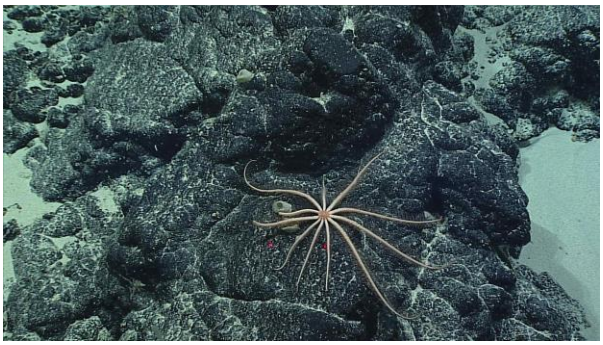
Purpose of the Dive	This dive will investigate the distribution and abundance of benthic mega-epifauna (both invertebrate and fish), map substrate composition in order to evaluate the relationship between faunal communities and substrate type, collect rock and crust samples to determine their geological and geochemical properties.
Description of the Dive	This dive was conducted in the northern Manihiki Plateau on the eastern edge of an elongated mesa-shaped feature with a depth of 1850 at its summit. There are a series of narrow elongate ridges and basins to the south-southeast of the bathymetric feature that may have been formed during earlier rifting of Manihiki Plateau. The dive began at a depth of 2500 m and touched down on Fe-Mn crusted rocks, some of which appear to be Fe-Mn crusted pillow lavas. Light colored biogenic (foraminifera) sediments were accumulated between the rocks, but the upper surfaces of the rocks were largely sediment free. Approximately 50 m up the slope the character of the surface changed slightly, with more loose boulders present on the surface; the light colored biogenic sediments continued to be found between these boulders. Throughout the dive we observed a higher density of fauna on the top of taller rock outcrops and boulders Two rock samples were taken. The D2_DIVE02_SAMP01GEO was picked up early in the dive and D2_DIVE02_SAMP02GEO was picked near the end of the dive. This second rock sample was collected at the base of a small cliff. The zoomed out view from Sieros showed that there were a series of two fractures running parallel to the cliff, suggesting structural control on this feature. The rock was collected from loose rubble near the base of the cliff. When inspected on board, each rock had a rather thin 2-4 mm thick Fe-Mn crust. Beneath the crust, the rock was heavily altered to brown clay. Overall fauna were fairly sparse on this feature, possibly because the dive track was toward the sheltered (west) side of the ridge. The most abundant megafaunal taxa were brisingids (Echinodermata, Asteroidea) and stalked tunicates (?*Culeolus* sp.); smaller box-shaped sessile tunicates were also seen regularly. Sessile fauna were relatively sparse, and coral and sponge species were observed only as singletons, i.e. a single observation of each species. Octocorals: *Anthomastus* (recent recruit of only 2 polyps), Rock pen (Pennatulacea, ?*Calibelemnon* sp.) with commensal polychaete, 3 species of bamboo corals (Isididae), one (?*Isidella* sp.) with a brittle star (Ophiacanthidae) positioned on a part of the colony lacking tissue; this observation has now been made a number times and begs the question of whether the ophiuroid causes the loss of tissue, or whether it takes advantage of a bare spot on the colony. Interestingly, the coral tissue above the ophiacanthid showed swellings suggestive of nematocyst batteries. Black coral: *Trissopathes* sp. Sponges observed included several *Pyloderma* sp. demosponges and small carnivorous Cladorhizidae, and glass sponges *Caulophacus* sp. (Hexactinellida). Surprisingly, not a single fish was seen despite patches of soft sediments containing potential prey scattered over the rock. Representatives of all 5 echinoderm classes were observed; brisingid asteroids were among the most abundant fauna seen throughout dive (none with arms raised). At least 4 species of crinoids, 4 species of sea cucumbers (Holothuroidea), 2 species of seastars (including the commonly observed brisingid and a *Hymenaster*), 1 sea urchin (Echinoidea, *Plesiodiadema*

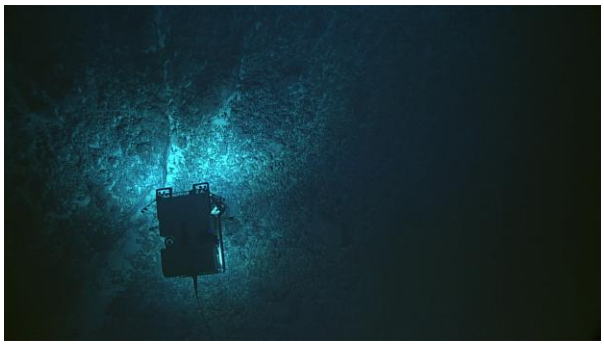
	sp?) and at least 1 species of brittle star (Ophiuroidea) seen on a bamboo coral. Other biological observations: Ping pong paddle-shaped stannomid xenophyophores (agglutinated foraminifera); Burrowing anemone (Actiniaria); several munidopsid crabs (Galatheoidea) and shrimp (Aristeidae); a tumbling snail (Margaritidae, *Gaza* sp.) and predatory snails (Eulimidae) on the stalk of a crinoid (Bathycrinidae) along with barnacles and hydroids. Biology removed from rock samples included: verrucomorph barnacle, agglutinated arborescent foraminifera, ?bryozoans, ?sponge
Map of the ROV Dive Site	
	
EX1705_IMG_20170430T235553Z_ROVHD.jpg (Xenophyophore) EX1705_IMG_20170430T234401Z_ROVHD.jpg (stalked tunicates ?*Culeolus* sp.) EX1705_IMG_20170430T232647Z_ROVHD.jp	

g (View of seafloor near beginning of dive).	

Representative Photos of the Dive

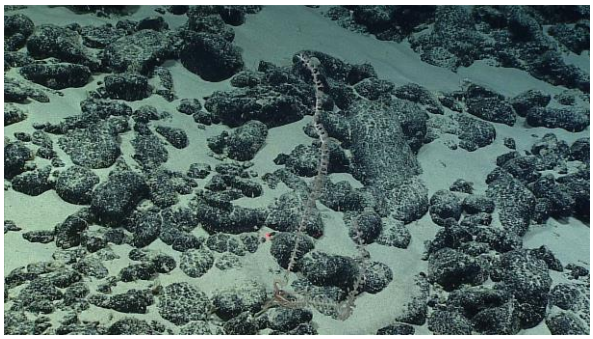


Brisingid asteroids were among the most abundant fauna seen throughout dive; shown here with tunicates on manganese encrusted substrate.



View of cliff where D2_DIVE02_SPEC2GEO was collected; note fracture pattern trending up and to the right in the image.

Stalked crinoid (Bathycrinidae) with multiple predatory snails, barnacles, hydroids on the stalk.



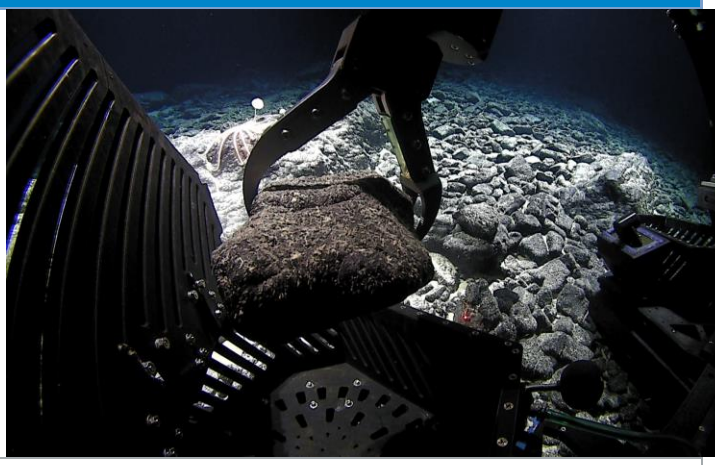
View of seafloor near beginning of dive. Manganese encrusted rubble among soft sediment with a bamboo coral.

Samples Collected

Sample

Sample ID	D2_DIVE02_SPEC01GEO
Date (UTC)	20170430
Time (UTC)	23:51:52

Depth (m)	2483.61	
Temperature (˚C)	1.8	
Field ID(s)	Angular rock	
Commensal ID and Field Identification	EX1705_20170430T235152_D2_DIVE02_SPEC01GEO_A01 (sponge?), EX1705_20170430T235152_D2_DIVE02_SPEC01GEO_A02 (Bryozoan) EX1705_20170430T235152_D2_DIVE02_SPEC01GEO_A03 (mixed- branched foram, and tube-like structure- possibly foram)	
Comments	highly altered, 2 mm black crust	

Sample		
Sample ID	D2_DIVE02_SPEC02GEO	
Date (UTC)	20170501	
Time (UTC)	005636	
Depth (m)	2446.25	
Temperature (˚C)	1.79	
Field ID(s)	Angular Mn crusted rock	
Commensal ID and Field Identification	EX1705_20170501T005636_D2_DIVE02_SPEC02GEO_A01 (branched foraminifera) EX1705_20170501T005636_D2_DIVE02_SPEC02GEO_A02 (unidentified -possibly sponge or foram) EX1705_20170501T005636_D2_DIVE02_SPEC02GEO_A03 (Verrucomorph barnacle)	
Comments	highly altered, 3 mm black crust	

Please direct inquiries to:

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