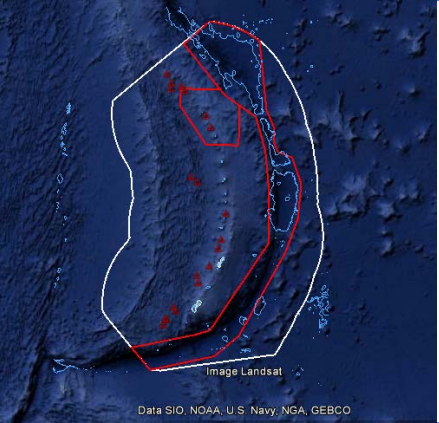


# OKEANOS EXPLORER ROV DIVE SUMMARY

<b>Site Name</b>	Fryer Guyot			
<b>ROV Lead/Expedition Coordinators</b>	Jim Newman/ Kasey Cantwell			
<b>Science Team Leads</b>	Shirley Pomponi (HBOI-FAU, CIOERT) Patty Fryer (UH)			
<b>General Area Descriptor</b>	Areas in and around the Marianas Trench Marine National Monument			
<b>ROV Dive Name</b>	Cruise	Leg	Dive Number	
	EX1605	3	DIVE17	
<b>Equipment Deployed</b>	ROV:	Deep Discoverer		
	Camera Platform:	Seirios		
<b>ROV Measurements</b>	<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	
	<input checked="" type="checkbox"/> HD Camera 2	<input checked="" type="checkbox"/> Low Res Cam 1	<input checked="" type="checkbox"/> Low Res Cam 2	
	<input checked="" type="checkbox"/> Low Res Cam 3	<input checked="" type="checkbox"/> Low Res Cam 4	<input checked="" type="checkbox"/> Low Res Cam 2	
<b>Equipment Malfunctions</b>				
<b>ROV Dive Summary (From processed ROV data)</b>	Dive Summary: EX1605L3_DIVE17			
	AA			
	In Water:	2016-07-03T20:29:18.955000 20°, 22.076' N ; 148°, 20.172' E		
	Out Water:	2016-07-04T04:32:06.104000 20°, 22.281' N ; 148°, 19.845' E		
	Off Bottom:	2016-07-04T03:28:29.197000 20°, 22.252' N ; 148°, 19.917' E		
	On Bottom:	2016-07-03T21:45:12.578000 20°, 22.072' N ; 148°, 20.241' E		
	Dive duration:	8:2:47		
	Bottom Time:	5:43:16		
Max. depth:	2128.6 m			
<b>Special Notes</b>				
<b>Scientists Involved</b>	Divya Amon	University of Hawaii	divyaamon@hawaii.edu	

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Kenneth Sulak	USGS	ksulak@usgs.gov	

**Purpose of the Dive**

This dive explored a rift zone ridge extending southeast from Fryer Guyot, a Cretaceous seamount to the east of the Trench Unit of the monument. The dive addresses two of the CAPSTONE priorities and has objectives that include exploring for high density communities of deep-sea corals and sponges and doing an initial characterization of Mn-crust habitats on one of the presumed oldest seamounts on the Pacific plate. West Pacific guyots will be the first type of terrain mined for mn-crusts and there is already a mining lease that has been issued by the International Seabed Authority (ISA) for the nearby Magellan Seamounts located just outside of the US EEZ.

### Description of the Dive:

The ROV landed in front of one of the only exposures of rock material that was not completely covered with a 5-10 cm thick crust of MnO. The boulder permitted us to zoom on the crust and make a rough estimate regarding its thickness, which was variable between 7 and 10 cm. At the beginning of the dive there were quite a few large prominences of boulders all covered with a thick MnO crust. All of the cobble and boulders looked cemented to the seafloor and one another by the thick MnO coating and had a dusting of pale sediment. The MnO surface had a botryoidal surface texture, which is commonplace for thick crusts.

At 2129 m, MnO crust had broken and slid down toward the ROV. This area also had significant patches of pale sediment around the boulders that was ripple marked. At 22:25:39 Z there was an abrupt transition to an entirely flat seafloor right above another small linear fracture in the MnO coating, also dipping down slope toward the ROV. After this, we saw a large quadrilateral-shaped, broad and flat block, again with thick encrusting MnO surrounded by ripple-marked sediment. We also saw an elongate narrow, low ridge set above the surrounding sediment surface at 22:28:27 Z.

There were scattered clumps of boulder- to cobble-sized rocks set among sediment ponds along the track for most of the dive. All were coated with a thick MnO crust. The slope alternated between steep and relatively flat, but we could not discern any layering except a faint horizontality of smoothed ridges in the slope at about 22:47:25, but these were intermittent, at best. The MnO coating was too thick to really tell what was exposed in the slope we traversed. What we had noticed after the mapping from the previous night was that there was a ~60 m fault scarp on the flat part of the guyot surface above the dive track and to the south of it.

The fact that we had observed many short vertical stumps, as well as broken, long stalks of dead hexactinellid sponges that were also coated with MnO suggests that the sundering of the northern half of the plateau above the dive track may have affected the environment of the slope for any animals living there. We were stumped by larger, barrel-shaped, Mn-encrusted forms; were these ancient barrel sponges from a much shallower environment?

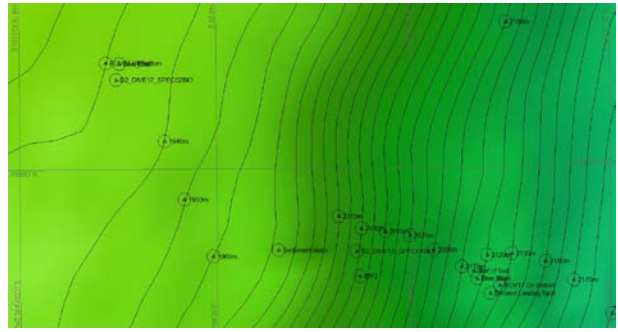
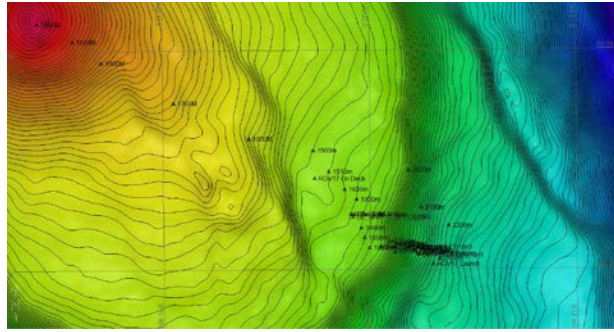
The bubble-gum coral (Paragorgiidae) was observed throughout the dive, as were numerous species of antipatharians, chrysogorgiids, primnoids, isidids (including the lyrate bamboos that are a new genus), and some rare sightings of sea pens. After seeing some bamboo corals that appeared to be partially eaten, we discovered one of the predators: an aplacophoran was eating its way up a bamboo coral stalk! Never has a bamboo coral been collected with the predatory aplacophoran on it, so we collected the pair. It's likely that the coral may be a new species!

We were intrigued by the relationship of some zoanthids and anemones with their octocoral and sponge hosts. The zoanthids take over so much of the tissue that they incorporate coral sclerites and sponge spicules into their stalks. It is unclear if the cnidarian living within the hexactinellid sponge (possibly a *Tretopleura* sp.) is an anemone or a zoanthid, and since this relationship has not been well-documented, we collected a sample (and both the sponge & anemone/zoanthid were fixed in formalin and ethanol for subsequent diagnosis).

The "giant" tunicate, *Coleolus* sp., was observed a couple of times, as were brittlestars (mostly on octocorals), crinoids, a couple of holothurians, and seastars (including a brisingid growing 4 new arms). A few halosaurs and cusk eels were observed (and Ken Sulak emailed us all some very interesting information about the halosaur's anatomy, light sensitivity, and reproductive seasonality).

**Overall Map of ROV Dive Area**

**Close-up Map of Main Dive Site**



**Representative Photos of the Dive**



This massive, fractured boulder is covered by a very thick MnO crust (the outer “shell” that we measured with the ROV laser spots and found to vary from about 5 to 15 cm thick.



The manganese-coated stalks of dead hexactinellid sponges were strewn all over the bottom.

**Samples Collected**

<b>Sample ID</b>	SPEC01BIO
<b>Date (UTC)</b>	20160703
<b>Time (UTC)</b>	234151
<b>Depth (m)</b>	2013.43
<b>Temperature (°C)</b>	2.17
<b>Field ID(s)</b>	APLACOPHORAN ON BAMBOO CORAL
<b>Comments</b>	Preserved in 95% ethanol. No genetics taken.



<b>Sample ID</b>	SPEC02BIO
<b>Date (UTC)</b>	20160704
<b>Time (UTC)</b>	030610
<b>Depth (m)</b>	1929.36
<b>Temperature (°C)</b>	2.05



<b>Field ID(s)</b>	TRETOPLEURA SP. W/ ACN OR ZOA	
<b>Comments</b>	Preserved in 95% ethanol and formalin.	
<b>Please direct inquiries to:</b>	NOAA Office of Ocean Exploration & Research 1315 East-West Highway (SSMC3 10 <sup>th</sup> Floor) Silver Spring, MD 20910 (301) 734-1014	