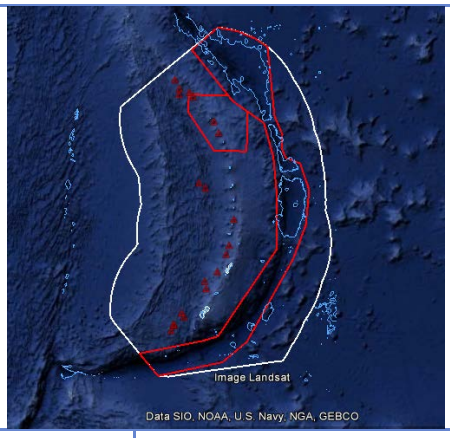
OKEANOS EXPLORER ROV DIVE SUMMARY

Site Name	Unnamed Forearc Seamount	
ROV Lead/Expedition Coordinator	Jim Newman/ Kasey Cantwell	
Science Team Leads	Shirley Pomponi (HBOI-FAU, CIOERT) Patty Fryer (UH)	
General Area Descriptor	Areas in and around the Marianas Trench Marine National Monument	

ROV Dive Name	Cruise	Leg	Dive Number
	EX1605	3	DIVE12
Equipment Deployed	ROV:	Deep Discoverer	
	Camera Platform:	Seirios	
ROV Measurements	☒ CTD	☒ Depth	☒ Altitude
	☒ 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 2
Equipment Malfunctions			

ROV Dive Summary (From processed ROV data)

Dive Summary: EX1605L3_DIVE12

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In Water:	2016-06-28T20:21:09.804000 21°, 34.021' N ; 145°, 31.153' E
Out Water:	2016-06-29T04:32:58.660000 21°, 34.630' N ; 145°, 31.789' E
Off Bottom:	2016-06-29T02:42:37.500000 21°, 34.261' N ; 145°, 31.067' E
On Bottom:	2016-06-28T22:13:36.453000 21°, 33.947' N ; 145°, 31.116' E
Dive duration:	8:11:48
Bottom Time:	4:29:1
Max. depth:	3321.0 m

Special Notes			
Scientists Involved	Robert Carney	Louisiana State Univ	rcarne1@lsu.edu

(please provide name / location / affiliation / email)			
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Purpose of the Dive

To investigate the summit of a feature that has the morphology and position (relative to the trench axis) to be a possible serpentinite mud volcano. As the dive transits the seafloor, the ROVs will be looking of evidence of active seeps and benthic fauna associated with the seeps.

Description of the Dive:

Today's dive, started at a depth of 3315 m on a sedimented sea floor that had a scattering of numerous small pebbles and a few patches of larger cobble- to boulder-sized rocks. In close zooms, there were numerous small, white, rounded specks that are likely foraminiferan tests scattered among the sediments and pebbles. In general, the sea floor surface was very similar throughout the dive. In some areas, however, there were clusters of cobbles and boulders resting on the flat sea floor. We collected a rock sample (SPEC01GEO), which upon examination on the ship proved to be a highly-serpentinized block of likely ultramafic (mantle) rock! We collected a second rock (SPEC03GEO) just before the end of the dive in another cluster and found that it is also highly-serpentinized and is thus another chunk of the mantle!

The most startling features of the sea floor morphology on the dive, starting at about 22:40 UTC, were a number of elongate furrows. Some were aligned more or less linearly and varying in depth (most about 0.5 m deep). Most were short furrows about a meter or two long and less than half that wide. Many were straight, but others were distinctly curved, as if whatever made them was changing direction as the furrow was made. Some had two parallel grooves of similar size, separated by a little less than 2 meters. Much of the shore-based science discussion centered around speculation that these were made by some deep-diving marine animal, perhaps a shark or a whale; however both were discounted (too deep for a whale, too small for a shark).

There were no active spring sites on this mud volcano, as was hoped. This mud volcano has not been active for a long time, but blocks of serpentinized mantle rocks are exposed on the surface. The area surveyed appears from the bathymetry to be the top of a slump on the east flank of the edifice.

As shore-based science team member Les Watling (U Hawaii) noted: these dives are like rolling invertebrate zoology courses. Xenophyophores ("bearer of foreign bodies")--single-celled, multinucleate protists that use their pseudopodia to select and cement particles of sediment to build their own tests—spurred a spirited online chat.

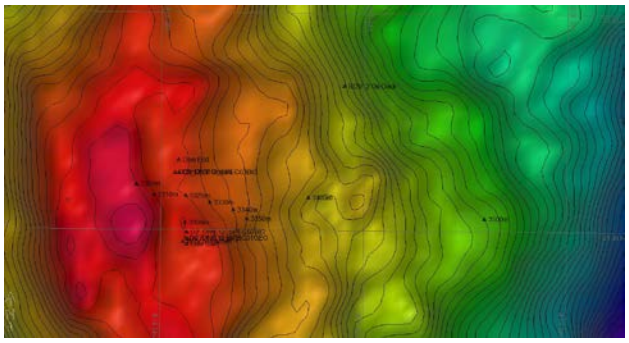
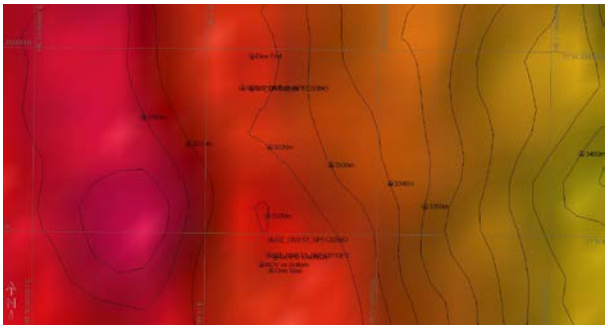
Here were also a number of holothurians, bothbenthic and swimming, observed during this dive. Continuing with the Echinodermata (and with the topic of excretion…), we also documented tiny urchins! One had a visible anal sac--raised to ensure that the wastes are not eaten. Also observed were brittle stars which seemed to be doing push-ups—possibly moving over small animals and dropping down to capture them (as some shallow water ophiuroids do). The other hypothesis was that they might be releasing gametes from slits that are on the underside of the disk flanking each of the arms.

Other fauna included glass sponges, shrimp, crinoids, 6 *Relicanthus* (most on glass sponge

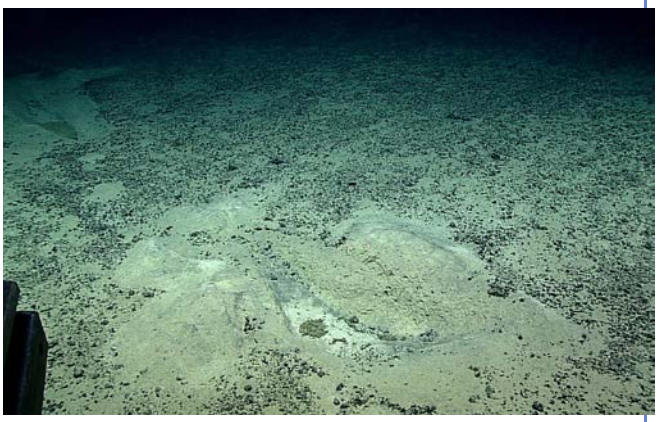
stalks); a sea star; amphipods; an octocoral, an anemone; a Brisingid seastar and a pregnant mysid shrimp that was hanging onto a glass sponge spicule stalk. Mysids (like isopods and amphipods—the "peracarids") brood their embryos in a chamber; when the "babies" hatch, they look like miniature adults. The observation of the one of the large anemone-like (but NOT an anemone!) *Relicanthus* sp. attached to the spicule stalk of a Caulophacidae hexactinellid sponge, generated a lot of excitement. The tentacles were VERY long—we measured one that was about 2 m long! On the same glass sponge stalk was also a beautiful, transparent, benthic ctenophore The *Relicanthus* collected as SPEC02BIO was quite tiny—no more than 1 cm in diameter when it was brought up to the ship in the ROV biobox.

Now, for vertebrates, we didn't see many fishes—the ones we saw were all cusk eels, but Bruce Mundy (NOAA Fisheries, Hawaii) thinks that the one with an unusual scaly head is a new species! Another banner day of discovery!

During ascent, we observed a jellyfish, siphonophores, fish, salps, and a number of organisms that either were at the edge of the ROV light pool or swam by too quickly.

Overall Map of ROV Dive Area	**Close-up Map of Main Dive Site**
	

Representative Photos of the Dive



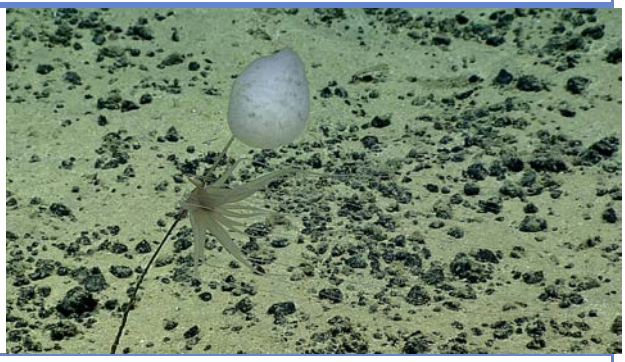
The seafloor on this dive was relatively flat and covered with pebble- to boulder-sized rocks. Both rock samples collected were mantle rocks. We got a glimpse of the layering under the surface in a few places, early in the dive, when we came across a series of gouges (~20-30 cm deep) in the sea floor made by what many of the participating scientists thought might be a deep diving shark or whale.

Xenophyophores are single-celled, multinucleate protists that use their pseudopodia to select and cement particles of sediment to build their own tests.

Samples Collected

Sample ID	SPEC01GEO
Date (UTC)	20160628
Time (UTC)	230446
Depth (m)	3306.73
Temperature (°C)	1.59
Field ID(s)	ROCK W/ MANGANESE COATING
Comments	Bastitic, harzburgite, serpentenized with 1mm MnO Encrustation.

Sample ID	SPEC02BIO
Date (UTC)	20160628
Time (UTC)	234526
Depth (m)	3304.66
Temperature (°C)	1.61
Field ID(s)	RELICANTHUS N.SP.
Comments	Slimy, dropped most of its tentacles on recovery.



Sample ID	SPEC03GEO
Date (UTC)	20160629
Time (UTC)	023439
Depth (m)	3309.45
Temperature (°C)	1.59
Field ID(s)	ROCK; SEDIMENTARY?
Comments	Serpentinized peridotite, broken into many pieces.

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