

## *Okeanos Explorer* ROV Dive Summary

Dive Information	
General Location	
General Area Descriptor	Musicians Seamounts
Site Name	Water Column 1
Science Team Leads	John Smith/Meagan Putts
Expedition Coordinator	Kasey Cantwell
ROV Dive Supervisor	Karl McLetchie
Mapping Lead	Mike White
ROV Dive Name	
Cruise	EX1708
Leg	-
Dive Number	DIVE11
Equipment Deployed	
ROV	Deep Discoverer

Camera Platform	Seirios		
ROV Measurements	<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 5
Equipment Malfunctions			
ROV Dive Summary (from processed ROV data)	<p style="text-align: center;">Dive Summary: EX1708_DIVE11            ~~~~~            In Water:                                 2017-09-17T18:28:09.192000              31°, 41.995' N ; 165°, 00.278' W             Out Water:                               2017-09-18T02:29:40.314000              31°, 41.557' N ; 165°, 00.294' W             Dive duration:                           8:1:31             Bottom Time:                            N/A             Max. depth:                             1003.0 m</p>		
Special Notes			
Scientists Involved (please provide name, location, affiliation, email)	Name	Email	Affiliation
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	Tracey Sutton	tsutton1@nova.edu	Nova Southeastern University
Purpose of the Dive	<p>The water column is one of the most underexplored environments on the planet. Basic information is lacking on the distributions and abundances of midwater organisms in most parts of the globe, and the vicinity of the Musicians Seamounts remains poorly explored. ROV visual surveys provide crucial data on the distributions, abundances, and behaviors of a variety of midwater animals. ROV surveys are especially well-suited to observe the understudied gelatinous fauna, which commonly fall apart using traditional net sampling methods. Collecting acoustic backscatter data (Simrad EK60) throughout the cruise - including during ROV transects – will complement the ROV surveys by providing critical information on the depth and extent of deep scattering layers, diel vertical migrations, and ROV avoidance behavior.</p>		
Description of the Dive	<p>Three vertical transects of the water column were made during the dive. The first was a steady oblique descent with optimal lighting conditions met from around 344m depth to 1000m, the second was a series of horizontal transects of 10 minutes duration each at depths of 300, 400, 500, 600, 700 and 800m, and the third descent with horizontal transects of 13 minutes each at 550, 650, 750, 850 and 900m depth.</p> <p>The most frequently encountered members of the mesopelagic fauna at this site, after perhaps the many Cyclothone fishes and chaetognath arrow worms, were the two-tentacled Narcomedusa Solmundella bitentaculata (600-950m) and doliolid nurse colonies (550-900m). The</p>		



many-tentacled narcomedusa *Solmissus* (300-800m) occurred predominantly in the 600-650m layer with a morphotype with nematocyst patches present on the exumbrella being filmed at 650m depth. An undescribed narcomedusa of the genus *Bathykorus* and with 4 tentacles (600-850m) was observed mostly in the 700-800m layer, while the 8-tentacled *Aeginura grimaldii* was observed only between 845-900m, suggesting these jelly-eating predators divide up the water column by depth but that most of their prey is distributed in the lower mesopelagic zone where the highest abundances of doliolids occurred as well as many other gelatinous species.

Members of the trachymedusae family *Halicreatidae* were found throughout the water column (400-990m) with *Halicreas minimum* at 600, 842, 900 and 990m depths. The animal at 900m had a hyperiid amphipod attached to the rim of its bell and had eaten several of its tentacles. The rhopalonematid trachymedusa genus *Arctapodema* (525-900m) was quite abundant, particularly between 650-900m depth, with at least two colour morphs observed. Other rhopalonematid trachymedusae that were observed included *Colobonema sericeum* (600-682m), *Pantachogon haeckelli* (650-1000m), *Crossota rufobrunnea* (650-1000m) and what seemed to be an undescribed genus observed at 900m depth.

Scyphomedusae that were observed included *Atolla* spp. (686-850m), *Periphylla periphylla* (885m & 988m) and *Poralia rufescens* (881m).

Very high diversity and biomass of siphonophores was apparent with positive IDs made of *Desmophyes annectens* (301m), *Nanomia bijuga* (405m), *Lilyopsis fluoracantha* (550m), *Forskalia asymmetrica* (672m), *Frillagalma vityazi* (700m) and *Chuniphyes multidentata* (625m). Good video was also taken of several other species (eg. *Clausophyes* sp., *Kephyes* sp., *Lensia* sp., a red Prayid, several physonects) where it should be possible to positively identify them to species level once the original quality video becomes available for analysis.

Ctenophores were also abundant and diverse. Several species of the lobate ctenophore *Bathocyroe* were observed between 550 and 900m depth, while the Thalassocalycid ctenophore *Thalassocalyce inconstans* was sighted at 300, 400 and 600m depth. A cestid ctenophore was sighted at 300m depth, the genus *Lampocteis* between 850-970m, a little ruby cydippid morphotype between 650-900m, and many other cydippid and lobate forms throughout the water column.

Protists were observed quite often with *Coelodendrid* phaeodarians



(840-890m), tuscarorid phaeodarians (750-800m), the "fried egg" collodarian radiolarian [Fig. 2D morphotype from Nakamura et al 2017] at 550m and 676m depth, and several other radiolarians being sighted between 300-850m depth.

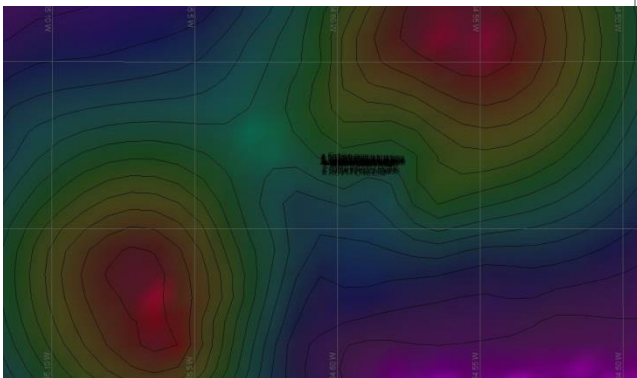
Cephalopod highlights included *Helicocranchia* at 700m depth and *Thysanoteuthis* at 510m depth. Fish highlights were *Alepiosaurus ferox* at 900m depth, some very clear imagery of a myctophid fish (?*Myctophum*) at 500m depth, what was possibly *Stylephorus chordatus* also filmed at 500m depth, and a huge leptocephalus eel larva also at 500m depth. Several good shots of the resident *Cyclothone* species were also obtained.

A spiny crustacean larva/postlarva was observed at 550m depth holding a phaeodarian protist in its claws, an ostracod at 650m, a black munnopsid isopod at 654m depth, and several shrimp and krill species that seemed widely distributed throughout the dive.

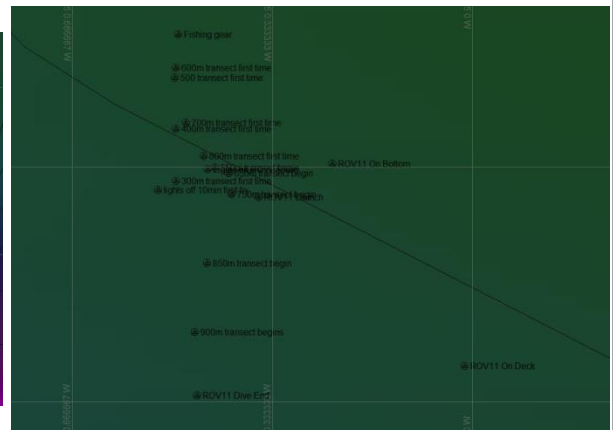
Bioluminescence was recorded during one of the periods with the lights turned off and the camera gain levels cranked up but no effect was noted on the fauna observed immediately after the lights were turned back on in comparison with before they were turned off.

All in all it was a very successful dive and should yield high quality data after the full quality videos are analyzed post-cruise.

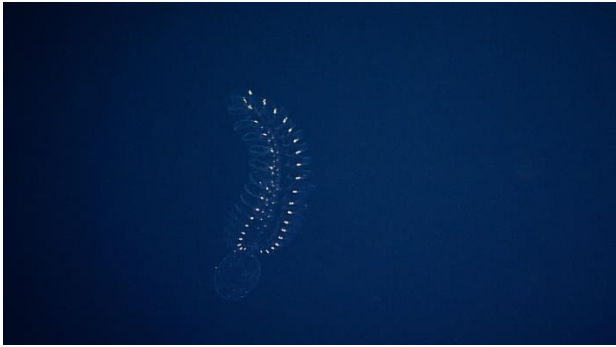
Overall Map of the ROV Dive Area



Close-up Map of Main Dive Site



Representative Photos of the Dive



Doliolids, a pelagic tunicate are so transparent, they are extremely difficult to see with the ROV in their solitary stage. When doliolids reproduce asexually, they form these “nurses,” with chains of offspring trailing behind. Doliolid nurses were extremely common throughout the water column at this site



The myctophids typically avoid the ROV, but this one stuck around just long enough for us to get a good look at its photophores, the key feature for identifying most myctophids. We have sent the image to John Denton, AMNH, for assistance with identifying it.



There are several undescribed species of *Solmissus sp. narcomedusae*, and taxonomists are working on describing these and their ranges. These were seen mostly from 600-650 m.



This *Helicocranchia* squid in the family Cranchiidae was seen at 700m.

### Samples Collected

No samples were collected during this dive.

Please direct inquiries to:

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