

Okeanos Explorer ROV Dive Summary

Dive Information	
General Location	
General Area Descriptor	Kingman Reef and Palmyra Atoll Unit of PRIMNM
Site Name	Palmyra Atoll
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 10
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	Only D2's LSS was functional.		
ROV Dive Summary (from processed ROV data)	<p style="text-align: center;">Dive Summary: EX1705_DIVE10 ^^^</p> <p>In Water: 2017-05-11T20:22:04.026000 05°, 51.357' N ; 162°, 08.032' W</p> <p>Out Water: 2017-05-12T01:26:40.700000 05°, 51.455' N ; 162°, 08.013' W</p> <p>Off Bottom: 2017-05-12T00:53:30.446000 05°, 51.482' N ; 162°, 07.993' W</p> <p>On Bottom: 2017-05-11T20:51:46.362000 05°, 51.325' N ; 162°, 07.979' W</p> <p>Dive duration: 5:4:36</p> <p>Bottom Time: 4:1:44</p> <p>Max. depth: 491.7 m</p>		
Special Notes	Dive time shortened to accommodate transfer of propane to Palmyra Atoll field station.		
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Purpose of the Dive	<p>This dive will investigate the distribution and abundance of benthic fauna, 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.</p>		
Dive Summary	<p>The ROV traversed the SW margin of the Palmyra Atoll between depths of 490 and 300 m. The average slope was ~40 degrees, as measured from the multi-beam; however, steeper sections were observed locally during the dive. The dive cross-submerged reef material that was devoid of Mn-crust material. Sediments and rubble from the upper carbonate platform were also observed throughout the dive, as were calcified algae chips. Minor amounts of terrestrial wood and leafy plant material were observed as falls.</p> <p>Overall the sessile fauna were relatively sparse, particularly compared to the previous two dives <1000 m. This may have been a factor of the currents – we may have been in the lee of the major long-term flow – and/or because of the extreme low oxygen concentration: < 1.0 mg/L and as low as 0.4 mg/L (and 0.2 mg/L at 270 m depth).</p> <p>At landing, the bottom was a sediment-draped slope, pock-marked by erosional features in the carbonate; there were lots of brittle stars, some seastars, and shrimp (<i>Heterocarpus</i>). To the east there was a steep wall clear of sediment with a few coral colonies (biflabellate primnoids, corallid), but we moved west to avoid possible overlap with previous HURL submersible dive tracks.</p> <p>Although the flatter slopes we traversed were sediment draped, we did see octocoral (incl. biflabellate primnoids, acanthogorgiids) and black corals (<i>Heteropathes</i>, <i>Trissopathes</i>, <i>Stichopathes</i>), and <i>Enallopsammia</i> (both yellow and pale white morphs). Several primnoid colonies were seen with zoanthid overgrowth (possibly both <i>Narella</i> and <i>Candidella</i>), including one that also had several different ophiuroids (Ophiacanthidae and an <i>Asterothrombus</i>). At 466 m we encountered a large seafan that from a distance looked like a <i>Leiopathes</i> black coral, but which was tentatively identified as <i>Swiftia</i>. It was much larger than any <i>Swiftia</i> the scientists in the chatroom had ever seen; a sample was collected. Brittle stars and a spider crab (Majoidea) were seen in the branches of the colony. Later we encountered a paragorgiid with many Ophiacanthidae-like brittle stars and a large slug/nudibranch. Extending from one nook in a wall were thin tentacles of what appeared to be a tube-dwelling Terebellidae polychaete – spaghetti worm – that may be the animal responsible for producing the mucousy “spider webs” often observed on dives.</p> <p>At 451 m depth we observed anthropogenic litter in the form of abandoned line; we could not determine if this was fishing line or cable associated with moored instrumentation. Many <i>Coenopedina</i> urchins were around the line. Further on large dislodged carbonate blocks provided substrate for hexactinellid sponges, urchins, paragorgiid bubblegum corals, primnoids, acanthogorgiids, <i>Victorgorgia</i>, yellow <i>Enallopsammia</i>, corallimorphs, and a liponemid pom-pom anemone. On the rock surface below the paragorgiid was the same type of large slug/nudibranch seen associated with a paragorgiid earlier in the dive. A platyctenid ctenophore (<i>Lyrocteis?</i>) and spider crabs (<i>Hyastenus</i>) were seen on a dead</p>		

octocoral skeleton. At 321 m we found a large *Leiopathes* black coral with a dense tuft of pedunculate barnacles in the branches. At the end of the dive we saw under a ledge *Eguchipsammia* scleractinians and a crinoid with striped arms.

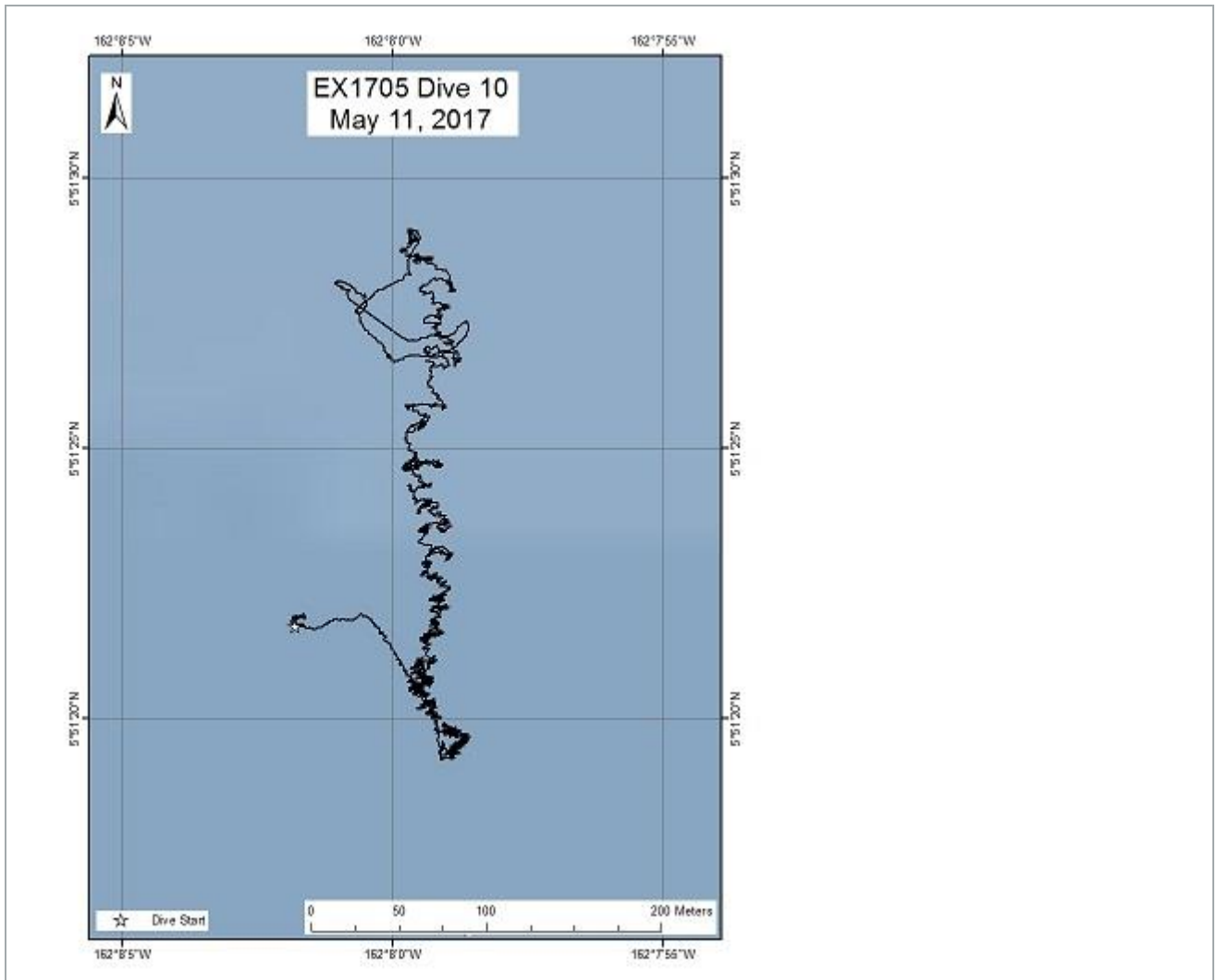
Despite the low [O₂], a good number and diversity of fish observations were made: several scorpionfish; a congrid eel (*Bathycongrus?*) with white fin edges (also seen on dive 7) that was ventilating rapidly to increase oxygen and was pretty lethargic compared to other individuals seen on Dive 7; pointed-snout macrourid rattail (*Coelorinchus*) - a two-barred species that we had not previously seen. After rising above 300 m and seeing [O₂] increase to above 1 mg/L, we saw spikefish (*Hollardia cf goslinei*), gold duckbill fish (*Chrionema chryseres*), silver dollar dories (*Cyttomimus* sp), a right eye flounder (Pleurinectidae) well hidden amongst the crustose coralline plate-sediments, a false moray (Chlopsidae), and several oreos (Oreosomatidae genus *Neocyttus*) and beautiful bright groppos (*Grammitonotus*).

Other biological observations: Cidarid urchins (*Histocidaris*) with barnacles on the spines and one in feeding position on a yellow *Enallopsammia*, echinothurid urchins, the broken test of a heart urchin, *Mediaster* and *Tremaster* seastars; anemones (Exocoelactinidae); galatheoid squat lobsters (including *Babamunida*), pagurid hermit crabs, shrimp; clusters of polychaete tubes as were seen in abundance on the Jarvis Island slope; cup coral.

The midwater today was really different from everywhere else we have explored on this expedition. The acoustically-detected layer of animals was closer to the surface and did not extend to the seafloor, but was thick with animals. The near-surface layer was filled with salps. We saw a lot of fish from 200-250 m, and below that a mix of chaetognaths (arrow worms), fishes, various crustaceans, ctenophores, and a lot of siphonophores. When we transited back up from the seafloor we saw a lot of fish again, but they seemed to be a different species than those we saw on the way down. The high abundance of salps and fish here is indicative of high productivity in the area, because both need a significant amount of food to thrive in high numbers.

Map of ROV Dive Site

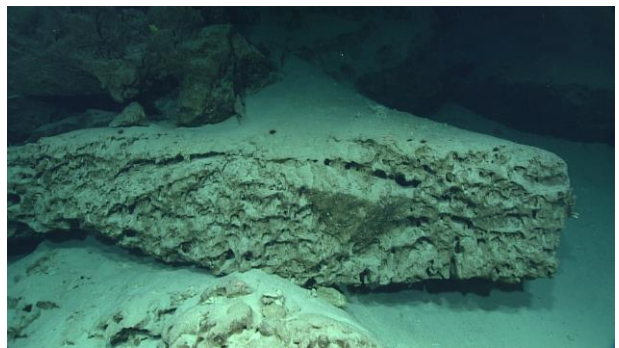




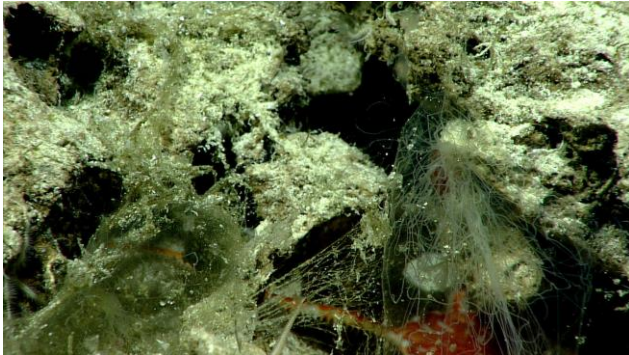
Representative Photos of the Dive



Wood fall and sediment containing calcified algae chips



Submerged carbonate reef material



Thin tentacles of a tube-dwelling Terebellidae polychaete – spaghetti worm – that may be the animal responsible for producing the mucousy “spider webs” often observed on dives

Randall’s snapper swims past two octocoral colonies



False moray Chlopsidae

Primnoid colony (?Candidella) with zoanthid overgrowth

Samples Collected


Sample

Sample ID	EX1705_20170511T215952_D2_DIVE10_SPEC01BIO
Date (UTC)	20170511
Time (UTC)	215952
Depth (m)	466.13
Temperature (°C)	8.47
Field ID(s)	Swiftia
Commensal ID and Field Identification	
Comments	



Sample



Sample ID	EX1705_20170511T233513_D2 _DIVE10_SPEC02BIO	
Date (UTC)	20170511	
Time (UTC)	233513	
Depth (m)	418.39	
Temperature (°C)	8.53	
Field ID(s)	Hexapathes	
Commensal ID and Field Identification		
Comments		

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