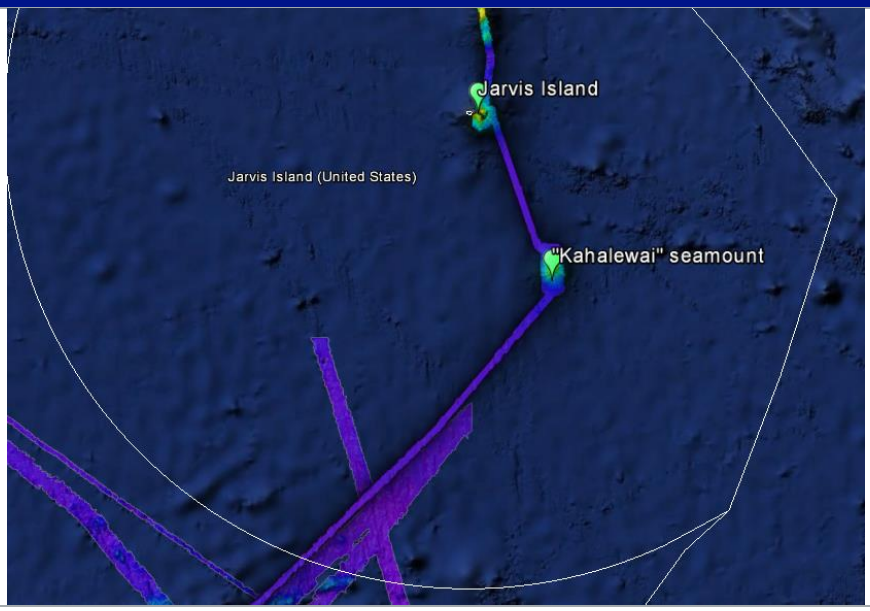
Ocean Exploration and Research

Okeanos Explorer ROV Dive Summary

Dive Information			
General Location			
General Area Descriptor	Jarvis Island Unit of the Pacific Remote Islands Marine National Monument		
Site Name	Jarvis Island		
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 05		
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 5
Equipment Malfunctions	Only D2's LSS sensor was functional.		
ROV Dive Summary (from processed ROV data)	Dive Summary: EX1705_DIVE05 ^^ In Water: 2017-05-05T19:27:17.824000 00°, 23.934' S ; 159°, 58.059' W Out Water: 2017-05-06T03:29:55.069000 00°, 23.554' S ; 159°, 57.863' W Off Bottom: 2017-05-06T03:16:55.462000 00°, 23.463' S ; 159°, 57.951' W On Bottom: 2017-05-05T20:09:56.738000 00°, 23.977' S ; 159°, 57.967' W Dive duration: 8:2:37 Bottom Time: 7:6:58 Max. depth: 819.3 m		
Special Notes			

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

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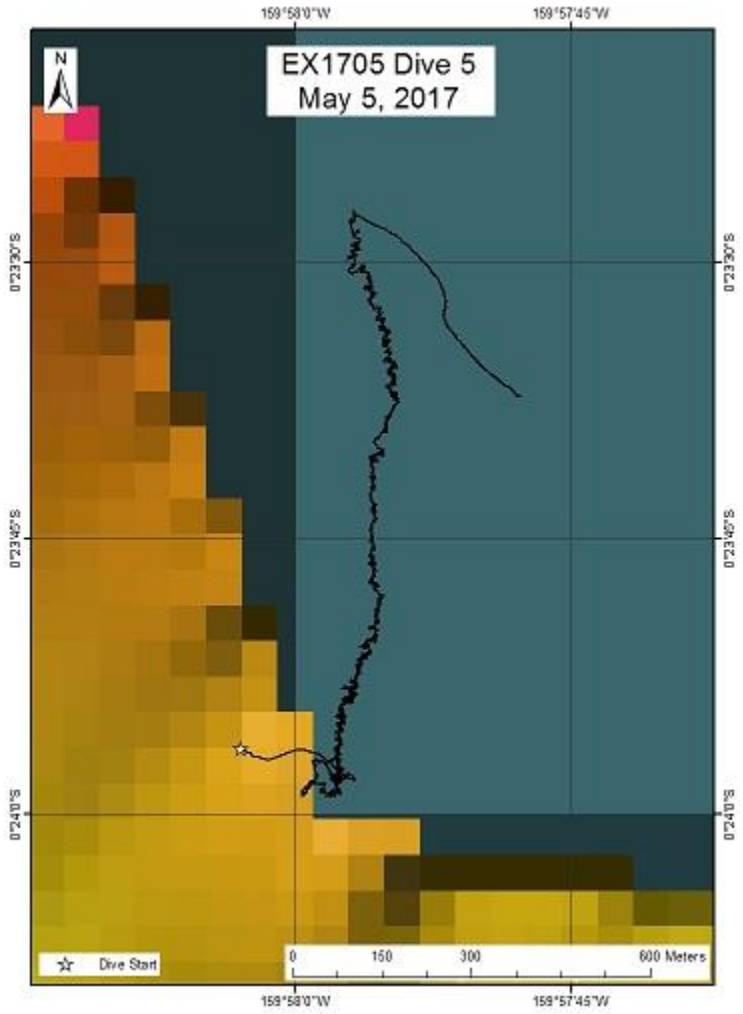
Purpose of the Dive	This dive will investigate the distribution and abundance of benthic fauna on the submerged flanks of Jarvis Island, map substrate composition in order to evaluate the relationship between faunal communities and substrate type, collect rock and crust samples to determine their geological and geochemical properties.

Dive Summary	This dive targeted a small ridge on the southeastern slope of Jarvis Island. The ROV began at a depth of ~800 m and then proceeded up to a depth of ~400 m. The ROV initially encountered coral rubble deposited on top of, or being lightly covered by, fine-grained light-colored sediment. The size of the this rubble, 1-10's cm, suggests that this material was deposited in place (as opposed to having moved downslope), and this is perhaps an indication that the deep-sea coral communities in this area were once more extensive. As the ROV proceeded up slope, outcrops of submerged carbonate reef rock were observed. The number and size of karst features increased as the ROV moved upslope through the carbonate sequence. These rocks were heterogeneous with more massive carbonate sections intermingled with more clastic sections. In some areas, these more massive sections of carbonate made up overhangs that provided rich habitat for suspension-feeding fauna. This was a stunning dive for biology both in terms of abundance and diversity. Where we acquired bottom at 800 m the sedimented seafloor was littered with dead and broken scleractinian coral branches, likely of the genus *Madrepora*. Many small live clumps of *Madrepora* were scattered throughout this coral rubble field. The clumps provided perches for crinoids, ophiuroids, chirostylid squat lobsters, and lepadomorph barnacles. The occasional plexaurid sea fan, *Anthomastus* mushroom coral, and *Chrysogorgia* were seen in this area, as well as a variety of sea stars, sea urchins (Echinothuridae), benthic shrimp, *Geryon* golden crabs, and several fish, including goosefish (Lophiidae *Lophiodes*), rattails (Macrouridae, *Coelorinchus*), oreos (Oreosomatidae, *Neocyttus*) and congrid eels (*Bathycongrus* sp.). Shortly before acquiring bottom we observed black scorpionfish (*Ectreposebastes imus*) in the water column drifting head up with their huge pectoral fins stretched out. These fishes are vertical migrators, a behavior that is uncommon for this group. As we continued upslope we encountered more rock outcroppings; these provided habitat for many interesting sponges, ribbon-like stoloniferous octocorals, cup corals, sea anemones, giant solitary hydoids (Corymorphidae), and the ubiquitous brittle stars. We saw more *Geryon* golden crabs, several females carrying eggs. Further upslope we encountered more exposed carbonate and extensive carpets of small anemones or zoanthids, ledges packed with urchins (Pedinidae?), vertical walls stacked with psolid holothurians (one was collected with the ROV scoop tool), and expanses of polychaete tube thickets that held a variety of fauna (including our first views of caprellid amphipods). At 433 m depth a most incredible predation event was observed: a brittle star (Ophiotrichidae) snagged a squid from the water column and then lost the squid to a second ophiotrichid. The squid may have been a midwater vertical migrator, *Abralia*. At 415 m we encountered bamboo coral colonies (*Isidella*?) being overgrown by a yellow zoanthid, perhaps the gold coral *Kulamanamana*. At 385 m we began to encounter vast areas of low topography dense with primnoid fans (*Thouarella*?) and urchins; at least one primnoid colony was observed with two snails (Ovulidae?) in its branches. The dive culminated in the most spectacular colorful tableau at 375 meters depth: an eroded carbonate structure that took on the shape of a toadstool topped with all

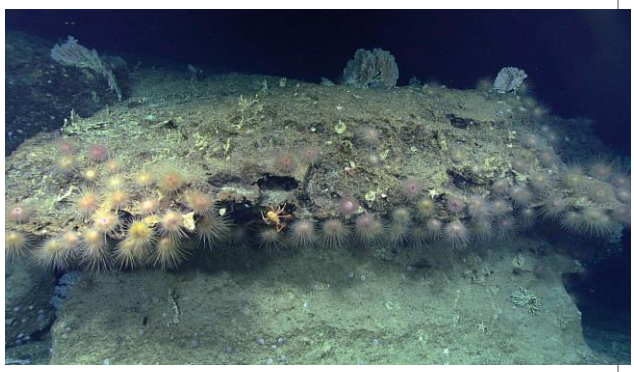
	manner of corals and sponges and mobile animals. The rock below was bare but for hundreds of urchins grazing the seafloor. A school of Randall's Snapper (*Randallichthys filamentosus*) were seen swimming past the feature. Many fish were observed throughout the dive. Especially abundant were congrid eels (*Bathycongrus* sp.) and snake eels (Ophichthidae, *Ophichthus* sp.); the latter have pointed tails they use to dig into sediments to create burrows. Other eels included false moray (*Chlopsis* sp), duckbill eel (Nettastomatidae) and a pair of bright yellow-striped eels (Myrocongridae). Several cusk eels (Ophidiidae) were seen, including *Pycnocraspedum* sp and members of the *Neobythites*. The *Neobythites* were seen repeatedly and exclusively inside and around corals, the first time we have documented a coral association for this group. Mesophotic fishes such as lantern bellies (Acropomadidae, ?*Synagrops* sp), deep-water cardinal fishes (*Epigonus* sp.) and barred basslets (Serranidae - *Plectranthias* sp) were observed. Oreosomatidae (Neocyttus) were abundant, and observations of the following fish were also noted: spikefish (Triacanthodidae *Hollardia*), boarfish (Caproidae *Antigonia* sp), armoured searobins (*Scalicus* sp), Roughy (*Hoplostethus*), codlings (Moridae *Physiculus* sp. and a black-bodied species), tonguefish (Cynoglossidae), gold-spotted duckbill (*Chrionema chryseres*) and several greeneyes (Chlorophthalmidae *Chlorophthalmus* sp), and a smalltooth sand tiger shark (*Odontaspis ferox*). Other corals observed during the dive included octocorals - a tubiculous ribbon coral (?*Telestula*), *Swiftia*-like Plexauridae, several primnoids, *Chrysogorgia* with chirostylid squat lobsters, bamboo coral; Black coral (Antipatharia) – ?*Umbellapathes, Leiopathes*; stony coral (Scleractinia) – *Enallopsammia*, and multiple species of cup corals (including the very colorful *Trochocyathus*). Some other notable observations included the poorly known seastar *Tremaster mirabilis*; basketstars (Gorgonocephalidae); *Pleurobranchea* slugs; dorid nudibranchs (*Plocamopherus*) with knob light organs; an octopus; an *Enallopsammia* coral apparently being grazed by echinothurid and histocidarid urchins; cone snails; spatangoid urchins; and an elbow crab, (Parthenopidae). We observed exceptionally high biomass of pelagic animals on the descent to the seafloor, indicating that there may be some local upwelling around the island. Midwater fish were abundant, especially around 500-700 m. We also saw numerous arrow worms, some comb jellies, shrimp, and mysids during the descent. The 18 kHZ EK60 echogram showed a deep scattering layer (DSL) from ~300 m to the seafloor at the start of the dive. The deeper portion of this layer clearly avoided the ROV after we it transited through on descent. Throughout the dive we also saw some pelagic animals near the seafloor. In particular we saw numerous siphonophores, which are likely a significant contributor to the DSL. We also saw many pelagic sea cucumbers (*Pelagothuria*) that appeared to be stuck on seafloor features.

Overall Map of the ROV Dive Area



Representative Photos of the Dive

Early in the dive, Madrapora coral rubble over fine grained sediments dominated the seafloor. Often medium to small living colonies were surrounded by a significant amount of coral



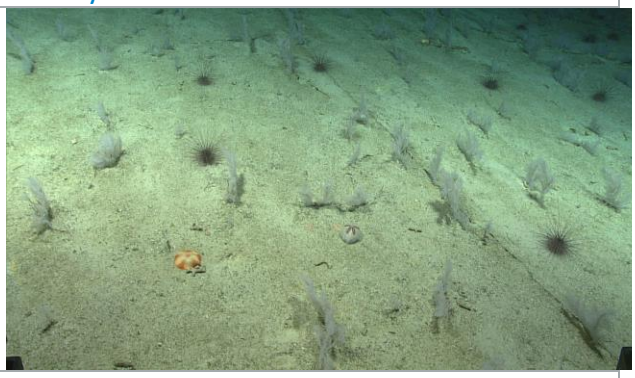
One of the bands of high density organisms, a large number of urchins crowded on a ledge of a carbonate outcrop. Polychaete thickets were seen on the upper surface of this

rubble.

outcrop.

Three brittle stars captured a small midwater squid in the first deep water observation of this behavior.

Close-up of polychaete thicket showing some polychaete cirri extended, with caprellid amphipods on the tubes. Thousands of these were observed during the dive in a high density band.



Carbonate pedestal packed with corals and sponges and associated fauna.

Hundreds, if not thousands, of small primnoid colonies, intermixed with hundreds of urchins covered the slope towards the end of the dive.

Samples Collected

Sample

Sample ID	EX1705_20170506T005454_D2_DIVE05_SPEC01BIO
Date (UTC)	20170506
Time (UTC)	005454
Depth (m)	532.29
Temperature (°C)	7.49
Field ID(s)	Holothurian Psolidae
Commensal ID and Field	

Identification	
Comments	

Please direct inquiries to:

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