

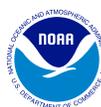


## Okeanos Explorer ROV Dive Summary

Dive Information	
General Location	<p style="text-align: center;"><b>Gulf of Mexico 2017</b></p>
General Area Descriptor	Gulf of Mexico
Site Name	Horn Dome (MC036)
Science Team Leads	Diva Amon and Charles Messing
Expedition Coordinator	Brian Kennedy
ROV Dive Supervisor	Dan Rogers
Mapping Lead	Mike White
ROV Dive Name	
Cruise	EX1711
Leg	-
Dive Number	DIVE17
Equipment Deployed	
ROV	Deep Discoverer
Camera Platform	Seirios



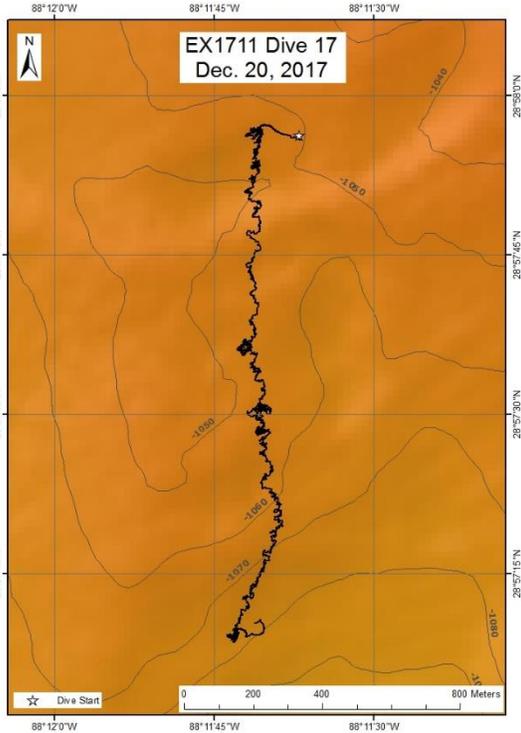
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Purpose of the Dive	<p>The dive target was within a proposed Flower Garden Banks National Marine Sanctuary expansion zone. We targeted the northwestern-edge of the dome that had a number of BOEM seismic anomalies and water-column bubble targets detected by the NOAA Ship <i>Okeanos Explorer</i>. The primary objective for this dive was to acquire baseline information on the distribution and abundance of benthic fauna, including chemosynthetic communities and corals. This aided in gaining insight into the diversity, biogeography, and connectivity of these communities, which has management implications. Improving the geological understanding of the composition and origin of the area was also of importance.</p>		
Description of the Dive	<p>Throughout the dive at 'Horne Dome', the ROV traversed areas of hydrocarbon seepage (discovered at water-column bubble targets) and sedimented seafloor between 1053 to 1074 m depth. Sparsely scattered Vesicomidae sp. shells were observed within the sediment. The sedimented fauna comprised of an abundance (&gt;10) of mating pairs or aggregations of <i>Chaceon quinquedens</i>, many of which had Scapellidae sp. growing on their exoskeletons. Additionally, echinoderms seen included <i>Nymphaster arenatus</i> with accompanying Polynoidae sp., Goniasteridae sp. (<i>Peltaster</i> or <i>Plinthaster</i>), and <i>Zygothuria</i> sp. <i>Parapagurus pilosimanus</i> with commensal <i>Epizoanthus</i> sp. as well as <i>Glyphocrangon</i> sp. were also observed. Fishes and skates included <i>Synaphobranchus kaupii</i>, <i>Ilyophis brunneus</i>, <i>Gadomus arcuatus</i>, <i>Hydrolagus alberti</i>, Macrouridae sp., <i>Hariotta</i> sp., a large and well-camouflaged <i>Dipterus linteus</i>, <i>Stephanoberyx</i> sp. and <i>Aldrovandia affinis</i>.</p> <p>'Horne Dome' featured four previously-undiscovered methane seeps with small associated chemosynthetic communities. Most of these seeps were associated with small sedimented mounds suspected to contain methane hydrate. Some of these features also had authigenic carbonate outcrops. Methane-bubble streams were observed at every site, with methane hydrate forming where bubbles were leaving the seafloor or under overhangs. The hydrate was yellow in colour indicating impurities in the gas hydrate or an oily coating on the surface of the hydrate, something that has been seen in other parts of the Gulf of Mexico. <i>Hesiocaeca methanicola</i> (ice worms) were observed in depressions on the hydrates.</p> <p>The chemosynthetic communities differed from those observed during other dives in EX1711. They were comprised of live and dead vesicomid clams</p>		



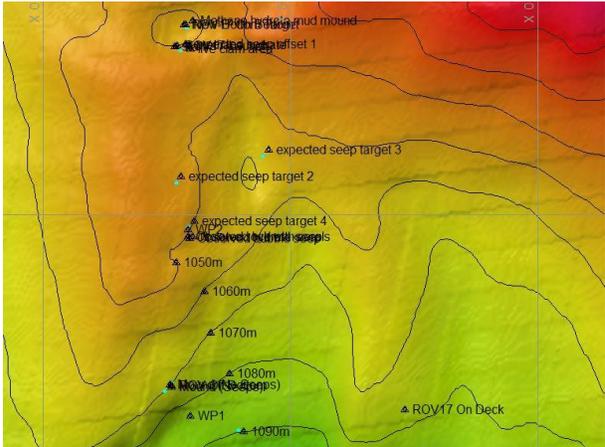
partially buried within the sediment and many *Lycodes atlanticus?* resting on the seafloor. Bacterial mats, blackened reduced sediment and *Lamellibrachia* sp. with Zoanthidae sp. growing on the tubes were also common. *Kanoia meroglypta* and *Phymorhynchus* sp. were also observed fringing blackened sediment and white bacterial mats. Some of these *K. meroglypta* hosted juvenile *Bathymodiolus* sp., which were also seen on nearby carbonates. Large *Cataetyx laticeps* were observed in many of the seep depressions, as has been seen on previous dives. *Neolithodes* sp. and brooding *Chaceon quinquedens* were seen in one of the seeps. Notably, one of the chemosynthetic communities was found in a pockmark-like feature, perhaps a collapsed methane-hydrate mound. The last seep had a slightly different faunal assemblage in that it also included adult *Bathymodiolus* sp., many *Leptochiton micropustulosus*, and two potential species of Vesiciocymidae sp. rather than one as previously observed during this dive.

An outcrop of authigenic carbonate located in an area where no obvious activity hosted a different faunal assemblage. Echiurans with green proboscises, solitary cup corals, ophiuroids, *Gracilechinus alexandri*, *Telesto?* stoloniferans, cladorhizid sponges, squat lobsters, polychaetes with a tentacle crown (Ampharetidae or Terebellidae), a monoplacophoran, encrusting demosponges, cerianthids and actinarians. Other observations included marine debris, a *Bathocyroe* sp., and *Siboglinum* sp. sparsely distributed in seemingly inactive areas.

Overall Map of the ROV Dive Area



Close-up Map of Main Dive Site



Representative Photos of the Dive



An authigenic carbonate rock ledge with orange methane hydrate deposits. Methane gas bubbles escaping from the seep temporarily freeze in transparent tubes of methane hydrate ice. Depth: 1,048 m.



One of many eel-pouts () observed in association with seeps in depressions characterized by dark anoxic sediment and white bacterial mats. Snails () would often concentrate along the discolored sediment margins. Depth: 1,055 m.



The viviparous cusk-eel, *Cataetyx laticeps*, was common among authigenic carbonate outcrops and boulders associated with a variety of cold seeps, this one characterized by numerous dead clams (). Deep-sea red crabs, *Chaceon quinquidens*, occurred both singly and in numerous mating pairs, at both seep and open sediment habitats. Depth: 1,055.6 m.



Live chemosynthetic clams () with numerous chitons () and snails () among broken authigenic carbonate slabs, cobbles and pebbles at a cold seep at a depth of 1,075 m.

### Samples Collected

#### Sample

Sample ID	
Date (UTC)	
Time (UTC)	
Depth (m)	

No samples were collected



Temperature ( ° C)		
Field ID(s)		
Commensal ID and Field Identification		
Comments		

**Please direct inquiries to:**

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