*Okeanos Explorer* ROV Dive Summary

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| Dive Information | | | | | |
| General Location | |  | | | |
| 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 | | | |
| 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 | | None | | | |
| ROV Dive Summary (from processed ROV data) | | Dive Summary: EX1711\_DIVE17  ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^  In Water: 2017-12-20T14:27:52.396000  28°, 57.914' N ; 088°, 11.661' W  Out Water: 2017-12-20T22:35:04.151000  28°, 57.141' N ; 088°, 11.706' W  Off Bottom: 2017-12-20T21:53:19.635000  28°, 57.152' N ; 088°, 11.714' W  On Bottom: 2017-12-20T15:05:50.163000  28°, 57.938' N ; 088°, 11.697' W  Dive duration: 8:7:11  Bottom Time: 6:47:29  Max. depth: 1075.1 m | | | |
| Special Notes | | None | | | |
| Scientists Involved  (please provide name, location, affiliation, email) | | |  |  |  | | --- | --- | --- | | **Name** | **Affiliation** | **Email** | | Alexandra Avila | Oregon State University / Nancy Foster Scholar (ONMS) | alexandra.m.avila@gmail.com | | Asako Matsumoto | Planetary Exploration Research Center, Chiba Institute of Technology | amatsu@gorgonian.jp | | Carolyn Ruppel | US Geological Survey | cruppel@usgs.gov | | Charles Messing | Nova Southeastern University | messingc@nova.edu | | Christopher Mah | Dept of Invertebrate Zoology, NMNH Smithsonian | brisinga@gmail.com | | Diva Amon | Natural History Museum, London | divaamon@gmail.com | | Enrique Salgado | NCCOS | enrique.salgado@noaa.gov | | Erik Cordes | Temple University | ecordes@temple.edu | | Lauren Jackson | NCEI-Stennis | Lauren.Jackson@noaa.gov | | Robert Carney | Oceanography and Marine Sciences, LSU | rcarne1@lsu.edu | | William Shedd | BOEM | william.shedd@boem.gov | | William Kiene | NOAA Office of National Marine Sanctuaries | William.Kiene@noaa.gov | | | | |
| Purpose of the Dive | | 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 *Okeanos Explorer.* 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. | | | |
| Description of the Dive | | 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 Vesicomyidae sp. shells were observed within the sediment. The sedimented fauna comprised of an abundance (>10) of mating pairs or aggregations of *Chaceon quinquedens*, many of which had Scapellidae sp. growing on their exoskeletons. Additionally, echinoderms seen included *Nymphaster arenatus* with accompanying Polynoidae sp., Goniasteridae sp. (*Peltaster* or *Plinthaster*), and *Zygothuria* sp. *Parapagurus pilosimanus* with commensal *Epizoanthus* sp. as well as *Glyphocrangon* sp. were also observed. Fishes and skates included *Synaphobranchus kaupii*, *Ilyophis brunneus*, *Gadomus arcuatus*, *Hydrolagus alberti*, Macrouridae sp., *Hariotta* sp., a large and well-camouflaged *Dipterus linteus, Stephanoberyx sp.* and *Aldrovandia affinis*.  '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. *Hesiocaeca methanicola* (ice worms) were observed in depressions on the hydrates.  The chemosynthetic communities differed from those observed during other dives in EX1711. They were comprised of live and dead vesicomyid clams 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 Vesiocymidae 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 actiniarians. 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 | | |
| ../HypackScreenGrabs/DIVE17_Hypack_wide.JPG | | | ../HypackScreenGrabs/DIVE17_Hypack_zoom.JPG | | |
| Representative Photos of the Dive | | | | | |
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| 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 an 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. | | |
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| Samples Collected | | | | | |
| Sample | | | | | |
| Sample ID |  | | No samples were collected | | |
| Date (UTC) |  | |  | | |
| Time (UTC) |  | |  | | |
| Depth (m) |  | |  | | |
| Temperature (°C) |  | |  | | |
| Field ID(s) |  | |  | | |
| Commensal ID and Field Identification |  | | | | |
| Comments |  | | | | |

# Please direct inquiries to:

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