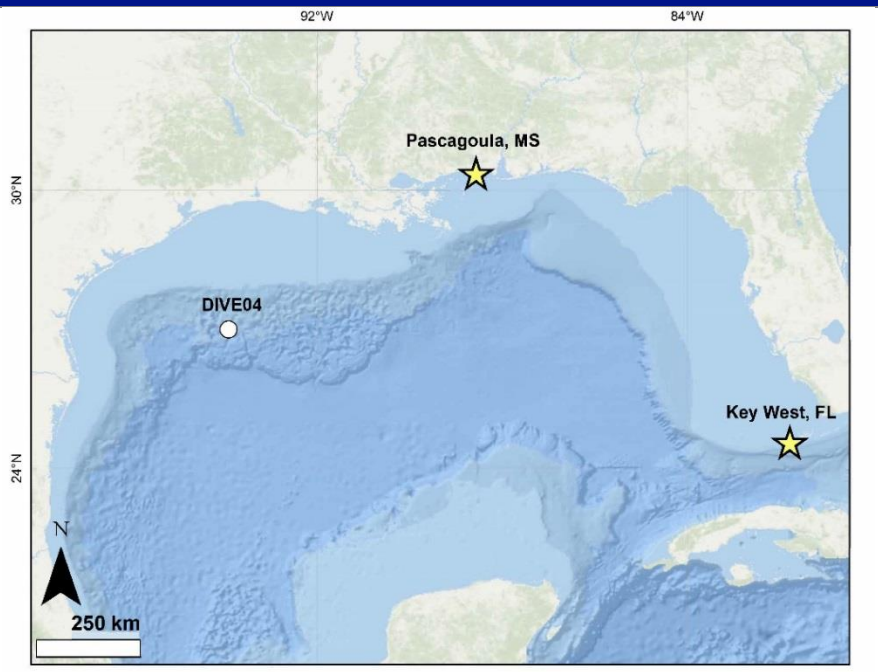
Ocean Exploration and Research

# *Okeanos Explorer* ROV Dive Summary

| Dive Information | |
|---|---|
| General Location Map |  |
| General Area Descriptor | Gulf of Mexico |
| Site Name | Unnamed mound in EB 1009 |
| Science Team Leads | Daniel Wagner (Biology)<br>Adam Skarke (Geology) |
| Expedition Coordinator | Nikolai Pawlenko |
| ROV Dive Supervisor | Karl McLetchie |
| Mapping Lead | Mike White |
| **ROV Dive Name** | |
| Cruise | EX1803 |
| Dive Number | DIVE04 |
| **Equipment Deployed** | |
| ROV | Deep Discoverer |
| Camera | Seirios |

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|---|---|
| Platform | |
| ROV Measurements | ☒ CTD ☒ Depth ☒ Altitude<br>☒ Scanning Sonar ☒ USBL Position ☒ Heading<br>☒ Pitch ☒ Roll ☒ HD Camera 1<br>☒ HD Camera 2 ☒ Low Res Cam 1 ☒ Low Res Cam 2<br>☒ Low Res Cam 3 ☒ Low Res Cam 4 ☒ Low Res Cam 5 |
| Equipment Malfunctions | None. |
| ROV Dive Summary (from processed ROV data) | Dive Summary: EX1803_DIVE04<br>^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^<br>In Water: 2018-04-17T13:21:46.353993<br>27°, 0.746' N ; 93°, 54.673' W<br>On Bottom: 2018-04-17T14:01:54.278261<br>27°, 0.703' N ; 93°, 54.663' W<br>Off Bottom: 2018-04-17T21:07:46.193012<br>27°, 0.37' N ; 93°, 55.026' W<br>Out Water: 2018-04-17T21:33:49.457445<br>27°, 0.239' N ; 93°, 54.972' W<br>Dive duration: 8:12:3<br>Bottom Time: 7:5:51<br>Max. depth: 898.0 m |
| Special Notes | |

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

| | | | |
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| Purpose of the Dive | Dive 4 targeted EB 1009, an area of the Gulf of Mexico that has never before been explored using deep-sea submersibles. The closest historical dive to the site, a single 2009 survey by AUV *Sentry*, was conducted over 12 km to the north in GB 837. Therefore, this dive was highly exploratory in nature, and its main purpose was to survey the area for hard-bottom communities, particularly deep-sea corals, sponges, and associated fauna. The target dive site showed very high habitat suitability for framework-building corals in models developed for the Gulf of Mexico (Kinlan et al. 2013). Furthermore, the area also contained several positive anomalies in the seafloor seismic amplitude map developed for the Gulf (BOEM 2017), indicating that it likely contains hard substrate. Thus, besides exploring a poorly known region of the Gulf of Mexico, observations collected during this dive would also help ground-truth existing models for deep-sea coral habitat suitability and seafloor seismic anomalies. | | | |
| Description of the Dive | The ROV reached the bottom on a heavily-sedimented, flat area at a depth of 895 m at 14:02 UTC. After reaching the bottom, the ROV transited to the west, moving up the flank of a ridge in an area identified as a positive seismic anomaly by the Bureau of Ocean Energy Management (BOEM). The ridge flank was covered with fine grained sediment and had abundant excavation burrows. It also had isolated areas with low amplitude sediment ripples suggesting current flow sufficient to mobilize sediment. Upon reaching the upper extent of the ridge (waypoint 2) at a depth of 850 m at approximately 15:34 UTC the ROV moved upslope towards the peak of an adjacent mound. As the ROV moved up the slope sediment became coarser and intermittently exhibited angular gravel to cobble sized clasts. At approximately 18:00 UTC the ROV observed bedded sedimentary rocks free of sediment cover. These rocks were tan to brown in color and appeared to be highly weathered. At approximately 18:46 UTC fractured blocky rocks with a dark grey to black color were observed on the surface of the mound. It was speculated that this material may be fractured asphalt. At approximately 19:00 UTC the ROV reached the summit of the mound, which was characterized by fully exposed bedded sedimentary rock substrate. Rock | | | |

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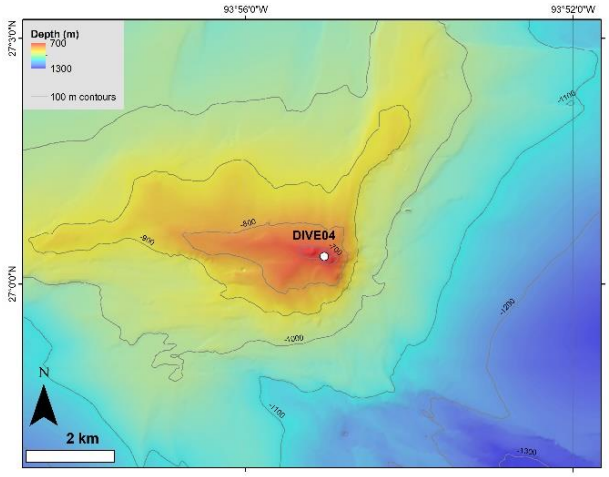
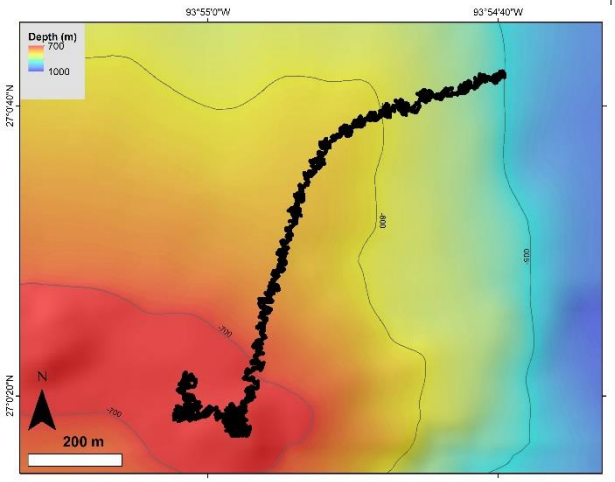
| | samples were collected at 19:28 UTC (EX1803-DIVE04-SPEC01GEO) and 20:12 UTC (EX1803-DIVE04-SPEC02GEO). The ROV explored the summit of the mound in search of a gas seep identified in multibeam sonar water column data collected the previous night; however, it was not located. The dive concluded with the ROV moving to the west toward an adjacent peak.<br><br>The most commonly observed animals were the hake *Merluccius albidus*, the blind lobster *Acanthacaris caeca*, the shrimp *Cerataspis* sp., the red crab *Chaceon quinquedens*, and the squat lobster *Munidopsis spinosa*. Other animals observed included several species of squid (including *Ornituthis antillarum*, *Echinotheutis atlantica*), fish (*Dicrolene* sp., *Gadomus longfilis*, *Synapobranchus* spp., *Conger* spp., *Manducus maderensis*, *Epigonus* sp., *Nezumia* sp., *Diplacanthopoma* sp., *Lophiodes beroe*), the urchin *Echinus* sp., the giant isopod *Bathynomus giganteus*, cup corals, as well as several species of sponges, holothurians and ctenophores. Towards the dive, the ROV recorded three small colonies of the stony coral *Lophelia pertusa*, a stolonieferan ocotcoral and a corallimorpharian. | |
| Notable Observations | Numeours large burrows were seen during the dive, several of which with the blind lobster *Acanthacaris caeca* inside or near them. | |
| Community Presence/ Absence (*community is defined as more than two species*) | ☒Corals and Sponges Present<br>☐Chemosynthetic Community Present<br>☐High biodiversity Community Present | ☐Active Seep or Vent<br>☐Extinct Seep or Vent<br>☐Hydrates Present |

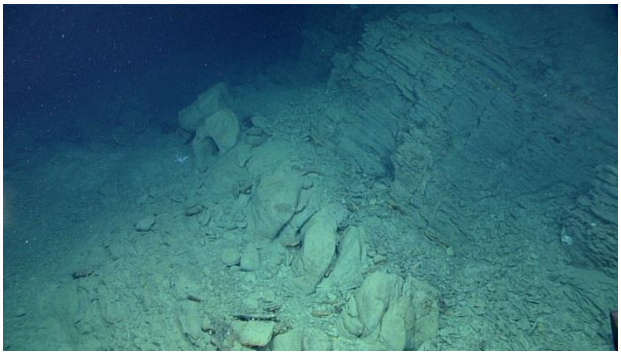
Overall Map of the ROV Dive Area




Close-up Map of Main Dive Site




Representative Photos of the Dive



Rock outcrop observed during the dive.

The blind lobster *Acanthacaris caeca* imaged during the dive.

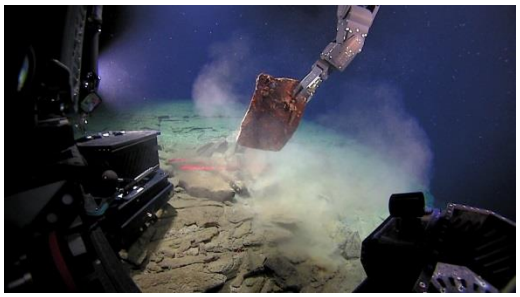
Goosefish *Lophiodes beroe* imaged during the dive.

Rock outcrop observed during the dive.

## Samples Collected

### Sample

| | |
|---|---|
| Sample ID | EX1803_20180417T193128_D2_DIVE04_SPEC01GEO |
| Date (UTC) | 20180417 |
| Time (UTC) | 193128 |
| Depth (m) | 638.65 |
| Temperature (°C) | 7.25 |
| Field ID(s) | Bedded sedimentary rock |



Commensals

| Commensal ID | Field Identification | Notes |
|---|---|---|
| EX1803_20180417T193128_D2_DIVE04_SPEC01GEO_A01 | Caryophyllia sp | 3 live cup corals and 12 dead cup corals N=15 |
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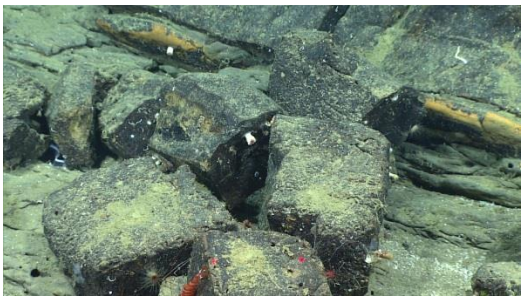
|---|---|
| Comments | |

## Sample

| | |
|---|---|
| Sample ID | EX1803_20180417T201517_D2_DIVE04_SPEC02GEO |
| Date (UTC) | 20180417 |
| Time (UTC) | 201517 |
| Depth (m) | 639.13 |
| Temperature (°C) | 7.71 |
| Field ID(s) | Unknown black rock |



*Interior is tan to grey in color and the oxidized exterior is dark orange to black. Sample is a well lithified sedimentary rock with grains that range in size from silt to fine sand.*

Commensals

| Commensal ID | Field Identification | Notes |
|---|---|---|
| EX1803_20180417T201517_D2_DIVE04_SPEC02GEO_A01 | Caryophyllia sp | N =1 |
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|---|---|
| Comments | |

## Please direct inquiries to:

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