

Purpose of the Dive

Dive 9 was the first of two dives along the flanks of Bryant Canyon, the easternmost of the three large drainage systems characterizing the north-central Gulf of Mexico. This dive, to examine a ridge along the “shallow” eastern flank of the Canyon, was slated for water depths of ~2,600-2,400 m. The dive was nominated by Tim Shank (WHOI) and Brian Kinlan (NOAA). The primary objective was to characterize deep-water coral habitats, and associated geologic environments.

Description of the Dive:

Geological Summary

The vehicles began the dive on a gentle slope in ~2,593 m of water. Upon arrival at the seafloor, the bottom was characterized by soft, unrippled sediment. Current strength was negligible (< 0.02 m/s), oriented ~N (up-Canyon). Very small hardground pieces (“float”) were occasionally observed, generally hosting anemones. However, as the vehicles began to climb, the bottom soon became characterized by ~parallel gullies/rills/mega-furrows. These drainage features were generally ~3-5 m wide and 1-2 m deep (est.). Ripples were occasionally observed crossing the flanks of these furrows. Lengths of these features could not be determined from sonar images, but were certainly at least 10s of m. Floors of these features, oriented consistently at 330 degrees (~downslope), were often wide and flat, but also complexly configured with internal meandering bars and drainage divides. The furrows were also occasionally anastomosing (i.e., cross-cutting), suggesting downslope flows overtopping drainage divides. Discussion initially focused on the possibility that these features might be brine-escape phenomena, although no brine was observed. BOEM input suggested instead that these rills must be formed by periodic downslope sediment flows (i.e., turbidity currents). The base of this slope on multibeam data collected by the EX confirmed the presence of sediment debris at the base of this slope, supporting the second hypothesis.

However, a number of small, circular depressions in seafloor sediment at more than one location suggested mass removal in the shallow subsurface, bolstering the possibility of dissolving evaporites, at least in places. However, BOEM data suggests that evaporites are far beneath the seafloor in this area, so these (non-biologic?) circular depressions remain unexplained.

Hardgrounds associated with these features were generally absent, until the crest of the ridge was reached, when layered outcrops at the seafloor were occasionally observed, supporting high backscatter characterizing parts of the dive track.

The dive ended at a water depth of ~2,396 m.

Biological Summary

Throughout the dive, there were holothurians and ophiroids present, along with unidentified shrimp and *Plesiopenaeus armatus* - deep relative of the royal red shrimp. Present and common to abundant throughout the dive were Holothurian- *Benthoodytes typica*, *Enypniastes*, and two different species of tripod fish. Cerianthids were common, with some flytrap anemones as well as Pennatulacea - *Umbellula* sp. There were a few hexactinellid- *Euplectella*- type sponges, all with osculum facing ~north (up-Canyon). On the initial slope, there was a small patch of rubble colonized by sea stars, swimming holothurians and a hexactinellid - (unidentified, lumpy, 7-8 cm wide).

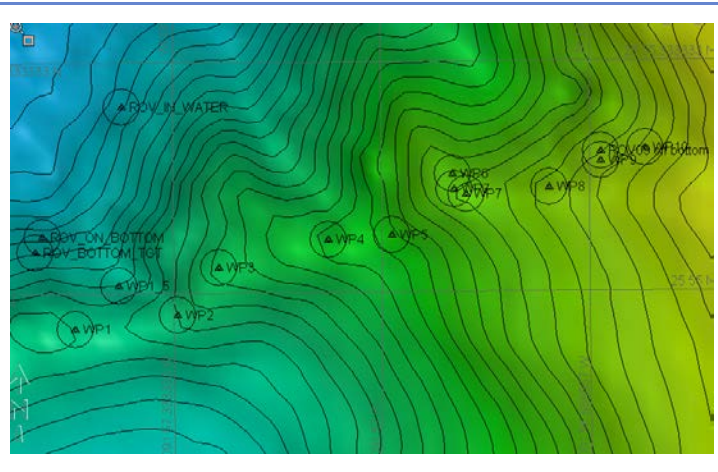
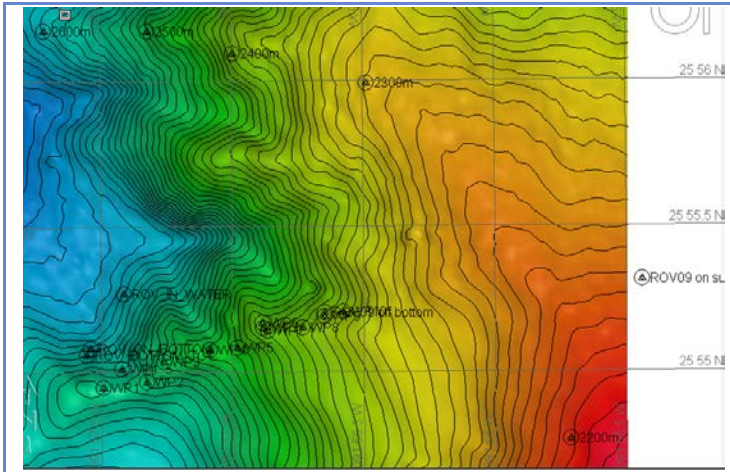
Rare species included a small hermit crab carrying two zoanths on its shell, as well as six unidentified anemones on human debris. One *Euphronides* (swimming holothurian) and one lizard fish- *Bathysaurus* sp. - were also observed

The furrowed area was mostly barren, but with some tube polychaetes, shrimp - *P. armatus*. Holothurians- *Enypniastes* sp. and Psycropotidae, and *Euplectella*-type hexactinellids, were also observed.

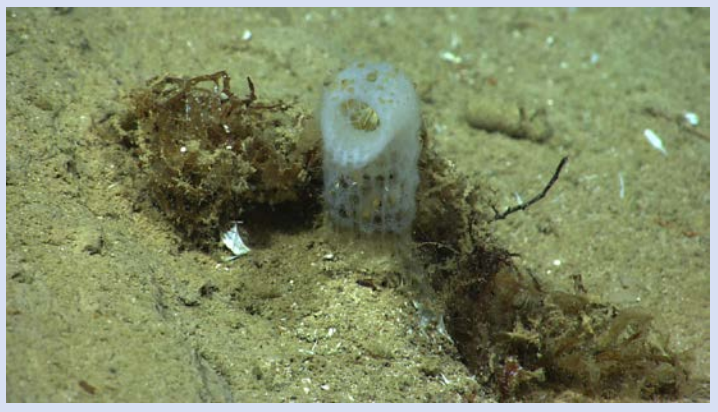
On the crest of the ridge, where there were patches of ~flat (occasionally slightly rippled), unfurrowed seafloor, there were Holothurians - *Amperima* sp. (new to this cruise) sighted. Towards the end of the dive, on occasionally rippled seafloor, there were three species of unidentified anemones on small rocks, as well as holothurian - *Scotoanassa*- type swimming (1st sighting this cruise), Ophiuroidea – *Ophiomusium?* sp.

Overall Map of ROV Dive Area

Close-up Map of Main Dive Site



Representative Photos of the Dive



EX1402L3_IMG_20140421T172722Z_ROVHD_CHANNEL.jpg;
~parallel gullies/rills/mega-furrows that make up the sea floor

EX1402L3_IMG_20140421T184304Z_ROVHD_SPO.jpg; A
Euplectella-type tube sponge faces up canyon.

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