DIRECT OBSERVATIONS OF A LARGE ACTIVE MUD VENT ON THE LOUISIANA CONTINENTAL SLOPE

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Abstract

High resolution geophysical data taken in support of drilling offshore acreage frequently reveal impressive evidence for expulsion of fluids, gases, and sediments on Louisiana's continental slops. Features resulting from extrusion of sedimentary materials at the sea floor range from small pock marks and vents a few meters in diameter to mud diapirs and volcano-shaped cones of sediment that can be greater than 1 km diameter.

In September 1989, the Johnson Sea-Link research submersible was used to study a large active mud vent in the Green Canyon Area, Blocks 143-144. This accretionary feature had a positive relief of approximately 70 m and a diameter of about 300 m. Flanks of the volcano-shaped mud vent were composed primarily of fine-grained sediment pocked by small burrows and grooved by gravity-driven downslope sediment transport. Lithification of the cone flanks was evident in isolated areas, many of which are undercut perhaps by escaping fluids and gas, and along ridges oriented down the cone sides. These ridges of the cone flank ridge and groove topography were found to have undergone surface lithification. The lithified materials were composed of both host sediments (terrigenous muds) cemented with aragonite and Mg-calcite and isolated authigenic carbonate buildups (<1 m high). Analyses of both these carbonate features and cements in host sediments revealed that they were extremely C-13 depleted, suggesting an origin related to the microbial degradation of hydrocarbons.

The crater at the apex of this feature was approximately 40 m diameter and rimmed by levees <1 m high, which marked former levels of fluid mud in the crater. Bacterial mats composed of a giant bacterium, *Beggiatoa* (up to 200 um diameter), covered the fluid mud surface within the crater. Gas escaping from the crater floor caused fine-grained sediments to be entrained in the water column. A turbid cloud was formed that subsequently cascaded down the crater flank. Sediments collected from the crater floor contained abundant crude oil and gas. Two dives were made on this mud vent. Gas was observed escaping from the crater only during the second dive. The conditions responsible for development of these impressive features and their frequencies of eruptions are not well-known.

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