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Gas Hydrate in the Northern Gulf of Mexico: New Insights Learned from Giant Piston Coring

The northern Gulf of Mexico hosts numerous seafloor (<7m subbottom) occurrences of gas hydrate. The seafloor is dominated by salt-tectonic basin structures, high sedimentation rates (about 40 cm/yr), and complex late Neogene stratigraphy with common seafloor failures. Natural oil and gas seeps are abundant, usually associated with fault conduits resulting in numerous hydrocarbon vents, often capped by gas hydrate when the seeps are within the hydrate stability zone. While gas hydrate is relatively common at the seafloor, the lack of bottom simulating reflections on seismic records suggest that gas hydrate at depth is largely absent. Thus, it is unknown if there are significant gas hydrate accumulations in reservoir sediments away from faults. To address this question a cruise was conducted with the IMAGES (International Marine Past Global Changes Study) and PAGE (Paleoceanography of the Atlantic and Geochemistry) programs aboard the Marion Dufresne in July 2002. Eighteen giant piston cores, up to 38-m long, and four giant box cores up to 9-m long, were recovered along seismic reflection transects in widely different geologic environments in water depths ranging from about 600-1300 m. The transects were designed to extend from known seafloor gas hydrate occurrences across the adjacent basin to background sediments away from any gas venting sites. Gas hydrate was recovered in four cores from previously known venting sites in subbottom depths of about 3 to 9-m, but was not found in adjacent basins. Our results confirm the presence of gas hydrate in near-seabed sediments in the northern Gulf of Mexico.