AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003

Harry Roberts[1], James M Coleman[1], Jesse M Hunt[2], W. W. Shedd[3], Roger Sassen[4] (1) Louisiana State University, Baton Rouge, LA (2) Minerals Management Services, New Orleans, LA (3) Minerals Management Service, New Orleans, LA (4) Texas A & M University, College Station, TX

Seafloor and Subsurface Geology of Gas Hydrate Exposure Sites—Northern Gulf of Mexico Continental Slope

Using 3-D seismic surface amplitude maps as guides for collection of seafloor verification data (manned submersible), new sites of exposed gas hydrate are being found each year. Relating over a decade of direct observation and sampling (grabs, cores, water and gas samples, etc.) from the northern Gulf's continental slope to an extensive database of 3-D seismic has produced a new understanding of the importance of fluid and gas expulsion in shaping the surficial geology of the continental slope. Within the spectrum of response features related to the rate and volume of discharge of hydrocarbons, formation fluids, and fluidized sediment, exposed gas hydrate and associated features have a unique intermediate position. Rapid flux systems are generally sediment-rich and they transfer heat from the subsurface, thus eliminating surface gas hydrate exposures. Ideal intermediate flux settings provide a constant source of gas for maintaining hydrate exposures and rebuilding them after dissociation from thermal loading by the water column (such as the passage of a warm Loop Current eddy). Echo sounder records indicate gas plumes in the water column over most exposed gas hydrate sites. Initial spectral analyses of seafloor topography indicate a high degree of topographic variability at exposed gas hydrate sites. This variability arises from authigenic carbonate buildups, small-scale expulsion features, and mound-like exposures of gas hydrate. Both faults and subsurface salt masses focus fluid and gas transport to the modern seafloor.