

Plumbing the depths of the northern Gulf of Mexico: recent understanding of Cenozoic sand dispersal systems and ultra deep reservoir potential

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The northern Gulf of Mexico Basin (GOM) contains a succession of Jurassic through Holocene strata that is as much as 20 km thick. Sediment supply from the North American continent has filled nearly half of the basin since its inception, primarily by offlap of the northern and northwestern margins. This sedimentary prism displays one of the best-described and most complex assemblages of gravity tectonic structures to be found in the world. More than two-thirds of the sediment entering the GOM during the Cenozoic has bypassed the shelf margin into the slope and deep water, since that is where the ultimate accommodation space was located.

The next exploration frontiers in the northern GOM are in the Middle to Lower Miocene slope and abyssal plain environments in the deep shelf, and the Paleogene in deepwater. The exploration challenge is to high-grade the preferred stratigraphic sequences where the slope and basin systems are more likely to hold high hydrocarbon potential. These two unique challenges are addressed by a gulf-wide regional study employing the most advanced depth imaging tools. Since conducting an encompassing 3D survey of the basin is not economically feasible, a regional grid of 2D survey lines was targeted to intersect key wells in order to constrain the seismic data and to facilitate the velocity model building process. Integrating the Gulf of Mexico Basin Depositional Systems (GBDS) data points, wells, and these regional 2D gulf-wide data is a step forward in improving our understanding of the complex depositional and petroleum systems in the northern GOM basin.
