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Seismic Stratigraphy of the Neogene Sequences in the Gulf of Mexico

Seismic exploration in the Coatzacoalcos offshore region (southern Gulf of Mexico) traditionally focused on the mapping of structural traps related to salt diapirs. Such structures are readily identifiable on 2-D seismic, and are already mapped in fair detail across the Gulf region.

The recent acquisition of 3-D seismic volumes allowed for significant advances in our understanding of the basin stratigraphy, paleo-environments, and evolution through time. The focus now shifted towards the interpretation of depositional systems and the construction of stratigraphic models, by employing the methods of sequence stratigraphy. This allowed for a substantial diversification and increase in the number of prospects identified in this part of the Mexican offshore.

Our sequence stratigraphic work commenced with the younger and relatively undeformed Neogene deposits that overlie the main salt bodies and compressional (12.5 Ma) structures. The shift through time of the shelf edge received particular attention, as this constrained the geographic distribution of the shelf versus deeper water (slope and basin floor) settings. Forced regressive, normal regressive, and transgressive packages have been identified and mapped along regional dip-oriented cross sections from paleo-shorelines into the coeval deep marine settings. A variety of play types have been recognized, including shoreline systems, shelf-edge deltas, slope submarine canyons, and basin floor fans. The shift in the location of depocenters through time was further studied by using regional cross-sections flattened at the main seismic horizons. This paper presents the results of ongoing research, which brings a new perspective for petroleum exploration in this Mexican Gulf region.