

Deep-water depositional settings, process, and depositional elements of the Miocene in the southern part of the Gulf of Mexico

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The petroleum exploration in deep-water depositional settings is important, due to the discovery of significant oil and gas reserves located in these depositional settings. However, studying these deposits is not easy because of their variability and complexity as well as the difficulty of conciliating the features of modern and ancient systems. For this reason, the understanding of the stratigraphic architecture, facies distribution and factors controlling these deposits is critical. Moreover, detailed stratigraphic and facies analyses are the most important tools for the study of ancient turbiditic systems.

In this study, the interpretation of the depositional sedimentary environments was performed with the integration of multiple data sets (biostratigraphy, cores, well-logs, and seismic). The sedimentological interpretation (main sedimentary facies, facies associations and depositional process) were combined with the interpretation of depositional elements based on seismic facies and 3D seismic-derived plan-view images.

The results showed that the deposition during the Miocene occurred in paleobathimetric environments that vary from Upper Slope to Lower Slope. From the seismic interpretation the main depositional elements identified in this study were channels, channel-levee systems, frontal splays, sandy debrites and mass-transport deposits.

13 depositional facies and 5 facies associations were identified from the sedimentological interpretation. According to this information the main depositional process are turbidity currents (high-density and low-density), debris flows (mud flows and sandy flows), deposition from fallout of suspended hemipelagic mud particles and in minor proportion liquefied flows.

Finally, the interpretations from different data sets determined that the depositional environments present in the Miocene for this area are submarine fans (channels and frontal splays) deposited in an irregular paleotopography with topographic lows and highs controlled by salt tectonics.

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