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Sequence stratigraphy of the Miocene section, southern Gulf of Mexico

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ABSTRACT

This study focuses on the interpretation of stratigraphic sequences through the integration of biostratigraphic, well log and 3D seismic data. Sequence analysis is used to identify significant surfaces, systems tracts, and sequences for the Miocene succession.

The depositional systems in this area are dominantly represented by submarine fans deposited on the slope and the basin floor. The main depositional elements that characterize these depositional settings are channel systems (channel-fills, channel-levee systems), frontal splays, frontal splay complexes, lobes of debrites and mass-transport complexes.

Five genetic sequences were identified and eleven stratigraphic surfaces interpreted and correlated through the study area. The Oligocene-lower Miocene, lower Miocene and middle Miocene sequences were deposited in bathyal water depths, whereas the upper Miocene sequences (Tortonian and Messinian) were deposited in bathyal and outer neritic water depths. The bulk of the Miocene succession, from the older to younger deposits consists of mass-transport deposits (Oligocene-lower Miocene); mass transport deposits and turbidite deposits (lower Miocene); debrite deposits and turbidite deposits (middle Miocene); and debrite deposits, turbidite deposits and pelagic and hemipelagic sediments (upper Miocene). Cycles of sedimentation are delineated by regionally extensive maximum flooding surfaces within condensed sections of hemipelagic mudstone which represent starved basin floors. These condensed sections are markers for regional correlation, and the maximum flooding surfaces, which they include, are the key surfaces for the construction of the Miocene stratigraphic framework. The falling-stage system tract forms the bulk of the Miocene sequences. Individual sequence geometry and thickness

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