

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

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Distribution of the Sedimentary Facies of a Middle Miocene Third Order Sequence, in Tiger Field, South Marsh Island, Offshore Louisiana Using Integration of Seismic Attributes and Sequence Stratigraphy

The lower part of middle Miocene (10.5-12.5 my) third order sequence, from "Tiger Field", South Marsh Island, offshore Louisiana was studied, integrating sequence stratigraphy with seismic attributes and well data to establish the depositional setting, facies morphology and reservoir character. Rapid fluctuations of sediment supply, and relative sea level change on the Northern part of the broad shelf setting of the Gulf of Mexico resulted in the evolution of the of sedimentary facies, which is reflected in the lateral variations of seismic reflection character. Using biostratigraphic data from 9 wells, several chronostratigraphic surfaces were matched to sequence boundaries and maximum flooding surfaces that were interpreted, correlated and extrapolated to 40 adjacent wells. A 3-D seismic interpretation of these chronostratigraphic surfaces was established and tested using the seismic attributes (amplitude, coherence, etc). A series of chrono surfaces, proportional to the previous seismic chrono surfaces, were built for intervals of 4 mille seconds and were used to infer the evolution of the facies. The combined analysis of sequence stratigraphy from the 3-D seismic and wells suggested that the sediments of the studied interval were deposited within a Lowstand System Tract, forming incised valley fills, delta sands and mouth bars as part of a shallow deltaic marine setting. These sand bodies become potential hydrocarbon traps, some of which have been identified and drilled and the others are new potential targets for production.