AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

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Depositional History and Genetic Sequence Stratigraphic Framework of the Middle Miocene Depositional Episode South Louisiana

Two widespread, transgressive deposits associated with the faunal tops Amphistegina B (15.5 Ma) and TextulariaW (12.5 Ma) define the Middle Miocene depositional episode. Sediment supply-salt interaction, subsidence and sea-level changes produced a mosaic of linked structural and depositional systems. Three distinct structural provinces are identified: The western province is characterized by continuous E-W orientated faults with minor salt spreading. The highly-subsided central detachment province is bounded by distinct lateral faults, shallow salt bodies, and a thin MM depisode, produced by salt withdrawal, structural rebound, and differential subsidence. Arcuate-seaward-dipping normal faults (Roho system) and counter-regional faults formed intricate pathways for sediments to reach the basin floor in this province. The eastern province was very stable with minor salt withdraw.

Four regressive cycles separated by maximum flooding events divide the MM depisode: Cycle1 (AmphisteginaB-Cibicides opima), cycle2 (Cibicides opima-CristelariaI), cycle3 (CristelariaI -- Bigenerina humblei), and cycle4 (Bigenerina humblei-TextulariaW). Regressive cycle facies patterns were modified by high-frequency sea level fluctuations.

Characteristic depositional systems in cycles 1 and 2 are fluvial dominated platform and shelf margin deltas fed by the mixed-load central Mississippi fluvial system in the western and central structural provinces. During cycle2 collapse of the shelf margin produced a retrogradational delta fed apron, flanked by a structural-controlled gorge that fed a long-lived submarine fan. During cycle3, main deltaic depocenter shifted eastward, fed by the eastern Mississippi fluvial system, while extensive shore-zone-shelf system tracts occupied most of the western and central provinces. During cycle4 submarine canyons started feeding the eastern portion of the submarine fan.