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Marcello Badali`[1] (1) University of Alabama, Tuscaloosa, AL

Sequence Stratigraphy and Seismic Stratigraphy of the Lower Cretaceous Section in the Northeastern Gulf of Mexico

The Lower Cretaceous (LK) section offshore Alabama and Mississippi has been an interesting petroleum target since the 1970's in the Main Pass and the Viosca Knoll area. To date, no comprehensive analysis of this section in these locations has been published.

This work focuses on the characterization of the sequence stratigraphy and seismic stratigraphy of the LK strata offshore Alabama and Mississippi. 3,500 kilometers of 2D seismic reflection data were interpreted and integrated with GR, SP, lithology logs, and lithostratigraphic picks from more than fifty wells, and with 527 meters of core from the study area and surrounding areas. Seven check-shot surveys were used to integrate the seismic and well data.

In the study area the LK section is composed mostly of carbonates with minor siliciclastic rocks that were deposited in inner-middle shelf, shelf margin, slope, and basin environments. Different well log signature types were associated with different paleoenvironments. Associations of seismic facies helped to ascertain the depositional settings.

Eight major third-order depositional sequences were recognized. The youngest unconformity indicates a deposition hiatus of 20 million years in the MP 253#6 well. Highstand systems tracts and lowstand system tracts deposits are often the only strata seismically resolvable. The shelf margin, characterized by discontinuous skeletal reefs in the carbonate sequences, shifted basinward during the LK. The shelf margin of the LK younger sequences underwent greater subsidence with respect to the back-reef and middle shelf areas. Tectonic activity, occasionally associated with salt movement, was restricted to the shelf margin and slope settings.