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Post Mid-Cretaceous Sequence Stratigraphy and Depositional History of the Northeastern Gulf

The results of a large-scale seismic sequence stratigraphic mapping project reveal a new detailed picture of the post mid-Cretaceous depositional history and depositional systems of the northeastern Gulf of Mexico. The project was based on a 7 x 7 kilometer seismic grid with 90 wells for age, lithology, and velocity control. The study area extends from the eastern side of the Mississippi Delta to the northern West Florida Shelf/Slope. Fifteen post mid-Cretaceous sequences were mapped. The isochrons and facies maps of the fifteen sequences differ dramatically from each other in their distribution pattern and the average sediment accumulation rate, reflecting the changes in depositional regimes and depositional systems through time.

The Upper Cretaceous and the lower Tertiary sequences are similar in depositional styles. They are characterized by mixed clastic and carbonate depositional systems and thin consistently to the south. These characteristics are strikingly different from the underlying Lower Cretaceous carbonate system, marking a dramatic change in depositional regime at the Mid-Cretaceous Sequence Boundary.

In Late Oligocene and earliest Miocene, clastic input diminished, which led to the establishment of an extensive carbonate/reef system extending from Texas to offshore Alabama. This represents another dramatic change in the depositional history of the study area.

The reef/carbonate system was suppressed abruptly by a clastic system in Early Miocene. The clastic sediments of the Mississippi Delta system fed a consistently southeast prograding wedge on the Mississippi/Alabama shelf. Complex deltaic, shelf, slope and submarine fan subsystems developed across the area, providing different exploration targets for hydrocarbon exploration.