Tiber Deep (Keathley Canyon 102): New Insights into Upper Cretaceous Deepwater Plays in the Northern Gulf of Mexico, Part 1: Paleogeographic, Chronostratigraphic, and Source to Sink System Implications

J. W. Snedden, M. L. Sweet, M. Purkey, and R. Weber

ABSTRACT

Newly released cores, logs, and biostratigraphic data from the Tiber well (KC 102 #1) help refine our understanding of the Late Cretaceous paleogeography and chronostratigraphic framework as well as generating new hypotheses for the larger scale source to sink siliciclastic system. Based on biostratigraphic data released by BOEM, we interpret at least the upper 460 ft of this interval to be Cenomanian age and part of the Tuscaloosa Sandstone of the Eagle Ford–Tuscaloosa Supersequence. Intriguingly, the lower 1150 ft of the well are likely Albian age. Approximately 70 % of this interval is composed of sandstone dominated sequence sets that are individually up to 400 ft thick. We interpret these sandstones and mudstones as the earliest bypass of the prominent Albian carbonate margin that had previously prevented siliciclastics from entering the deep Gulf of Mexico basin. These new age data suggest a temporal progression from the Albian basinward shift to the abyssal plain at Tiber and then later backstepping into updip slope systems such as penetrated at MP 395#1, Davy Jones II well (South Marsh Island), the Highlander well (McMoran Jeanerette Minerals LLC #1 in central Louisiana) and finally into Cenomanian shelf margin deltaics of the Judge Digby and other updip Tuscaloosa fields. This temporal trend is consistent with sequence stratigraphic models for lowstand sequence set evolution, though the primary driver appears to be more sediment supply than global sea level changes. Slope and upper basinal equivalent sandstones are locally known as the Dantzler Sandstone, a latest Albian unit found in the top of the Paluxy-Washita Supersequence as penetrated by several wells in the Main Pass and updip areas.

This new information also allows refinement of our model for the evolving source-to-sink transport history. This Upper Cretaceous siliciclastic system yielded the largest grain volume since the Hosston–Travis Peak (Valanginian-Hauterivian) influx in the earliest Cretaceous. However, two

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major differences are apparent. The Hosston–Travis Peak siliciclastics (part of the Sligo-Hosston supersequence) are dominated by the paleo-Apalachicola bedload river system but these sands did not bypass the prominent lower Sligo carbonate shelf margin. By contrast, the Dantzler-Tuscaloosa system, fed by the paleo-Mississippi fluvial axis, was able to by-pass the margin and enter two separate depositional corridors, in Keathley Canyon and Mississippi Canyon. The driver behind margin bypass remains controversial with various deep crustal processes invoked to explain the resulting siliciclastic outbreak. These results show that large volumes of sand were delivered to the deepwater Gulf of Mexico earlier than previously thought and open the potential for a new Albian-age plays in the eastern Gulf of Mexico.