



Restoring the Rifted Conjugate Margins of the Gulf of Mexico: Implications for Exploration Fairways

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ABSTRACT

In this talk we review progress in restoring the non-salt-covered margins of the Gulf of Mexico (GOM) which includes the Yucatan margin of the southern GOM with the Florida margin in the northeastern GOM. We first describe the extent of oceanic crust and the precise locations of its spreading ridge and its fracture zones in the GOM by using an integration of potential fields data with deep-penetration, seismic reflection lines. The oceanic crust formed progressively by slow spreading in the eastern GOM during the late Jurassic in age based on correlations of downlapping sedimentary units onto the top of oceanic crust. Oceanic spreading was asymmetrical with 60% of the oceanic crust found to the northeast of the spreading ridge. As commonly found on slow-spreading ridges, the spreading axis is marked by large volcanoes that formed during the final stages of spreading. The boundary between oceanic crust and thinned continental crust on both the Florida and Yucatan conjugate margins is marked by: (1) the “step-up fault” with the oceanic crust standing higher than the thinned, continental crust and; (2) by a marginal rift basin that acted to localize Louann-Campeche salt deposition. Both the Florida and Yucatan conjugate margins exhibit a common structural style consisting of salt rollers overlying thin, salt-based detachments. We propose the salt rollers formed as the result of long term, Cretaceous subsidence of both conjugate margins in the direction of more rapidly subsiding oceanic crust in the central GOM. The end of salt roller deformation is marked by a prominent, angular unconformity at the Cretaceous-Tertiary boundary. From a petroleum exploration viewpoint, we propose a much larger belt of pre-rift Norphlet dunes that is inferred to have once encircled the eastern GOM.