
The Plate Tectonic, Paleogeographic, and Paleoclimatic Context for the Development of the Mesozoic Gulf of Mexico

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ABSTRACT*

Some of the main uncertainties for exploration are the presence of source rocks and reservoirs. To provide an objective, process based, predictive methodology focused on these problems, global palaeogeographic reconstructions underpinned by data were coupled with state-of-the-art paleo-Earth systems modeling (HadCM3 palaeoclimate model). Detailed paleotectonic and paleoenvironment maps for seven Mesozoic-Cenozoic time slices were prepared and a new method relating topography and bathymetry to plate tectonic environments was used as the basis for paleo-digital elevation models (DEMs). These were gridded in a geographic information system (GIS) and used to provide the topographic and bathymetric boundary conditions for coupled ocean-atmosphere general circulation models (GCMs), and a barotropic model to simulate paleotides. The compilation of the base maps is based on a global database of paleoenvironmental and lithofacies data, the legacy of over 25 years of petroleum geological studies and an equally extensive source rocks database. These data include climate proxies that were used to test the veracity of the modeling results. Here this work is used to provide an understanding of the evolving paleogeography and paleoclimatic context for exploration in the Gulf of Mexico.

*Due to various circumstances, the full peer-reviewed manuscript was not available for inclusion within the Technical Papers section, but is available in the [Addendum](#).