

Cenozoic Structural Evolution and Tectono-Stratigraphic Framework of the Northern Gulf Coast Continental Margin — Revisited After 25 Years

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Abstract

The 1995 publication of the paper Cenozoic Structural Evolution and Tectono-Stratigraphic Framework of the Northern Gulf Coast Continental Margin (Diegel, et al, 1995) reset the general narrative of salt tectonism in the Northern Gulf of Mexico. Previous salt tectonic models suggested the formation of a salt nappe that was ‘pushed’ basinward by sediment loading on the shelf. This publication demonstrated that the formation of salt-withdrawal mini-basins were formed by more local and vertical salt flow and salt-based detachment systems (ROHO) formed by both vertical and localized lateral salt flow. A highlight of the regional study was mapping of the GOM structural framework with definition of structural provinces based on underlying structural mechanisms and autochthonous salt thickness (Karlo and Shoup, 2000). Now 25 years after that seminal publication, aspects of the paradigm merit review and discussion. The regional seismic surveys available to the 1995 study consisted of widely spaced 2D lines with record lengths of 6.0 to 7.2 seconds. Current 2D regional seismic lines now have record lengths between 9.0 and 14.0 seconds, allowing us to see the deeper elements of structures that could only be guessed at before. Widespread availability of 3D seismic time and depth data allow us to see the whole structural system. Our general understanding of passive margins has advanced and we now must consider the GOM in a more evolutionary context. Detailed studies of other salt basins have been done which now highlight the importance of other salt tectonic mechanisms, particularly

the pairing of updip extensional and downdip contractional styles. With this broader understanding, we now know that salt-withdrawal mini-basins on the shelf are similar to, but different from those on the slope.