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# Insights into Structure and Stratigraphy of the Northern Gulf of Mexico from 2D Pre-Stack Depth Migration Imaging of Mega-Regional Onshore to Deep Water, Long-Offset Seismic Data

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## ABSTRACT

Mega-regional, 2D, long-offset PSDM (pre-stack depth migrated) data can provide advances to the interpretation of the framework of the northern Gulf of Mexico because the onshore shelf margins and linked deep water systems can be seen in continuous sections with consistent depth processing. We present an interpretation of one such seismic line from a new composite survey made up of reprocessed PSDM legacy onshore data from Seismic Exchange, Inc. (SEI) and Geophysical Pursuit, Inc. (GPI), and newly acquired ocean bottom cable (OBC) data and existing marine streamer data from GX Technology. The line extends from onshore east Texas to the deep water of the northwestern Gulf of Mexico and displays distinct, large-scale structural styles and salt remobilization events. Robust shelf sediment loading plus regional tilting drive several phases and scales of linked extensional-contractional geologic elements which are more directly seen in these data than on previous data sets. The Mesozoic to Early Tertiary margins are offset by a series of down-to-basin faults starting at the shelf/slope break positions and form a region dominated by extension and salt withdrawal. Each margin progrades out over its own prodelta shale facies, and lowstand wedge sediments expand into the topography created by this extension and salt withdrawal. Oligo-Miocene translation occurred on a detachment in the base Oligocene section with associated allochthonous salt welds. In addition, modest amounts of Neogene translation are recognized at the autochthonous Louann salt level. Minor shortening is recognized in Paleogene thrusting, as well as the more commonly documented Oligo-Miocene detachment folding in the Perdido fold belt and the folding and thrusting in the Port Isabel fold belt.