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Gravity Tectonics in Western Gulf of Mexico

The western sector of the Gulf of Mexico is characterized by gravity driven thin-skinned tectonics in the Tertiary section. Listric extensional growth faults occur in the near shore shallow marine platform, whereas the offshore deepwater is characterized by spectacular growth folds and associated thrusts.

The study area offshore eastern central Mexico (North Veracruz region) encompasses approximately 28,000 km² covered by both regional and detailed 2D seismic surveys. The distribution and origin of the Tertiary sediments are related to turbidity currents fed from two major river systems. Three structural domains have been identified in the research area: extensional, transitional and compressional.

The extensional domain occurs in the platform and consist of both regional and counter regional growth faults. The distribution of these varies along strike from a northern area with large rotated regional growth faults, a central area with dominant counter regional growth faults and a southern area with small regional growth fault systems. The compression domain is known as the Mexican Ridges fold-belt. These have formed in response to up-dip sedimentary loading, basin subsidence and extension during the gravity failure of the continental margin above a thick shale detachment layer. The structures within the compressional domain vary along strike, showing different structural styles such as buckling, detachment, fault-propagation and fault-bend folds. The extensional domain is linked to the down dip compressional domain via a transitional domain locally characterized by the presence of shale diapirism.