
Salt Cored Convergent Transfer Zone in the South Timbalier Block 54, Offshore Gulf of Mexico: New Insights from Balanced Cross Sections and Three Dimensional Structural Models

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ABSTRACT

The structural style of Oligo-Miocene detachment province in offshore Louisiana is characterized by short arcuate regional and counter-regional growth fault systems that form complex transfer zones above shallow, Miocene level salt bodies. South Timbalier Block 54 (ST 54) constitutes one such area where a convergent transfer zone is present between a basinward dipping regional and a landward dipping counter-regional fault. 3D seismic and well data have been used to interpret the structure of four offshore blocks adjacent to ST 54. The interpretation reveals that the eastern and western flanks of the structure contain salt in the footwalls of the main regional and counter-regional faults; the salt rises to a much shallower stratigraphic level in the central part of the transfer zone, thus forming a collapsed crest structure. Secondary antithetic and synthetic faults adjacent to the two main faults and also extending into the transfer zone, are responsible for accommodating slip between the main faults. Kinematic restorations of a series of cross sections across the structure reveal that salt evacuation is a result of sediment loading and growth fault movement and the location of the transfer zone is controlled by the initial geometry of the salt body. A 3D structural model using depth converted horizons, balanced cross sections and well tops has been constructed to accurately represent the subsurface structure. Understanding the evolution of the structure in ST 54 provides insight on similar structures in other areas of offshore Louisiana and aides in establishing the relationship between salt evacuation and transfer zone development.

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