

Structural and Stratigraphic Complexities in Traps Adjacent to Salt Stocks and Ridges in Gulf of Mexico Deepwater Subsalt Plays

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The development of traps targeted in north-central Gulf of Mexico (GoM) deepwater subsalt plays (both Miocene and Early Tertiary age reservoirs) involves interaction between sedimentation and salt movement. Subsidence of sedimentary depocenters into an underlying autochthonous salt layer initiates salt movement into a polygonal network of ridges and stocks between the sedimentary depocenters. Common exploration targets in deepwater subsalt plays are 3-way dip-closed traps against salt ridges, and salt stocks, on the periphery of depocenters. Seismic and well data indicate that structural and stratigraphic complexities within the sedimentary section adjacent to salt ridges/stocks can range from relatively minor to extreme. In cases, these areas are characterized by both structural (steep dips, bed rotation, faulting) and stratigraphic (thinning, unconformities, onlapping beds) complexities. To evaluate the potential of a given prospect, an understanding of the present-day configuration of the trap, as well as, an understanding of the evolution of the trap and the depocenter in which it resides, is required. In this study, prospect to semi-regional scale transects, restorations, and maps based on 3D seismic and well data from the north-central GoM deepwater province, and structural models, are used to illustrate complexities associated with depocenter and trap formation. Given the geological complexities associated with this trap style, seismic imaging to-date has been difficult. Therefore, consideration of models and well-constrained case studies, like those presented in this study, which use well data, and/or are in areas of high quality seismic imaging, should be considered when evaluating subsalt prospects adjacent to salt stocks and ridges.