
Basement Controls on Salt Related Structures in the Northern Deepwater Gulf of Mexico

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ABSTRACT

To understand better the basement configuration of the central Gulf of Mexico and the influence of rift structures on salt related features, a structural analysis was carried out integrating reflection seismic and potential field data. The original Jurassic rift architecture plays a significant role on the distribution of autochthonous salt and the location of subsequent allochthonous salt feeder systems and deep water fold belts.

Basement faults in the Gulf of Mexico consist of a series of horst, graben, and half-graben, prevalently oriented northeast-southwest and offset by northwest-southeast trending transfer fault zones. Louann Salt flowed basinward, from its original depositional location, overriding basement faults. The uneven basement surface facilitated the upward movement of the salt. Diapirs, folds, and salt walls nucleated in proximity of basement features, which also controlled the spatial orientation of the salt bodies.

The regular spacing and offset of transfer zones and related salt bodies, as well as the arrangement of the rifted structures in the eastern portion of the Gulf of Mexico, can serve as a template to be used as a predictive tool, particularly in poorly imaged area beneath thick allochthonous salt bodies. A regional understanding of the tectonic setting and basement influence on salt geometry can help to address risks associated with the play and high grade the most favorable areas for exploration.