

Preliminary 3D Basin Model of the United States Portion of the Perdido Foldbelt, Deepwater Northwestern Gulf of Mexico

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3D basin modeling has proved to be instrumental in evaluating the petroleum system of the US portion of the Perdido Foldbelt in the deepwater northwestern Gulf of Mexico. The 3D basin model utilizes Unocal seismic and potential fields interpretations as well as the results of available well control in the area. An existing 3D regional basin model covering the northern Gulf of Mexico provided regional heat flow trends and access to additional calibration data from a deepwater regional well database. In addition, it allowed us to utilize the results generated by several high-resolution, 3D sub-regional basin models that were previously built for the western and central Gulf. This ensured regional and sub-regional consistency.

The model successfully reproduced the existing Trident and Great White discoveries and confirmed the high exploration potential of additional, undrilled structures in the Perdido Foldbelt. Timing of structural trap formation and hydrocarbon generation/migration, generated volumes and regional migration focus are very favorable in the trend. Modeled scenarios indicate that understanding of timing of erosion in the crestal zones of the compressional folds, the amount of missing section, the distribution of carrier beds and reservoirs, pore pressure evolution, sandstone diagenesis, and autochthonous/allochthonous salt evolution are critical for evaluating remaining exploration potential in the area. Key issues are addressed related to calculated heat flow, reservoir quality, migration directions and calculated volumes and their implications on exploration potential.
