Structural Styles and Regional Play Types in the Mexican Offshore from New Seismic Data

**Cian O'Reilly[1], James Keay[2], Alex Fick[2], Alex Birch Hawkins[1],
Dario Chisari[1], Jason Kegel[2], and Brad Torry[2]**

[1]TGS, 1 The Crescent, Surbiton, Surrey, KT6 4BN, UK

[2]TGS, 10451 Clay Rd., Houston, Texas 77041

EXTENDED ABSTRACT

A complex tectonic history has resulted in several distinct structural provinces throughout the Gulf of Mexico, each with characteristic structural styles and sedimentary sequences. This presentation will provide seismic examples of these various terrains with the new 180,000 km TGS Gigante 2D seismic survey that covers the entire Mexican Gulf of Mexico (Fig. 1).

Geological evolution of the Gulf of Mexico began with Late Triassic rifting followed by Late Jurassic oceanic spreading and then transition to a passive margin. Thick Middle Jurassic salt deposited in rift basins began to move by the Late Jurassic. A stable tectonic setting developed from the Late Jurassic, characterized by carbonate deposition on shallow water structural highs fringing the subsiding oceanic basin. Large Late Cretaceous to Miocene clastic sediment inputs related to events like the Laramide and Chiapas orogenies resulted in gravity sliding and high amplitude fold belts along the western flanks of the basin. Complex compressional terrains in the southern Mexican Gulf of Mexico (Campeche) are overprinted by halokinesis, which also sets up deepwater play possibilities in the Isthmus Saline Basin.

The regional survey is ideally suited to creating a catalogue of structural styles, depositional characteristics, and trap and play types for each of the structural provinces in the Mexican Gulf of Mexico. Examples of transitions between the provinces and petroleum systems are also afforded via the continuous regional grid. Seismic integration with potential field data helps constrain the tectono-stratigraphic framework and provides insights to deep structure and the extent of oceanic-continental crust boundaries.

The Gigante survey also ties regional 2D U.S. Gulf of Mexico data. Although the U.S. Gulf of Mexico is a mature province with over 19,000 exploration wells and extensive seismic coverage, new technologies and play concepts have provided a catalyst to new discoveries of giant fields like Great White and Tobago in the Perdido Fold Belt and Jack and St. Malo in the deepwater Wilcox. U.S. Gulf of Mexico learnings can be applied to the underexplored Mexican Gulf of Mexico with only ~600 exploratory wells.

Trion and Maximino are examples of successes in the Perdido in Mexican waters. Observations of play extensions from the Gulf of Mexico to the Mexican Gulf of Mexico are presented.

...