Seismic Imaging and Interpretation of the Fold and Thrust Belt in the Northwestern Cuban Offshore Sector

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ABSTRACT

The fold and thrust belt of the northern Cuban oil and gas province is a relatively well known petroleum system where several oil fields produce mainly heavy oil. The highly deformed section includes all tectono-stratigraphic units deposited of the continental paleo-margin of North America described in northern Cuba from deepwater environment to large carbonate platforms. The main stratigraphic section is composed by Lower Jurassic to Upper Cretaceous rocks covered by synorogenic sediments of uppermost Cretaceous to Lower Tertiary. The main detachment fault runs along the lower part of the Upper Jurassic section. Other secondary detachments are located at Lower Cretaceous and Eocene levels. The main exploratory target are the hinterland-dipping thrust folds.

The northern Cuban fold and thrust belt extends below the waters of Gulf of Mexico, partially covered by a thick Tertiary section. Seismic information shows an extended triangle zone with large folds associated to the Yucatan Platform in the westernmost area. Anticlines have been mapped also in the central section associated to deepwater sedimentary basins. In the western part, the Florida Platform is also highly deformed. The thrust belt includes several tectonic sheets composed mostly by southernmost tectono-stratigraphic units.

Seismic images are largely deficient in the most part of the area, probably due to imbrications, faults, and high-dipping angles. Improvements in the seismic imaging and mapping have been achieved through special processing of 2D and 3D seismic data. The northern Cuban fold and thrust belt is a demonstrated exploratory play in the Gulf of Mexico.

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