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ABSTRACT

REVISED STRUCTURAL INTERPRETATION OF THE SOUTHERN BASIN, TRINIDAD USING GRAVITY, MAGNETIC, TOPOGRAPHIC AND SEISMIC DATA: IMPLICATIONS FOR HYDROCARBON PROSPECTIVITY OF THE BASIN

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Individual interpretations of Bouguer gravity anomaly and high-resolution aeromagnetic anomaly maps of Trinidad revealed a series of northwest-southeast trending offsets that extend across the Southern Basin. There was a close correlation between the offsets identified on the Bouguer gravity anomaly maps and those identified on the aeromagnetic anomaly maps. The said offsets also correspond to a series of lineaments identified on a digital topography map of Trinidad. When these results were integrated with 2D seismic data, a relationship was observed between the offsets and lineaments identified on the maps and a piggy-back imbricate system of faults on seismic sections (see Figs. 1 and 2 below).

On the northwest-southeast seismic lines, these faults have a sigmoidal shape and steepen with depth. On northeast-southwest seismic lines they are curved and have a flattening downward profile, eventually meeting at a detachment surface.

Based on their geometry and kinematics, we propose that these faults are dextral oblique thrusts formed as a result of recent inclined triclinic dextral transpression occurring at the oblique boundary between the Caribbean and South American plates.

Upon completion of the fault mapping on seismic sections, fault plane maps were created. The surface expression of the faults (indicated by the zero contour line) was compared with a map of the producing fields in the area. The results of this analysis revealed that these faults may have profound implications for the hydrocarbon prospectivity of the basin.

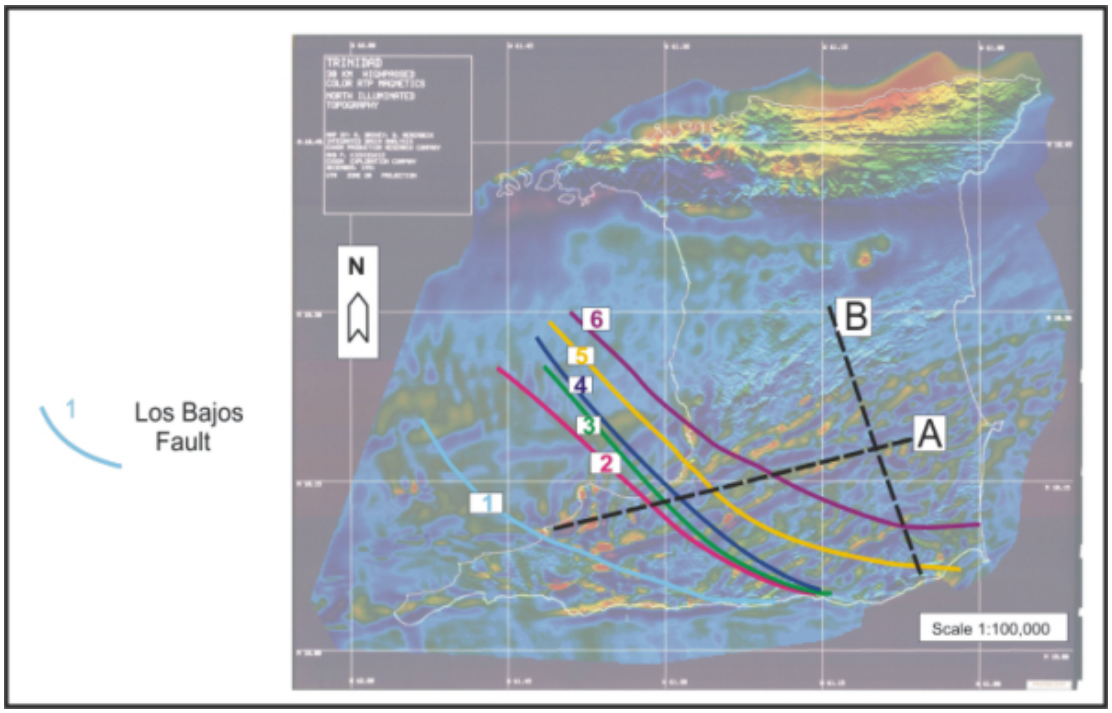

Fig.1. Aeromagnetic anomaly map of Trinidad highlighting the 6 lineaments mapped on the 2D seismic sections. Also shown are the locations of two seismic lines used in this study (see Fig. 2).

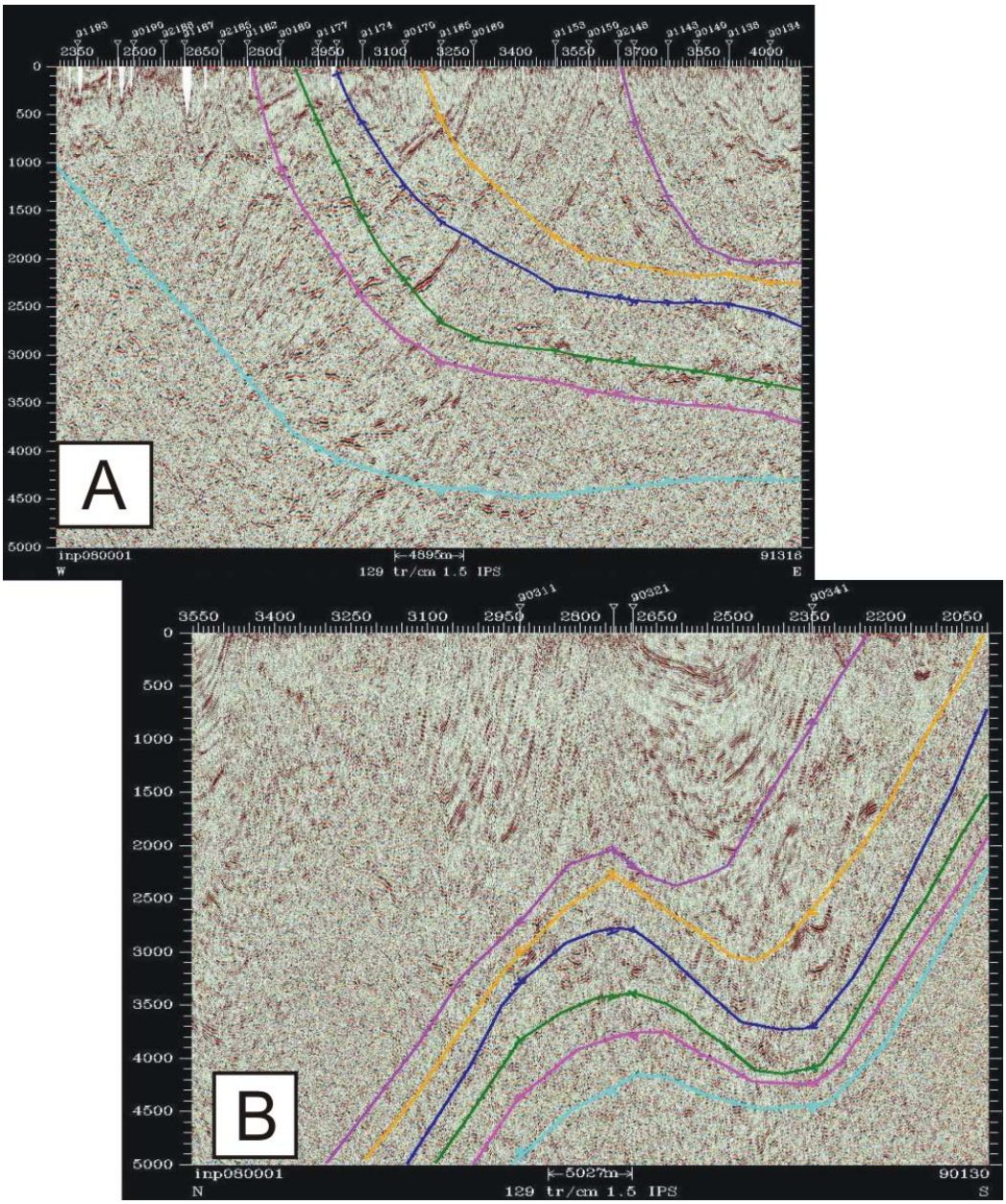

Fig. 2.

A: In a NE-SW direction the faults are curved and have a flattening downward profile eventually meeting at a detachment surface.

B: In a NW-SE direction the faults have a sigmoidal shape and steepen with depth. Sigmoidal-shaped folded faults with an upthrust profile are characteristic of transpression (Lowell, 1997).