TG06
Tectonic Model for Eastern Venezuela and Trinidad since 12Ma

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Abstract

A simple, new 3-stage model describes the tectonic and basin history of Eastern Venezuela and Trinidad for the last 12Ma. The model integrates and synthesizes primary structural and depositional aspects in the region, and is fully consistent with the east-west shear history (@~20-22mm/yr) between the Caribbean and South American plates since about 12 Ma. Seismic sections and regional geology show that strong N-S contraction during Middle Miocene dextral oblique collision between the plates ceased by about 12Ma. At that time, a change in Caribbean motion direction to ~E-W was accompanied by a clear change in structural style in the SE Caribbean where the two plates had collided. Post-12Ma development has been highly transcurrent, with the associated development of a plate boundary zone or zone of orogenic float. Strong transtension occurred from ~12Ma to Pliocene time, initiating new subsidence and creating a new set of basins above the previously-eroded, Serranía del Interior-Northern/Central Range thrust front. Since Pliocene, transpression has dominated and the transtensional basins have become strongly inverted, thereby producing many exploration targets. The Central and Southern Range faults and the "Pedernales Lineament" are examples of inverted, previously transtensional faults. It is speculated that the southern flank of the El Furrial structure (Eastern Venezuela) is also an inverted transtensional fault, and that all these faults are systematically interconnected and genetically related. The model is presented in map view and cross sections to demonstrate paleogeographic implications. Ongoing debate about the relative roles of extension vs compression in the region may be partially reconciled by the model. The modeled deformations have occurred during the time of peak hydrocarbon generation and therefore are critical to further refinement of models for primary hydrocarbon migration patterns in this economically important province.

Manuscript Not Submitted