



Cretaceous to Recent Tectonic History and Controls on Hydrocarbons in the Western Caribbean Sea

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ABSTRACT

We analyze western Caribbean structural styles and depositional controls associated with Late Cretaceous-Cenozoic deformational events using a 1600 km (994 mi) long, regional, NW-SE transect extending from the Cayman Trough in Honduras to northern Colombia. Different structural provinces defined along the transect include: (1) Cayman Trough and adjacent Honduran Borderlands marking the North America-Caribbean, transtensional, plate boundary characterized by late Eocene-Holocene, fault-controlled depocenters; (2) Nicaraguan Rise that includes continental Paleocene-Eocene rocks deposited in sag basins following a Late Cretaceous convergent phase; these basins are overlain by relatively undeformed Miocene-Holocene carbonate and clastic shelf deposits of the Northern Nicaraguan rise; (3) Colombian Basin that includes thick, Miocene, clastic depocenters, and the localized presence of upper Cretaceous rocks overlying the basement. Much of the subsidence in the Colombian Basin is likely isostatic and flexurally-driven given its proximity to the subduction zone of northern Colombia; (4) the South Caribbean Deformed Belt is an active, accretionary prism produced by the subduction of the Caribbean Large Igneous Province beneath the South American plate, which has deformed the Cenozoic prism and forearc section and produced thrust-fault-controlled, accommodation space for upper Miocene-Holocene, piggy-back deposits; and (5) the onshore Cesar-Rancheria Basin in northern Colombia, which has recorded the uplift of its bounding mountain ranges, the Sierra de Santa Marta Massif to the west and Perija Range to the east. Plate reconstructions place the various crustal provinces along the transect into the context of the Late Cretaceous-Cenozoic deformation events that can be partitioned into strike-slip, convergent, and extensional components. Information on various potential source rocks in the area are reviewed including Upper Creta-

aceous shale and carbonate overlying the Caribbean large igneous province and several overlying Cenozoic units. Potential reservoirs include mainly carbonate, reefal buildups.