

Regional to basin scale influence of strike slip tectonism on the evolution of the western Caribbean Margin: implications for petroleum play systems in Patuca and Mosquitia

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The Honduran Caribbean Margin lies on the eastern bound of a major regional left lateral sigmoidal strike slip fault that has influenced the evolution of the Patuca and Mosquitia basins coevally to transfer of the continental Chortis block to the Caribbean plate.

Utilizing airborne full tensor gravity gradient (ftg) and magnetics, satellite gravity and magnetics, and 2d regional seismic interpretation of Cenozoic well-tied seismic horizons, the evolution of the Mosquitia and Patuca basins are seen to have evolved separately through the Cretaceous to Eocene period as Chortis drifted south.

In mid-Eocene times, the onset of Cayman Trough oceanic spreading, and significant Chortis anticlockwise rotation (Boschman et al, 2014) influenced carbonate deposition within the Patuca and Mosquitia basins within two distinctly different palaeo-marine environments.

The Patuca basin developed syn-tectonically on the margin to the sinistral Eocene opening of the Cayman trough, and rifting proceeded eastwards towards the East Basin and further east. Correlation of seismic mapped Miocene carbonate mounds with terrain corrected vertical gravity gradient tensor (Gzz) reveals a sinistral strike slip fault system that has influenced the growth and distribution of the Patuca's carbonate mounds and sub-basins through the Tertiary rift phase.

To the south, the Patuca and Mosquitia basins are bound by a major sinistral strike slip fault mapped from satellite gravity that extends westward towards the Tela Basin, and eastwards to define the northern limit of the Pedro Fracture Zone.

The Mosquitia basin is defined by a large dextral extensional strike slip fault system mapped from satellite gravity and magnetics that extends onshore Honduras to include the Sang Sang Graben north of the Cocos River, and on trend with the Ulua Olancho basin expressed as a prominent residual gravity trough, but buried by a thick sequence of Tertiary volcanics related to prior fore-arc activity on the margins of the Pacific Trench subduction zone.

The western margin of the Mosquitia basin is defined by a dextral bounding fault adjacent to the uplifted and exposed Cretaceous marine section and older metamorphosed exposure of the Chiapas Massif interior. The Patuca anticline mapped by Mills and Hugh, 1974 lies in a transfer zone to a sinistral strike slip fault system that is linked to the Polochic—Motagua- Jocatan fault system that exposes metamorphosed Precambrian section in the west. Between the western Polochic fault margin, and the eastern bounding fault with the Mosquitia Basin, a broad region of compression is defined by a series of restraining transpressional zones on the margin of a regional left lateral bounding fault.

Within the Mosquitia basin, a number of sub basins are defined by a series of extensional dextral strike slip faults correlative between the satellite and airborne ftg-magnetics survey, and at the Base Tertiary and Eocene horizons mapped from the regional 2d seismic. A seismic defined antiformal structure mapped at Base Tertiary level correlates to a fault bound magnetic basement high in the vicinity of Main Cape-1 which suggests there may be further prospects within the southern Mosquitia hosting potential hydrocarbon prospects.

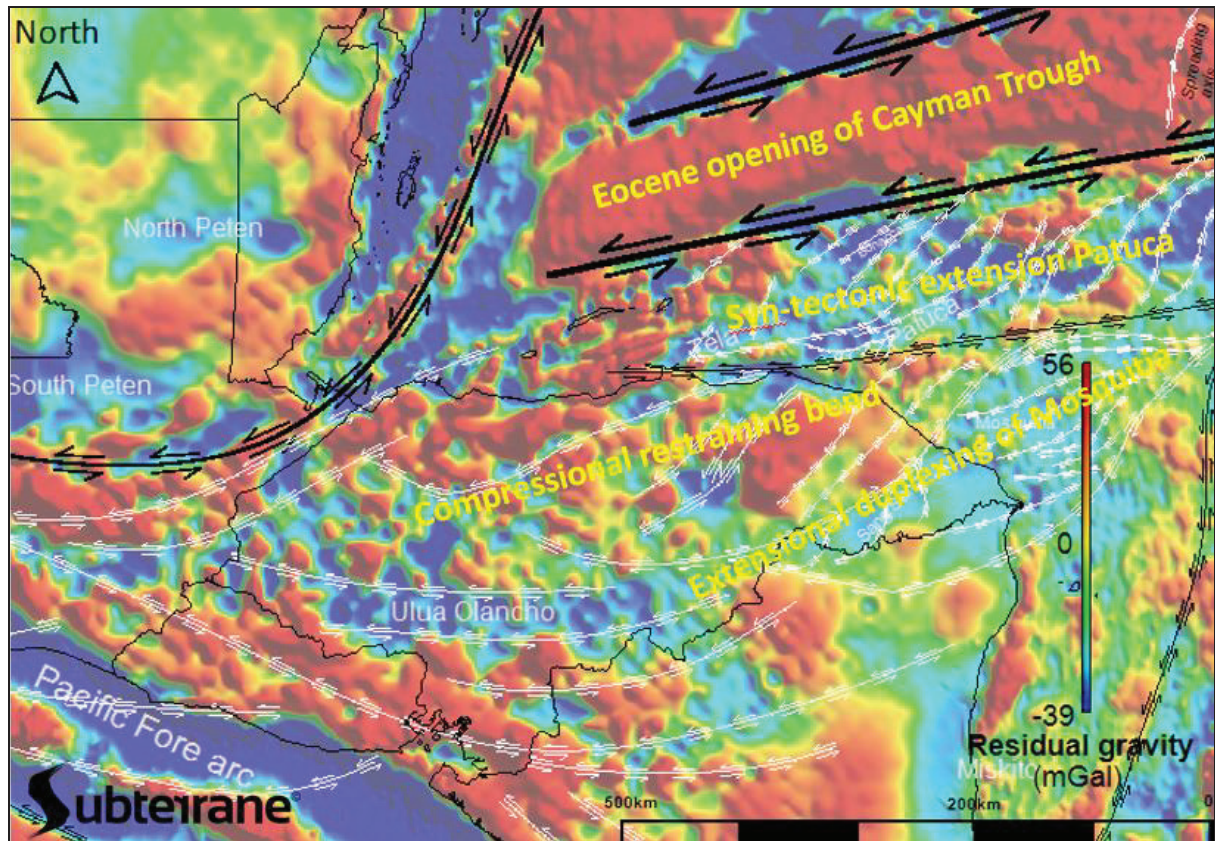


Figure 1: The Honduran Caribbean Margin: Satellite residual gravity derived from Sandwell et al, 2014, showing the main tectonic provinces defining the Patuca and Mosquitia basin systems