

## Caribbean Plate Evolution: Intra Plate Model Observations and Interpretations

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### Abstract

Plate tectonic evolution of the Caribbean has long been a topic of debate. Diverse geological data show complex plate interactions and have led to different schools of thought on plate evolution, the fixist and the mobilist views. Given the diversity of the tectonic terrains in the Caribbean area a combination of alternative models may best explain such complexity. This paper proposes an intermediate view using the concept of intra plate tectonics. This Caribbean Intraplate is a preserved slab of Jurassic to Cretaceous oceanic crust from the separation of North America and South America; this crust would be juxtaposed against the Pacific derived Caribbean large igneous province to the west. This model is based on the following observations:

- 1) Allochthonous terranes of the Caribbean are comprised of: 1) passive margin terrain floored by continental crust, 2) obducted oceanic crust, 3) Cretaceous island arcs, 4) greenschist and blueschist metamorphic rocks, and 5) Eocene to recent accretionary prism.
- 2) There is an area of very thick oceanic crust juxtaposed against an area of relatively thin oceanic crust just south of the Puerto Rico Trench (Anegada Passage).
- 3) Similar deformation styles and associated faulting trends that exist from the Villa De Cura in Venezuela, through to Trinidad and the northern accretionary prism
- 4) Structural restoration within the accretionary prism shows 300km of deformation since Eocene time this is less deformation than what has been previously published.

The Caribbean plate has a number of micro plates within its allochthon, namely the Gonave, the north Hispaniola, south Jamaican, Puerto Rico Virgin Island, Panama and the Maracaibo micro plates. These plates form as a result of the Caribbean-South American plate interaction of distinct geologic terranes since the Eocene. From this the concept of an intra-plate is plausible. Restoration of the accretionary prism suggests 300km of deformation since the Eocene, which is 300km less than what Pindell (2007) predicts. This 300km less can be accounted for by an intraplate. This intraplate consist of oceanic crust and is a remnant of the proto Caribbean opening. A continental fragment within the middle Caribbean area becomes involved in subduction in the Cretaceous creating a SW-NE trending island arc system. This system then collides with northern South America creating obducted blueschist, island arc and continental terrains. Jurassic oceanic crust would exist north of this Cretaceous island arc. This crust is what subducts under the Atlantic oceanic crust to form the Eocene island arcs that exist today. It is this relatively thin oceanic crust that we refer to as the intra plate. The Pacific derived Caribbean large igneous province does exist in this model but it to the west of this intra plate and a subtle boundary separates these two oceanic crust assemblages.