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Pacific Origin of Caribbean Oceanic Lithosphere and Circum-Caribbean Hydrocarbon Systems

Circumstantial evidence overwhelmingly favours a Pacific origin for Caribbean oceanic lithosphere that is allochthonous with respect to North and South America, as opposed to an "intra-American" origin whereby Caribbean lithosphere formed by spreading between North and South America. Direct implications of intra-America models are examined and found to violate dynamics of arc systems and significant aspects of Caribbean geology. Therefore, the kinematic, geometric, and geologic basis for Pacific origin models is presented, including a range of primary aspects requiring a Pacific origin model. For example, continent-verging arc-continent collisions between various portions of the Great Caribbean Arc with the Atlantic-type Proto-Caribbean margins are documented as younging east, from Chortis and Ecuador to Puerto Rico Trench and Trinidad, from Albian to Plio-Pleistocene, in accord with Caribbean-American relative displacements exceeding 1,500 km during that interval. This relative migration is outlined as a function of progressive westward drift of the Americas in the hotspot reference frame as the Atlantic opened, "engulfing" a piece of Pacific crust that is now Caribbean lithosphere. A "non-Caribbean" Paleogene tectonic event is proposed in NE South America that explains the only known relationships contrary to this model. An animation shows the relative migration and origin of larger circum-Caribbean tectonic features. Primary circum-Caribbean hydrocarbon systems are summarised in light of the model, making predictions for deposition of reservoir units, timing and magnitudes of source rock burial, and timing and direction of oil migration in the four circum-Caribbean foreland basins created by Caribbean loading as Caribbean Plate progressed relatively eastwards.