

CARIBBEAN PALEOGEOGRAPHIC SYNTHESIS: THE PACIFIC ORIGIN MODEL

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We further refine our original Mesozoic-Cenozoic Caribbean evolutionary model by integrating new data and modified interpretations of Caribbean geological criteria. Primary advances are: 1) Mesozoic break-up of Pangea is re-evaluated to better define the Proto-Caribbean passive margin elements and the geology/kinematics of the Mexican and Colombian back-arcs; 2) pre-Albian circum-Caribbean metamorphic assemblages are reconstructed into the primitive, west-facing, Mexico-Antilles-Ecuador arc (Great Arc) during NoAm-SoAm separation; 3) the formation and exhumation history of Early Cretaceous hi P/T assemblages, and other criteria, are related to the Aptian-Albian arc polarity reversal and subsequent E-ward migration of the Great Arc and Pacific-derived Caribbean Plate; 4) Jurassic-Lower Cretaceous Antillean ophiolites/cherts may derive from the Mexican-Colombian back-arc of the Proto-Caribbean Sea rather than the Pacific; 5) B plateau basalts may relate to Kula-Farallon ridge eruptions; 6) Late Cretaceous back-arc closure and Cordilleran orogenesis in Mexico and Colombia are tied to Pacific origin of Caribbean Plate; 7) opening mechanisms for Yucatan and Grenada basins remain conjectural, but in our opinion NW-SE and N-S intra-arc spreading in Yucatán (Maastrichtian-Paleocene) and Grenada (Paleocene-Middle Eocene) basins, respectively, best explain these basins; 8) definition of a 3-stage Tertiary relative-motion history for Caribbean-North America, the last stage of which (12 Ma) changed the Caribbean-North American azimuth from E to ENE, and the Caribbean-South American azimuth from SE to E, resulting in wholesale changes in tectonic development in both the northern and southern Caribbean; 9) full integration of Mesozoic-Cenozoic depositional facies and magmatism with plate boundary evolution and intraplate deformations in maps and digital animation, with implications fo