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**Title:** GULF OF MEXICO AND NORTHERN CARIBBEAN EVOLUTION: THE TRICKS ARCS CAN PLAY TO ACCOMMODATE COMPLEX CONTINENTAL MARGIN GEOMETRIES DURING ARC-CONTINENT COLLISION

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**Author 1 (CONTACT AUTHOR)**

Name: James Pindell

Org: Rice University

Country: USA

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**Abstract:** Starting from a closed Triassic reconstruction of western Pangea, the first of two stages in Gulf of Mexico opening comprised NW-SE asymmetric extension within continental lithosphere. The northern and western Gulf was the footwall and Yucatan was the hanging wall. Several metamorphic core complexes rim the western and probably the northern basement break-away zones along the Gulf's margins. Oceanic crust formation or emplacement of "proto-oceanic crust" appears to have started late in Stage 1, but red beds and salt characterise most of Stage 1 deposition as extension continued. In addition to Yucatan, continental crust of the Grand Banks block of the Bahamas also migrated out of the Gulf (eastern part), along Central Atlantic flow lines. Stage 2 involved CCW rotation of the Yucatan Block, leaving a westward-widening fan-shaped swath of oceanic crust with curvilinear transforms in its wake. Eastern Mexico is a Stage 2 transform/fracture zone margin where the central Gulf spreading ridge abutted the continental crust, which continued south through the Isthmus of Tehuantepec west of Chiapas Massif to tie into Proto-Caribbean spreading systems. This Early Jurassic-Valanginian Gulf history produced a complex marginal geometry along southern North America with salients and re-entrants on a many-hundred-km scale. Starting in the Aptian, the Great Caribbean Arc of Pacific/Cordilleran origin began its ENE migration toward this complex margin, the tectonic interaction with which can be described as a set of developmental phases of arc-continent collision. These phases include: (1) mid-Cretaceous sinistral transpressive accretion of arc terranes onto the southern and eastern margins of Chortis Block; (2) Late Cretaceous oblique collision of the arc (Jamaica segment) along southern Yucatan Block; (3) end Cretaceous-early Paleogene obduction of Chortis Block onto Caribbean lithosphere, such that Chortis became part of the Caribbean Plate; (4) a three-plate model for the Paleocene-Middle Eocene opening of Yucatan [intra-arc] Basin; (5) Middle Eocene collision of the arc with the Bahamas; and (6) Middle-Late Eocene nucleation of the Cayman Trough through the northern Caribbean Plate, which connected the Pacific and Atlantic Caribbean subduction zones and allowed North America to continue its westward drift past the Caribbean Plate since the Eocene. This last phase comprises two primary aspects of evolution. The first being the transcurrent dissection of the Great Arc into its component parts of the northern Caribbean islands of today. The second is the ESE migration of the Chortis Block along

southern Mexico and Yucatan, as well as the trench-trench-transform triple junction behind Chortis. The migration of Chortis and the triple junction in turn controlled arc, thrustbelt, and basin development in southern Mexico and Guatemala as the former transform margin has been transformed into a subduction-zone hanging-wall margin.