Evidence of Westward Progression of Multiple Pull-Apart Basins in Central-Eastern Mexico: Transition from Proto-Oceanic Rift to Oceanic Back Arc Setting

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ABSTRACT

New evidence suggests that two major extensional basins were formed at the same time during the Jurassic in Mexico: the Gulf of Mexico Basin and the Arperos Basin of central Mexico. How those were interacting and how they were accommodated between subduction at the Pacific Coast and rifting of the Atlantic are the topic of our research. Preliminary results on the stratigraphy and sandstone provenance of Early Jurassic–Cretaceous clastic basins along a transect from Huayacocotla to Guanajuato has shown: (1) they were continental to the east and marine to the west; (2) they have a short time span of deposition and are followed by carbonate sedimentation; (3) if they recorded volcanism, it has small volumes and is felsic in composition; (4) some were exhumed and shed sediments to younger clastic basins that evolved toward the west; and (5) their ages range from post-Pliensbachian (Xaltipa and Cahuasas) to the east to Berriasian (Arperos Basin). Their setting suggests that they were related to strike slip faults, and were not aulacogens or simple rift basins as previously suggested. The Arperos Basin was a deep marine back arc basin, as evidenced by deep marine volcaniclastic turbidites and radiolarian chert. Preliminary results suggest that the 'continental' crust of Mexico experienced higher rates of transtension-extension toward the west, probably related to higher heat flow associated to coeval active subduction. These models need further testing.

Centeno-García, E., V. Dávila-Alcocer, M. Martini, C. C. Mendoza-Rosales, E. Campos-Madrigal, and G. Silva-Romo, 2011, Evidence of westward progression of multiple pull-apart basins in central-eastern Mexico: Transition from proto-oceanic rift to oceanic back arc setting: Gulf Coast Association of Geological Societies Transactions, v. 61, p. 717.