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Thermo-Tectonic Evolution of Southern Mexico: Implications for Sediment Delivery to the Foreland Basins and the Southern Gulf of Mexico

D. Villagomez, J. Pindell, R. Molina, C. Steffensen, and P. O'Sullivan

ABSTRACT

We have acquired an extensive dataset of new geo/thermo-chronological data from several areas in Southern Mexico to constrain the tectonic history of the region, as well as to determine source-to-sink relationships and burial history. Our analysis acknowledges that not all cooling/heating observed in the source areas is due to erosional exhumation/burial but, in some cases, due to advective heat transfer from magmatic sources, which potentially overprinted earlier events. We have identified a number of areas that have been exhumed since the latest Cretaceous and potentially provided clastic material to the southern Gulf of Mexico area. A summary of our main findings:

- (1) Potential source areas providing quartz-rich material into the southern Gulf of Mexico and the Veracruz Basin during the Paleocene-Eocene included the Sierra de Juarez Complex and the Mixtequita Block.
- (2) Early Laramide exhumation of the allochthonous Chontal Complex in southern Mexico provided oceanic-like material to the Sureste basins. This was a time when the Guichicovi Block was tectonically buried by Chontal. The Guichicovi Block was subsequently exhumed from late Eocene through late Miocene.
- (3) Fault zones representing the North America-Caribbean plate boundary record Maastrichtian-Recent plate interactions. The mobile Chortis Block along with its early Cenozoic arc (whose tail currently floors the Gulf of Tehuantepec), probably provided sediments to Chiapas Basin at least from middle Eocene through the earliest late Miocene. The Chiapas Massif became a topographic barrier only at around 10 Ma.
- (4) The easternmost Cuicateco Belt underwent renewed exhumation since the late Oligocene, providing crystalline material to the Veracruz Basin. The Cordoba platform was exhumed during the same period and provided carbonate detrital material to the northern Veracruz Basin.

Our results highlight the importance of understanding relative block and plate boundary displacements and also ponder the role of major faults when interpreting source-to-sink relationships in the area.