

Long Lasting Interactions between Tectonic Loading, Unroofing, Post-Rift Thermal Subsidence and Sedimentary Transfers along the Western Margin of the Gulf Of Mexico: Some Insights from Integrated Quantitative Studies

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After Jurassic rifting, numerous carbonate platforms (i.e., the Cordoba and Tuxpan platforms) developed during the Lower and Middle Cretaceous episode of thermal subsidence along the western passive margin of the Gulf of Mexico, with intervening basinal domains (i.e., the Tampico-Misantla, Zongolica, Veracruz and Deep Gulf of Mexico -DGM- basins).

During the Late Cretaceous-Paleocene, the east-verging Sierra Madre Oriental-Cordoba thrustbelt developed, resulting in tectonic uplift and unroofing of the allochthonous units (i.e. Orizaba Platform and Zongolica Basin series). This new topography provided also an important source of clastics to feed the adjacent foredeep, where coeval tectonic loading accounted for the bending of the foreland lithosphere. However, shallow water facies or even emersion persisted until the Eocene in the forebulge area (at the present location of the Golden Lane), preventing the clastics to reach the DGM. This topographic barrier was ultimately bypassed by the clastics only during the Oligocene and Neogene, once (1) the prograding clastic wedge had exceeded accommodation, and (2) the long lasting thermal subsidence of the passive margin could overpass the effect of the bending and force the former bulge to sink.

Numerous paleothermometers (Fluid inclusions, Tmax, Ro), PVT and coupled forward kinematic and thermal modeling have been used to calibrate and date the progressive unroofing of the thrustbelt. Coupled tectonic and sedimentologic modelling was applied in the foreland to predict the distribution of sand versus shale ratios in the Oligocene to Plio-Quaternary clastic sedimentary wedge of the passive margin, where gravitational gliding of post-Eocene series occurred during the Neogene along major listric faults.