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The Crust in the Abyssal Plain of the Northeastern Gulf of Mexico: Morphology and Consequences on Opening Models

Recently acquired seismic data in the abyssal plain of the eastern Gulf of Mexico (GOM) allow a precise mapping of the top of the oceanic crust in that region and help to locally decipher the final steps of the Mesozoic opening of the GOM.

There are converging indications from refraction seismic, gravity and magnetic data on the one hand, from regional plate reconstructions on the other to indicate that the abyssal plain of the GOM is underlain by oceanic crust. The seismic morphology of the top basement closely resembles that of recent oceanic crust near spreading centers, with well-expressed transform faults. Due to cooling and contraction, the axial ridge axis is no longer expressed by any relief.

Seismic mapping of the strata above the basement however indicates a progressive "onlap" of the series on the crust. Rather than an actual onlap onto a preexisting high, this relationship is interpreted to reflect the progressive accretion of the oceanic crust during the Mesozoic. The highest onlap roughly coincides with the axis of symmetry between Yucatan and Florida and is interpreted to correspond to the final position of the spreading ridge.

Several well-expressed segments of transform faults trending NE help define the pole of rotation of that phase near north Cuba. The corresponding ridge segments trend SE in the study area. One set of major faults with a different trend south of the Mississippi fan foldbelt could reflect a slight change in spreading direction shortly after the end of the Louann salt deposition.