AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

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The Origin of the Macuspana Basin of Southeastern Mexico with Implications for Petroleum Systems in the Surrounding Area

The Macuspana Basin (MB)is a NNE trending graben 160 km long and 50 km wide in southwestern Yucatán. The Yucatán section is characterized by thick Mesozoic and Cenozoic carbonates, while the MB contains thick Oligocene(?) to Miocene terrigenous clastics. The MB is bordered on the west by a 50 km wide segment of the Yucatan Block named the Reforma-Akal Horst (RAH). Mesozoic carbonates deformed by NW trending Miocene antiforms at the southern and northern ends of the RAH contain most of Mexico's oil, in contrast with mainly dry gas production from the MB clastics.

Existing tectonic models relate the origin of both the MB and the folding of the RAH to Miocene left-lateral transpression from the south. It is difficult to explain how this transpression simultaneously folded the northern end of the RAH and created the 50 km wide MB graben.

A possible analog for the origin of the MB and RAH may be in the Mexia-Talco Fault Zone of Texas; a graben formed by detachment at the zero edge of the Louann Salt. In the case of the much larger MB, the zero edge of salt at the Yucatán margin would have localized Oligo-Miocene detachment of the RAH which then glided over the salt towards the Gulf of Mexico. This sequence of events, if substantiated, will guide exploration to new hydrocarbon plays in compressional features along the western margin of the RAH.