Contrasting Structural Styles of the Macuspana and Veracruz Basins, Mexico

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Abstract

The Veracruz and Macuspana Basins are important gas producers from Neogene sandstone reservoirs in Mexico. Controls of basin structure and tectonic evolution on occurrence and preservation of the Neogene gas accumulations were assessed in joint studies by the Bureau of Economic Geology and PEMEX EyP.

The Veracruz Basin is a Tertiary foreland depression in eastern Mexico, between the Gulf of Mexico and a continental thrust-and-fold belt. Transpressional basin inversion with reactivation of early Tertiary extensional faults resulted in marginal uplifts and downward flexure of the basin center. Folding and thrusting produced a reentrant of uniform vergence in the southeast. Maximum deformation occurred at about 6 Ma. Structural trends and their relation to the gas accumulations were defined in the basin.

The Macuspana Basin is located in southeastern Mexico between the Yucatan Platform and the Sierra de Chiapas thrust-and-fold belt. The early Tertiary history of the basin is poorly understood owing to data paucity and quality, but northwest extension is interpreted to have locally accommodated thick Oligocene shale sections. Middle Miocene shortening of the southern basin margin triggered shale diapirism that dominated until a late phase of basin inversion at about 6 Ma. Inversion produced most of the structural closures for gas trapping.