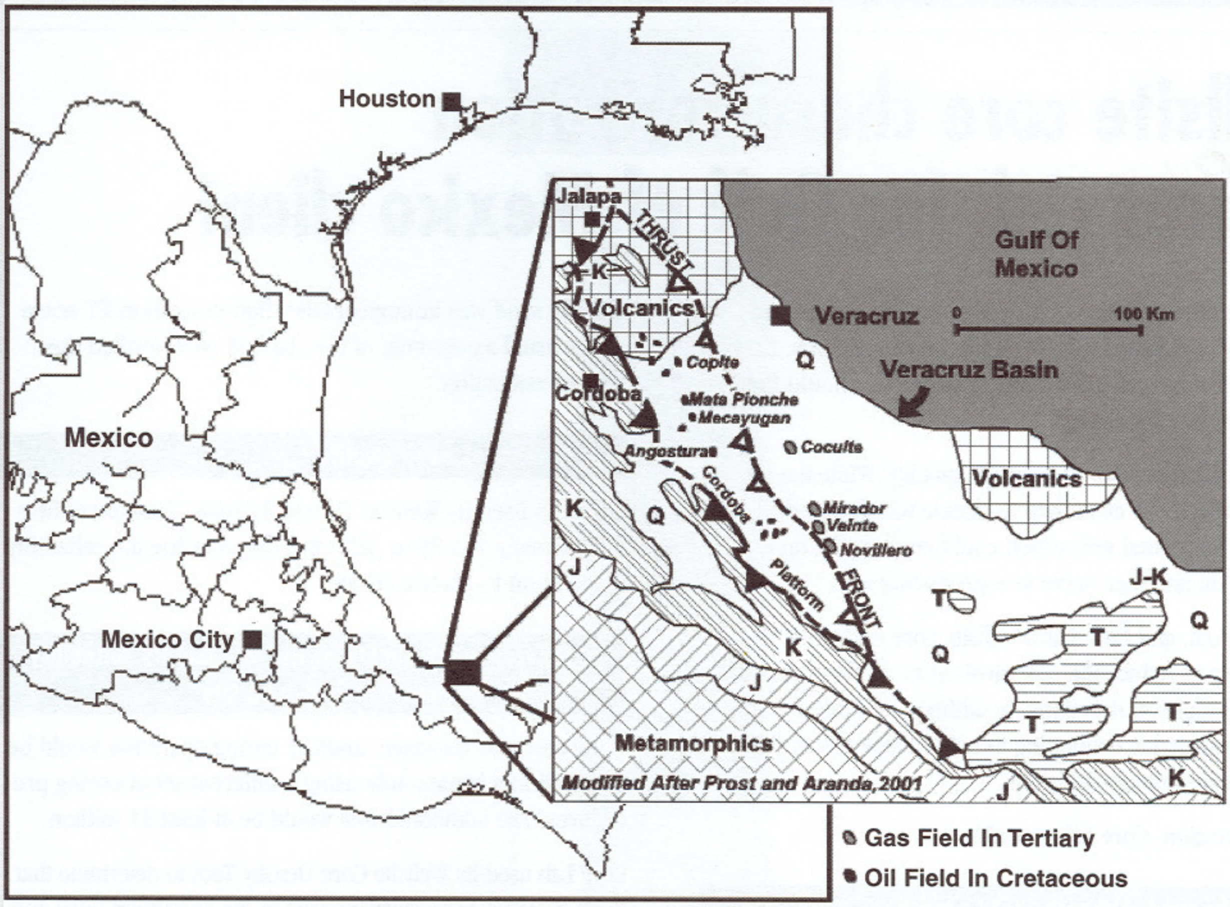
**Monday, October 21, 2002**
Westchase Hilton • 9999 Westheimer
Social 5:30 p.m., Dinner 6:30 p.m.
Cost: $25 Preregistered members; $30 Nonmembers & Walk-ups
Make your reservations now by calling 713-463-9476 or by e-mail to Joan@hgs.org (include your name, meeting you are attending, phone number, and membership ID#).

*by Robert G. Hickman,* et al.
*Structural Solutions*




# Geology and Exploration Potential of the Veracruz Basin

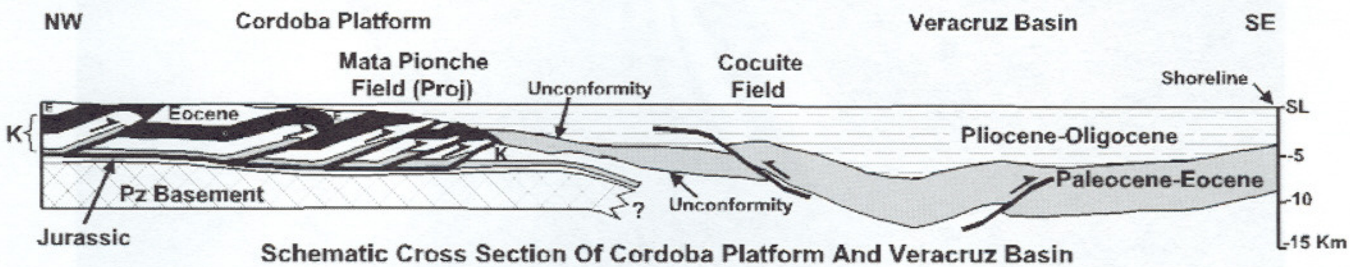
While the Veracruz region of southeastern coastal Mexico has produced oil and gas for 50 years, a joint Pemex-Schlumberger integrated evaluation shows that the Veracruz Basin's exploration potential remains very significant.

The basin has had a complex Mesozoic–Cenozoic evolution. Early Mesozoic rifting divided the Mexican margin into a series of basement blocks separated by a thinned continental crust. During post-rift subsidence, Jurassic and Cretaceous platformal carbonates were deposited on the basement blocks, while basinal carbonates accumulated above areas of thinned crust. In the Late Cretaceous–Early Eocene an east-verging thrust belt developed along the eastern margin of Mexico. This deformation produced an emergent imbricate thrust fan composed of largely Cretaceous strata that forms the western margin of the Veracruz Basin. The basin thus developed in the unusual setting of a "foreland basin" located along a rifted, subsiding continental margin. A rift-related basement fault block, the Teziutlan Massif, forms the northern boundary of the basin; the San Andres Tuxtla volcanic center forms a southern boundary.

From the Early Eocene to the present, the emergent thrust belt has provided sediment to the Veracruz Basin via high-gradient streams. As a consequence of this topography, the depositional setting along the western margin of the basin abruptly changes from one of incised fluvial systems to deep marine environments. As a result of differential subsidence and sedimentation, the thrust front was buried and more than 8 kilometers of Cenozoic sediments accumulated in the basin to the east. Benthic foraminiferal data indicate that most of the sediments were deposited in a bathyal environment (water depth between 200 and 1000 meters) that progressively shallowed through the Cenozoic. Eustatic sea-level changes are superimposed upon this general pattern. ➢

**International Dinner Meeting** *continued on page 17*

## International Dinner Meeting *continued from page 15*




Schematic Cross Section Of Cordoba Platform And Veracruz Basin

In the central part of the basin, Neogene strata show two major depositional cycles. From the late Early Miocene to earliest Late Miocene there was an upward progression from submarine fan deposits to submarine channel and overbank deposits to an eastward prograding deltaic assemblage. A second, earliest Late Miocene–Early Pliocene depositional cycle is characterized by a progression from a submarine channel facies to an eastward prograding shelf-delta facies.

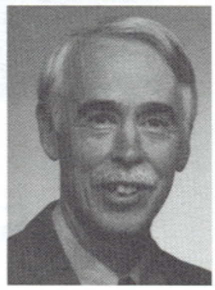
In the Middle and early Late Miocene, a series of fault-propagation anticlines developed across the onshore and near offshore part of the basin as a result of compression probably related to a period of rapid subduction of the Cocos plate beneath the Pacific margin. Offshore, beyond the zone of compressional structures, detached extensional deformation occurred during the Plio–Pleistocene.

More than 400 MMBO and about 1 TCF of gas have been produced from fracture-enhanced Cretaceous carbonates in 16 fields of the buried frontal thrust zone. In the Veracruz basin proper, five gas fields have been discovered in upper Middle Miocene to lower Pliocene submarine channel-levee deposits and amalgamated deepwater sand sheets that are draped over or wrapped around the Miocene anticlines. Recent 3-D seismic surveys have been effective at delineating this play. The Cocuite Field provides a well-documented example of an accumulation in a channel-levee system.

Gas from these latter fields is a mixture of both thermogenic and biogenic gas. Jurassic source rocks underlying the basin are likely over-mature, making Cretaceous oil-prone source rocks and Paleogene gas-prone sediments the most likely sources of thermogenic gas in Tertiary strata. Faults are probable pathways for dominantly vertical migration of thermogenic gas. Biogenic gas was generated in Neogene depo-centers and dominantly migrated laterally toward structural highs.

Currently, the Cocuite-type play is being actively explored and developed. Additionally, in the western part of the basin potential plays include up-dip pinchouts of Paleocene sands beneath unconformities, incised valley fill, shallow marine deltaic deposits, and fractured Cretaceous carbonates thrust over Paleogene clastic strata. In the central part of the basin additional potential exists for channelized reservoirs in older Neogene and Paleogene deposits. Based on facies patterns, submarine fan deposits are inferred to be present east of the central part of the basin.

### Biographical Sketch



ROBERT G. HICKMAN received his BS in geology from Stanford University and PhD in geology from the University of Wisconsin-Madison. He spent much of his career with Unocal Corporation working as a structural geologist and as a coordinator of structural geology/remote sensing. He has expertise in thrust belt complexes, extensional and salt tectonic regions, and has worked on projects in Cordilleran basins, sub-Andean basins, Southeast, South and Central Asia, the Middle East, and the Gulf of Mexico. He is a member of AAPG, GSA, AGU, and HGS and is a certified petroleum geologist (CPG # 5694). Doing business as Structural Solutions, Bob specializes in analysis of complex structures, regional tectonic studies, and fractured reservoir analysis and presents structural courses. He can be reached at: rhickman@pdq.net.

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