

Upper Miocene-Pliocene Plays and their Economical Importance in the Tertiary Veracruz Basin, Mexico

Martin Martínez-Medrano, Renato Vazquez-Benitez, Victor M. Valdivieso-Ramos, Marco Antonio Arreguin-López, and Sergio Rivera-Cruz

Pemex Exploración y Producción, Activo Integral Veracruz, Av. Urano No. 420 Modulo "E"; Col. Ylang Ylang, Bocal del Rio, Veracruz, Ver., México, CP 94298

ABSTRACT

The Tertiary Veracruz Basin (TVB) is located southwest of Mexico City, between the Tampico-Misantla and Salina del Istmo basins. The western limit is a thrust fault with a NW-SE orientation. The eastern limit is unknown given that it extends into the Gulf of Mexico. The sedimentary column exceeds 9,000 m, with basin filling starting in the Paleocene and continuing to the present. The sediments come from igneous, metamorphic and carbonate sources. The sedimentary column is mainly composed of deep-water and shelf deposits.

The erosive action of submarine canyons cutting into the western thrust and folded belt ended during the early Miocene and canyon filling then started. The basin is a depression between the Tuxtlas, the Santa Ana and the Cordoba Platform highs.

Deformation reached its peak during the middle Miocene, causing an inversion of the basin. The old basin changed into two mini-basins separated by three structural trends. These conditions made the E-W sediment influx turn into a NW-SE direction. The calcareous clastic influence on the sandstones ended and igneous and metamorphic sources dominated. Reservoirs of this age are associated with channel-complexes and submarine fans facies.

Tectonic activity occurred episodically during the late Miocene. Meanwhile a NW-SE regressive system began to develop; this is represented by a shelf-to basin progradational sequence, and it reached its peak during the Pliocene-Pleistocene. Reservoirs of this age are associated with thin-bedded channel fills. Channels are laterally amalgamated and show high sinuosity.

From this standpoint the basin shows at least 5 different regional events associated with a massive contribution of terrigenous sediments, which are represented by the following sequences: MS-PL-5.7, MS-6.9, MS-9.2, MM-11.7 and MI-17.3. The sequence with the best porosity and permeability values is MS-PL-5.73, with porosity less than 34% and permeability less than 1 D (Darcy) respectively. The MS-6.98 sequence is second with porosity values reaching 32% and permeability values of up to 795 mD. The sequence MM-11.7 is third with maximum values of porosity of 29% and permeability 943 mD. Finally the MI-17.3 sequence has peak porosity values of 23% and permeability values of 212 mD.

The gas production in the basin was 45 million cubic feet per day in 1977. With the discovery of new reservoirs in these sequences the gas production has increased to a record of 612 million cubic feet per day in early 2006.