
Structural Restoration and Basin Modeling in North-Central Gulf of Mexico Deepwater Subsalt Plays

Van S. Mount, Keith I. Mahon, and Samuel H. Mentemeier

Anadarko Petroleum Corporation, P.O. Box 1330, Houston, Texas 77252-1330

ABSTRACT

The structural development of traps targeted in north-central Gulf of Mexico deepwater subsalt plays (both Miocene and Early Tertiary aged reservoirs) involves interaction between sedimentation and salt movement. Trap development and timing are typically related to subsidence of sedimentary depocenters (which contain Mesozoic source rocks) into the underlying autochthonous salt layer, and emplacement of a salt canopy at a shallow structural level through a system of salt stock feeders. Typical targets in the deepwater play include three-way dip-closed traps developed against salt feeders on the periphery of depocenters, and subtle four-way dip-closed traps in the central portions of depocenters. The timing of trap development, as well as the geometry through time of the depocenter in which the trap resides, are critical elements of the petroleum system that need to be understood to assess geologic risk associated with subsalt prospects in the play. Sequential structural restoration of semi-regional transects based on depth-imaged 3D seismic are used to constrain the timing of trap formation and the geometry of the associated depocenter through its entire history (pre-, syn-, and post-canopy emplacement). The structural restorations are used as input for 2D basin models that allow investigation of timing of hydrocarbon generation, expulsion, migration, accumulation, and preservation through time across the length of the transect.