

FUTURE TRENDS IN STRATIGRAPHIC ANALYSES, MESOZOIC OF MIDDLE NORTH AMERICA

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Exploration models in mature petroleum basins must consider many geologic factors in the search for subtle accumulations. Because the overall stratigraphic and tectonic framework are generally well known for the Mesozoic of Middle North America, emphasis in future stratigraphic analyses will be placed on the following: (1) an understanding of reservoir distribution by reconstruction of environments of deposition; (2) intra-basin syndepositional tectonic influence on sedimentation; (3) sea-level changes and their control on distribution of unconformities, on depositional patterns, and on related diagenesis affecting reservoir quality; and, (4) timing of the maturation and migration of hydrocarbons to traps. Integration of new seismic and borehole data with the improved geologic models will be essential for successful exploration in most petroleum basins.

At the prospect level in exploration, a powerful predictive model can be developed which relates global sea level changes to depositional modeling and tectonics. Regional unconformities, commonly with incised drainages, develop during low stands, whereas more normal marine and non-marine depositional patterns form during high-stands. Examples from the Cretaceous of the Western Interior of North America show the distribution of valley-fill, shoreline and shelf sandstones in relation to the above factors. The recognition of patterns of depositional topography and structural topography, within an area of exploration, is essential in evaluating how a changing sea level controls the distribution of reservoir rock and, therefore, petroleum occurrences.