

Miocene Play Definition and Chronostratigraphic Framework of the Burgos Basin, Northeastern Mexico

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The Bureau of Economic Geology (BEG) and Pemex Exploración y Producción (Pemex) conducted a study of the Miocene chronostratigraphy, structure, geochemistry, and plays in the Burgos Basin and adjacent south Texas within an area of approximately 32,500 km², onshore and offshore (to 500 isobath). Using more than 15,000 linear km of 2-D seismic lines, 98 onshore wells, 2 offshore wells, and paleontological data, we defined plays by age (upper upper Miocene, lower upper Miocene, middle Miocene, and lower Miocene) and paleogeography (shelf, slope, and basin floor). These play types were inferred from depositional geometry and the amplitude character and geometry of reflectors. Sets of parallel reflectors present updip (westward) of shelf-edge clinoforms characterize the shelf play, subdivided into an expanded-shelf play in a zone of major growth faults. The slope play consists of clinoforms and subtle stratal downlaps. The internal architecture of this seismic facies is complex, with downlapping strata indicating locally developed lowstand prograding complexes. The basin floor play comprises parallel sets of reflectors downdip (eastward) of the slope clinoform play. A fourth play type was defined from onlap of strata onto diapirs in the eastern salt province. Areas where intervals are not present due to diapir piercement were also mapped to provide a framework for mapping the onlap plays.

This play framework provides the means for initial exploration of Miocene strata and evaluation of key play elements (reservoir presence and quality, seal, trap, source, and migration) in this structurally complex, underexplored basin. The relative importance of these play elements varies systematically for each play, especially between the onshore shelf plays and the offshore deep-water plays, where fault complexity and stratigraphic variability is significantly greater.
