

### **Detrital Mineral Composition and Reservoir Quality of Lower Miocene Sandstones, Western Gulf of Mexico**

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Future exploration in lower Miocene sandstones in the Gulf of Mexico will focus increasingly at depths below 15,000 ft, and reservoir quality will be an important risk factor in deep to ultradeep reservoirs. Detrital mineralogy of lower Miocene sandstones varies significantly in the western Gulf of Mexico from Louisiana to the Veracruz Basin, Mexico. Petrographic study of 81 lower Miocene thin-section samples from depths of 7,600 to 23,500 ft demonstrates differences in detrital mineral composition, diagenesis, and reservoir quality.

Lower Miocene samples in this study were deposited in on-shelf highstand and transgressive systems tracts and lowstand basin-floor-fan, slope-fan, and prograding-wedge settings. Average composition of sandstones from offshore Louisiana, which were derived from the central Mississippi River draining the Rockies and Appalachians, is Q86F12R2. Feldspar and rock-fragment content both increase toward the southwest in samples from offshore Texas, from Q67F23R10 in High Island and Galveston blocks to Q54F22R24 in Matagorda Island and Mustang Island blocks. Lower Miocene sandstones in this area of offshore Texas were derived from the Red River draining the Rockies and the Rio Grande draining west Texas and Mexico. Lower Miocene sandstones from the onshore Burgos Basin, Mexico, have a composition similar to that of Matagorda Island and Mustang Island blocks of offshore Texas, averaging Q54F22R23. Burgos Basin sandstones were also derived from the Rio Grande. Lower Miocene sandstones from the Veracruz Basin, southern Mexico, contain the highest proportion of rock fragments; average composition is Q33F12R55. Sandstones were derived from the Laramide-age fold-and-thrust belt to the west and volcanic centers to the east. The relative abundance of chemically and mechanically unstable detrital grains influenced burial diagenesis and porosity loss in these lower Miocene sandstones.