

Reservoir Potential and Characteristics of Miocene to Pliocene Sandstone in the Hikurangi Forearc, North Island, New Zealand

Kevin S. Rivera and Kathleen M. Marsaglia
California State University, Northridge, CA

A study of Miocene to Pliocene sedimentary successions in the Raukumara Region of North Island, New Zealand was conducted to determine the petrographic characteristics, provenance, and reservoir potential of sandstone interbeds. The section consists of primarily thinly to moderately bedded, moderately hard to hard mudstone, siltstone, and fine-grained sandstone with lesser fossiliferous sandstone and limestone. Three exposed intervals (total 420m) were measured, described, and sampled at spacing ranging from 2 m to 20 m. All outcrop samples were thin-sectioned and impregnated with blue-dyed epoxy for porosity identification. Select samples were then stained for both calcium-rich and potassium-rich feldspar and covered. To minimize dependency of composition on grain size, 400 sand grains in each thin section were counted using the Gazzi-Dickinson method. Grid spacing larger than the maximum grain size was used to minimize the occurrence of multiple counted grains. Counted grains were divided into 19 mineral grain and lithic fragment compositional categories. Interstitial components were also tallied (e.g. porosity, matrix, and cement). Sandstone samples vary from lithic to feldspathic graywackes and calcite-cemented litharenites to feldspathic litharenites. QFL triangular plots of point count data fall within a zone along the boundaries of three provenance fields; dissected arc, recycled orogen, and transitional arc. Maximum percent porosity is <25%. Overall porosity can be related to degree of bioturbation and proportion of volcanic debris. Surprisingly, the highest porosities are associated with tuffaceous intervals in this forearc basin.