Provenance and Correlation of Upper Jurassic and Lower Cretaceous Reservoir Sandstones in Papua New Guinea using Heavy Mineral Analysis.

A. C. Morton[1,2], B. Humphreys[1,3], G. Manggal[3,5] and C. M. Fanning[4]

[1]British Geological Survey, Keyworth, Nottingham NG12 5GG, UK
[2]Department of Geology and Petroleum Geology, Kings College, University of Aberdeen, Aberdeen AB21 3UE, UK
[3] Petroleum Division, Department of Petroleum and Energy, Port Moresby, Papua New Guinea
[4]Research School of Earth Sciences, The Australian National University, Canberra, ACT 0200, Australia
[5]Mineral Resources Development Company Pty Ltd., PO Box 1076, Port Moresby.

Abstract

Heavy mineral data can be used on a regional or local scale to provide information on palaeogeography and the continuity and correlation of sandstone bodies. This paper provides new data on the source of sandstones in the Papuan Fold Belt. The variations in mineralogy detected indicate the existence of several discrete fluvial systems draining separate parts of the northern Australian craton. Heavy mineral assemblages can be used to indicate the lateral extent and degree of mixing of sand bodies, providing valuable information on the depositional systems of the reservoir sand bodies.

Provenance-sensitive heavy mineral indicators can also be used to characterise and subdivide clastic reservoir sequences. Variations in heavy mineral assemblages allow high-resolution correlation of reservoir sandstones. This provenance-based correlation complements conventional biostratigraphic and wireline log correlation and sequence stratigraphic techniques. Heavy mineral data can be particularly useful for indicating the likelihood of sandbody connectivity within complex heterogeneous sequences. A case example from the Gobe fields is provided to show the applicability of provenance-based correlation to reservoirs in Papua New Guinea.