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Neil Sutherland Meadows¹ (1) Redrock Associates Limited, Wirral, United Kingdom

Mineralogical, Chemical and Sequence Stratigraphy in the Triassic Sherwood Sandstone Group, UK

The prolific hydrocarbon reservoir of the Early Triassic Sherwood Sandstone Group in NW England comprises a 1km+ thick sandstone dominated succession that includes depositional facies representing fluvial channels, aeolian sandsheets, sandflats and playa lakes. The current stratigraphic nomenclature for the Sherwood Sandstone uses the vertical association of these facies to define formation boundaries but makes no allowance for areal variations that have become apparent between wells and outcrops as a result of an expanding database due to hydrocarbon exploration and development in the area.

The application of chemical stratigraphy coupled to both detrital mineralogy and sedimentary facies has confirmed suspicions about diachroneity within the Sherwood Sandstone succession. Additionally, these subtle variations can be used to identify sequence boundaries, correlate individual sandbodies and model the detailed heterogeneity of this complex reservoir. The systematic changes providing the key to this review of Sherwood Sandstone stratigraphy are considered to reflect subtle variations in the provenance of the sandstones that can be traced across the basin regardless of facies.

This modelling has revealed not only that fluvial channel and aeolian/sandflat environments were contemporaneous within the Triassic basins but also that major incised valleys created during episodes of degradation were subsequently filled by dominantly fluvial channel sandstones. The major controls on these areal and vertical variations in sedimentary facies can be ascribed to climatic parameters and conform to recently published models of continental sequence stratigraphy in which climatic variations are seen as a major control upon degradation and aggradation within fluvial systems.