

# **PS Impacts of Regional Allogenic Forcing on a Single Depositional System: Example from the Sherwood Sandstone Group, UK\***

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## **Abstract**

The Triassic Sherwood Sandstone Group offers an opportunity to study outcrop and borehole sections through a dryland fluvial system whose lateral correlatives are exploited for hydrocarbons and groundwater; it also suffers contamination from a legacy of industrialisation over the past 250+ years. A detailed understanding of flow, and processes that influence flow through this rock unit is therefore relevant to the development of reservoir and contaminant management strategies. This study assesses five regions which, as a result of allogenic forcing, show variations in the lithofacies architecture and arrangement at both regional and local scales. This includes thicker successions of clean sandstones with isolated mudstone lenses, to condensed successions of gravelly sandstone largely devoid of mudstone. Most allogenic forcing is likely to be syn-sedimentary; however, subtle variations in facies are demonstrated to have a major influence in diagenetic processes, including the development of deformation bands and cementation. Whilst these occurred exclusively post-depositionally, they are also responsible for marked reductions in the host facies permeability within the Group.

These variations in lithological and property heterogeneity within the Sherwood Sandstone Group ultimately affect its ability to store and transport fluids. A series of regional models are depicted that show the relative challenges associated with the regions unique mix of autogenic and allogenic controls. These diagrams are placed within a matrix that allows prediction of sedimentary architecture based on the presence/absence of a variety of allogenic controls. Data collection for this work comprises borehole records and outcrop studies (architectural panning and sedimentary logging), which provide a useful dataset that places diagenetic processes including the formation and style of deformation band in context, and also illustrates the facies architecture of this critical geological horizon in the UK.



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