

Sediment Distribution of Upper Triassic Reservoirs in SW Morocco: Evidence for Inter-Rift-Basin Connection Between the Argana Sub-basin and the Central Essaouira Basin

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Determining sediment provenance and facies distribution of major fluvial systems is a key element in understanding the Triassic petroleum systems of SW Morocco. This study examined Upper Triassic continental deposits in core from the central Essaouira Basin and extensive outcrop from the Argana Sub-Basin, both sub-basins of the large Agadir-Essaouira Basin, in order to develop a model to predict reservoir distribution.

The Upper Triassic reservoirs in the Meskala Field within the central Essaouira Basin display distal end-member facies of a fluvial system feeding the basin, previously thought to have been derived mainly from the Argana Basin to the SW. However, the time equivalent sandstone deposits in the Argana Basin (Tadrart Ouadou Sandstone Member T6) display palaeocurrents that indicate transport to the SW/S. This suggests that during the Upper Triassic, the southern part of the Argana Sub-Basin acted as the main depocentre for fluvial sandstones derived from the Massif Ancien to the E/NE. Facies analysis suggests fluvial transport was directed into the neighbouring Souss Basin to the SW/S.

With the westward shift of active rifting of the central Atlantic margin, these basins are interpreted to have acted as fill- and spill type basins, where sediment was stored and recycled before being eventually transported N along the evolving rift. The results of this study have significant implications for facies distribution in the central Essaouira Basin, and suggest that the T6 fluvial sandstones exposed in the Argana Valley are not the direct, proximal sediment source for the time-equivalent reservoir sandstones in central Essaouira. Instead of direct SE to NW fluvial flow from the Argana Sub-Basin into the Essaouira Basin to supply the finegrained reservoir sandstones, a more complex transport system feeding the central Essaouira Basin from the South is proposed.