

Unravelling the Palaeogeography of the Early Cretaceous in the Essaouira – Agadir Basin Along the Complex Moroccan Passive Margin.

Tim Luber¹, Jonathan Redfern¹, Angel Arantegui¹

¹ University of Manchester, School of Earth, Atmospheric and Environmental Sciences, University of Manchester, Manchester, M13 9PL, UK.
tim.luber@postgrad.manchester.ac.uk

Early Cretaceous deepwater clastics offer the most prospective reservoir target along the offshore Moroccan margin; however, recent drilling in Morocco has failed to find commercial reservoir sands.

This margin was far from “passive” during the Late Jurassic and Cretaceous. Recent studies (Bertotti & Gouiza, 2012) indicate Late Jurassic and Cretaceous exhumation of 2-3 km in the hinterland during this period, associated with enhanced subsidence in the developing deepwater basin.

Onshore, extensive Early Cretaceous fluvio-marine deposits are exposed, showing laterally and temporal variability. They comprise dominantly fine-grained deposits with intervals of coarse-siliciclastic to mixed carbonate/siliciclastic input.

The aim of this study is to develop onshore palaeogeography maps for the individual stages of the Early Cretaceous and it is linked to a similar study in the Souss – Tarfaya Basin (A. Arantegui). Extensive field mapping, involving sedimentary logging, biostratigraphy and integration of subsurface well data, has allowed the generation of first depositional environment maps. Further the new high-resolution biostratigraphy e.g. allows accurate dating of a second order maximum flooding surface, sequence boundary and hiatii in the succession.

The depositional environments present are coastal plain to outer shelf and developed on top of the inherited low relief carbonate platform of the Jurassic extending up to 100 km inland from the continental slope margin.

These results will help to locate sediment input points into the offshore basins and to enhance seismic data-based interpretations by better understanding the shallow sink component of the overall source to sink project. In the deep marine part turbiditic deposits are only supported by amplitude analysis, some channel like morphologies on seismic data and indirectly confirmed by minor sands in current and older wells. Equivalent Early Cretaceous turbidites are exposed in the offshore section of the Tarfaya basin in the inverted Fuerteventura outcrops of Spain.

Constraining timing, provenance and location of coarse clastic sediment delivery from source to sink in these underexplored basins are key to mitigate reservoir presence risk.

Keywords Early Cretaceous, Atlantic Margin, Morocco, Shallow-marine, Clastic reservoirs, Source to Sink, Biostratigraphy

References

Bertotti, G.; Gouiza, M., 2012. Post-rift vertical movements and horizontal deformations in the eastern margin of the Central Atlantic: Middle Jurassic to Early Cretaceous evolution of Morocco. *International Journal of Earth Sciences*, **101**, p. 2151-2165.