

Lower Mesozoic Syn-rift Salt deposits in Morocco : Stratigraphic, climatic, depositional, and temporal context

Mohammed Et-Touhami¹ & Paul E. Olsen²

¹ Université Mohammed Premier, Département de Géologie, Oujda, Morocco
mohammed_et_touhami@yahoo.com

² Lamont-Doherty Earth Observatory, Palisades, NY 10964, USA

One of the most characteristic features of the rift basins of the central Atlantic margins is thick sequence of red mudstone of Late Triassic to Early Jurassic age. These red mudstones are often associated with evaporites (mostly salt), which sometimes reach kilometers in thickness. Actually, syn-rift salt forms large diapiric provinces along both Eastern and Western central Atlantic margins, but also thick undisturbed units in several onshore Moroccan subsurface basins. Although these evaporites are often of critical importance to the petroleum system, their overall stratigraphic, climatic, depositional, and temporal context are surprisingly poorly understood.

In the High Atlas, the Late Permian to Early Jurassic syn-rift successions divide into 4 major tectonostratigraphic sequences (TSI – TSIV) that are at least locally separated by syn-rift unconformities corresponding to major extensional pulses (Olsen *et al.* in this volume). Elsewhere in Morocco, with the exception of Essaouira basin, only TSIII and TSIV, Norian to at least Sinemurian age, are represented. They contain thick salt units organized in two formations separated by CAMP lavas flows. This stratigraphic section is remarkably similar in all Moroccan subsurface basins when they are not affected by diapirism.

In Morocco, most TSIII and TSIV were accumulated in very shallow continental to marginal settings for over 20 million years. During this extended time span as Africa was drifting northward, many Moroccan basins experienced periods of aridity resulting in the formation of saline or desert facies. Nevertheless, we suggest that the onset of the thick salt deposition is associated with a widespread extensional pulse reflected in : 1) local creation of large-scale accommodation space (for the salt), 2) eruption of the lavas, and 3) regional subsidence that allowed the seepage of marine waters (already fractionated) into the basin. This extensional pulse marks the initiation of TSIV.