Upper Triassic-Middle Jurassic Salt Deposits of the Saharan Platform

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ABSTRACT

. The Upper Triassic to Middle Jurassic evaporites of the Saharan Platform in eastern Algeria, Tunisia and western Libya are a key element of the North African petroleum systems. They form a regional seal to both Palaeozoic (Hassi Messouad) and Triassic (TAGI) hydrocarbon reservoirs. The restricted conditions needed for evaporate formation were controlled by deep crustal lineaments and Palaeozoic intraplate tectonics. Deformation of the evaporite sequence is restricted to the area north of the Medenine-Jifarah High. Sequence 1 consists of five evaporitic cycles dominated by mudstone and halite, which represent the main salt deposits of the Berkine Basin. At this time the Berkine-Ghadames Basin was a restricted evaporitic basin with a barrier to the north (Medenine-Jifarah High) separating it from peri-Tethys. These evaporites were formed by the marine flooding of the eastern margin of Pangaea. Sequence 2 saw the basin-wide development of a carbonate platform (‘B Marker’) in Pliensbachian times in response to relative sea level rise and tectonic adjustment associated with the emplacement of magmatic rocks of the Central Atlantic Magmatic Province (CAMP). Sequence 3 comprises five cycles that are predominantly mudstones, fine-grained carbonates and anhydrites and were formed as global sea level rose. They show cyclostratigraphic changes on a variety of scales which probably relate to astronomical fluctuations. The depositional style contrasts with Sequence 1, the presence of carbonates, occasional patch reefs and sabkha-type anhydrites indicating a marine carbonate–evaporite ramp setting. Similar thickness variations to those observed in Sequence 1 continued through Sequence 3 and reflect the on-going influence of differential subsidence along basement lineaments. Sequence 3 salt deposits are restricted to Algeria and progressive westward onlap resulted in Liassic salt being deposited on north-south basement ridges. A number of factors controlled the development of this evaporite basin. These include Late Triassic sea level rise and flooding of a sub-sea level fluvio-lacustrine basin, combined with globally warm climatic conditions, on-going break up of Pangaea and the emplacement of the CAMP. The evaporite deposits contain the records of these major global tectonic and climatic changes at the Triassic-Jurassic boundary.