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Eric Braccini[1], François Lafont[1] (1) Totalfinaelf, pau, France

Sedimentological Interpretation and Stratigraphic Architecture of the Silurian Akakus Formation - A field survey of the Akakus Cliff, southwestern Libya

This outcrop study aimed at characterising the sedimentological nature and stratigraphic architecture of the Silurian Akakus Sandstone in its eponym site in southwestern Libya, which is still very little studied. The Akakus Formation is a major sandstone unit in the Saharian area. The compound reservoir formed by the amalgamation of the Lower Devonian Tadrart sandstone onto the Akakus is also known as the F6 reservoir in Algeria. The field survey spread over 150 km along the Libyan part of the Akakus cliff. Field sections were measured and photo panels were realised along this south-north section which follows roughly the sedimentary dip. The Akakus sandstone starts either by a sharp-based massive shoreface or by tidal flat facies lying directly onto lower shoreface heterolithics. The diachronous shingled geometry of the base Akakus demonstrates a large-scale forced regression. In the outcrops of southwest Libya, most of the Akakus formation is made up of backbarrier to lagoonal facies, with several metre-thick cycles showing first wave-dominated deposits and then increasingly bioturbated tide-dominated intervals capped by iron crusts. Small channels cut the tide-dominated intervals. An analogy with facies models is suggested with the Waddenzee in the Netherlands, which is characterized by a broad mixed tide and storm influenced back-barrier area with subtidal channels. In terms of stratigraphy, this purely aggradational formation record only the periods of highest relative sea level, with large hiatuses represented by the pedogenetic iron crusts.