

Sequence Stratigraphy of the Upper Jurassic Deposits and Associated Clastic Marginal Marine Reservoir Deposits of M'rabtine Formation (Gulf of Gabes, Offshore Tunisia)

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The Upper Jurassic shallow marine carbonates include the most prolific reservoirs in the southern tethyan margin (Ghawar field); whereas, in Tunisia, only small-sized fields are discovered since seventies with oil-bearing paralic to marine sandstones (Ezzaouia and El Bibane) and gas-condensate shows are hosted in dolomites (Ali Ben Khalifa, Chaal). These oil occurrences are reported in southern Gulf of Gabes that lying at the north-western edge of the Saharan craton and occurring as a depositional basin developed mainly in responses stage of tethyan rifting.

The productive reservoirs in M'rabtine Formation are identified in the sandy bodies interpreted as channel or sheets that took place in marginal to marine environment. Setting above a broad shallow carbonate shelf of Late Callovian in age (Tlalett or Ghomrassen Members), the M'rabtine Formation ranging from the Latest Callovian to the Tithonian in age, was abruptly capped by prograding fluvio-deltaic complexes of the Early Cretaceous. Regional discontinuity characterizes the uppermost M'rabtine Formation is associated to important erosion in connection with a major sea level fall.

Based upon Jeffara outcrops and subsurface data such as lithological description and wireline log characteristics, integrate study using sequence stratigraphy tool and geological modelling contribute to considerate the lithostratigraphic nomenclature used until now, the stratigraphy interpretation and sandy bodies distribution. Therefore, spatial and temporal distribution and geometries of oil-bearing sand bodies (channels or sheets) and their related depositional environment established within M'rabtine Formation gain precision in exploration efforts where some uncertainties constrain the reservoir delineation.

Sequence stratigraphy applied in southern Gulf of Gabes has led to recognize several transgressive intervals picked at the max gamma ray reading and/or the occurrence of important carbonate bed markers as of the Kimmeridgian? Bir Miteur carbonate unit. The whole carbonate Tlalet Member and the alternating carbonates, clays, sandstone and evaporites of the M'Rabtine Formation encountered in the Wells constitute three major transgressive-regressive major cycles, where, the M'Rabtine Formation has been itself subdivided in several half cycles, labelled M1 to M4 in ascending order. Each half cycle shows a distinct wire line logging signature related facies and interpreted as shallowing-up or deepening-up depositional sequences.

The sandy bodies particularly those associated to the lower unit (M1) have a multi- kilometric spatial distribution and occur as a progradational sheets. Those associated to the third unit (M3) were postulated to be developed in retrogradational phase and crowned by a dolomitic level referred at Early Kimmeridgian in age. Those of M4 are capped by a major seal represented by evaporites.

Clastic influx was introduced into southern Gulf of Gabes from the south and the southwest by a flooding stream and redistributed by marine currents; whereas, a decreasing sand supply