

3d Property Modelling of the Lower Acacus Reservoir, Ghadames Basin, Libya

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Abstract : The Silurian Lower Acacus sandstone is one of the main reservoirs in North West Libya. Our aim in this study is to grasp a robust understanding of the hydrocarbon potential and distribution in the area. To date, the depositional environment of the Lower Acacus reservoir still open to discussion and contradiction. Henceforth, building three dimensional (3D) property modelling is one way to support the analysis and description of the reservoir, its properties and characterizations, so this will be of great value in this project. The 3D model integrates different data set, these incorporates well logs data, petrophysical reservoir properties and seismic data as well. The finalized depositional environment model of the Lower Acacus concludes that the area is located in a deltaic transitional depositional setting, which ranges from a wave dominated delta into tide dominated delta type. This interpretation carried out through a series of steps of model generation, core description and Formation Microresistivity Image tool (FMI) interpretation. After the analysis of the core data, the Lower Acacus layers shows a strong effect of tidal energy. Whereas these traces found imprinted in different types of sedimentary structures, for examples; presence of some crossbedding, such as herringbones structures, wavy and flaser cross beddings. In spite of recognition of some minor marine transgression events in the area, on the contrary, the coarsening upward cycles of sand and shale layers in the Lower Acacus demonstrate presence of a major regressive phase of the sea level. However, consequently, we produced a final package of this model in a complemented set of facies distribution, porosity and oil presence. And also it shows the record of the petroleum system, and the procedure of Hydrocarbon migration and accumulation. Finally, this model suggests that the area can be outlined into three main segments of hydrocarbon potential, which can be a textbook guide for future exploration and production strategies in the area.

Keywords : Acacus, Ghadames , Libya, Silurian

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