

Structural Styles of Poly-phase Triassic Halokinetic and Thrust Tectonic in the Sahel Block: Implication on Hydrocarbon Prospectivity

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Abstract

The eastern foreland basins, considered among the most prolific hydrocarbon province in Tunisia, has always attracted the interest of several petroleum companies and the exploration activities started earlier, since the fifties and have been boosted following the discoveries of Douleb (1966), Ashtart (1971) and Sidi El Kilani (1988) oil fields. Although the richness and diversity of the data acquired in this area, all these works appear to be unconcerned about the success controlling factors, and which we believe are summarized in two major points: 1-The Structural schema still poorly understood; the structural configuration of the Sahel platform was controlled by multi-directional and multi-scale faults and reactivated differently during successive tectonic phases from the Triassic rifting till the recent compressional phases. Thus, the incomprehension of the fault networks development and kinematics, generate many uncertainties on both trap integrity and the likely-hydrocarbon migration pathways. 2-The structural and paleogeographic schema of the Sahel block is widely governed by halokinetic movements triggered in several periods of structuring. A deep understanding of the Kinematics, mechanisms, and structural styles of poly-phase Triassic salt tectonic will provide a great help to draw the tectono-sedimentary framework and to reconstruct the geodynamic evolution of the basin throughout the geological times. In this context, this work presents a new insight on the Sahel's structural configuration and proposes a new tectono-stratigraphy zonation. Structural interpretation of surface and subsurface data in the Eastern Sahel platform, have shown a poorly seismic-imaged zone with a series of high-angle N-S and NE-SW oriented- reverse faults, forming the boundary between the Atlas Foothills to the West and the structural low lying Pelagian basin to the East. Potential traps associated to the thick-skinned sub-thrust footwall of these faults to the East could be identified. The complex Triassic salt tectonic types (pillows, diapirs, minibasins...) constitute a good opportunity to explore the salt related-traps plays. The key to success this challenging play is the comprehension of the interplay between sedimentation, salt tectonics and relative sea level changes. These essays may provide explorationists with some "food for thought" to unveil the interesting petroleum potential of the area and may serve also as guidelines and new challenging tracts to unlock the undiscovered buried reserves.