

PS New Petroleum Systems Related to the Structuring of Meso-Cenozoic Basins in North African Plate Tunisian Margin*

Mourad Bédir¹, Mohamed Soussi², Hakim Gabtni¹, Hajer Azaiez¹, Taher Zouaghi³, Sami Khomsi³, Dorra Tanfous-Amri², Afif Arbi¹, Faten Houatmia¹, and Akram Soltani²

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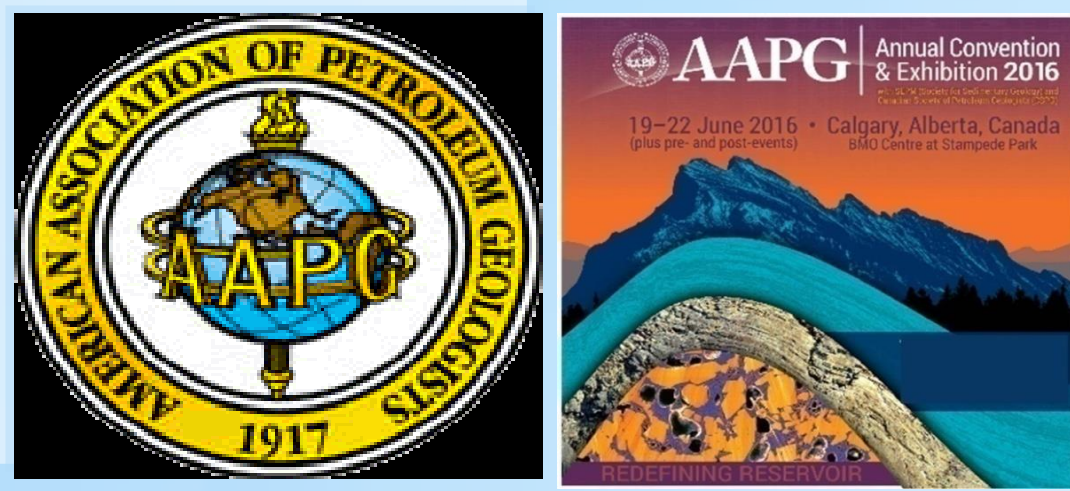
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Abstract

Atlassic Meso-Cenozoic Petroleum proven systems of carbonate and siliciclastic deposits in the North African plate Tunisian margin are distributed to a platform and basin mosaic that is studied here for more petroleum systems structuring understanding and discoveries for new objectives. Modern integrated studies had been undertaken to highlight the tectono-sequence deposits structuring and the relationship between platform to basin potential zones. Subsurface studies were based on petroleum wells, wire line logging, seismic reflection and gravimetric data and seismic stratigraphy of system tract distribution calibrated to surface structural, sedimentology and sequence stratigraphy for carbonate and siliciclastic characterization and basin modelling. Sedimentary cover basin structuring is controlled by deep-seated E-W and N-S strike slip flower Master faults connected to NE-SW and NW-SE Reidel's. These faults guided a Triassic, Jurassic and Cretaceous carbonate deposits in a pull apart rift platform and basins induced by a regional N-S to NE-SW extensional strains accompanied by Upper Triassic salt pillow to diapiric bodies and basic magmatic intrusions along faults since the Jurassic period exhibiting rim synclines, prograding deposits, turbidites, Reefs and pinch outs. These rift-sealed basins constitute new targets with complete petroleum systems ingredients. Upper Cretaceous to Eocene Pyrenean and Miocene to Quaternary Alpine and Atlassic NW-SE compressional strains reactivated platform-basin borders deep-seated new ramified transpressional faults inducing basin inversions, salt intrusions, folding, thrusting and foreland basins. Carbonate and siliciclastic source rocks and reservoirs of respectively Cretaceous and Tertiary deposits exhibit prograding system tracts, Reefs, deltaic to deep-sea fan channels and turbidites. These reservoirs represent a new petroleum exploration targets. Both rift and compressional superposed basins present structural and stratigraphic hydrocarbon traps and prospects along faulted transition borders with stratigraphic unconformities, pinch outs, Flower faults and fold flanks closures. Basin modelling and timing events suggest a maturation, expulsion, migration and trapping of hydrocarbons towards platform-basin borders.



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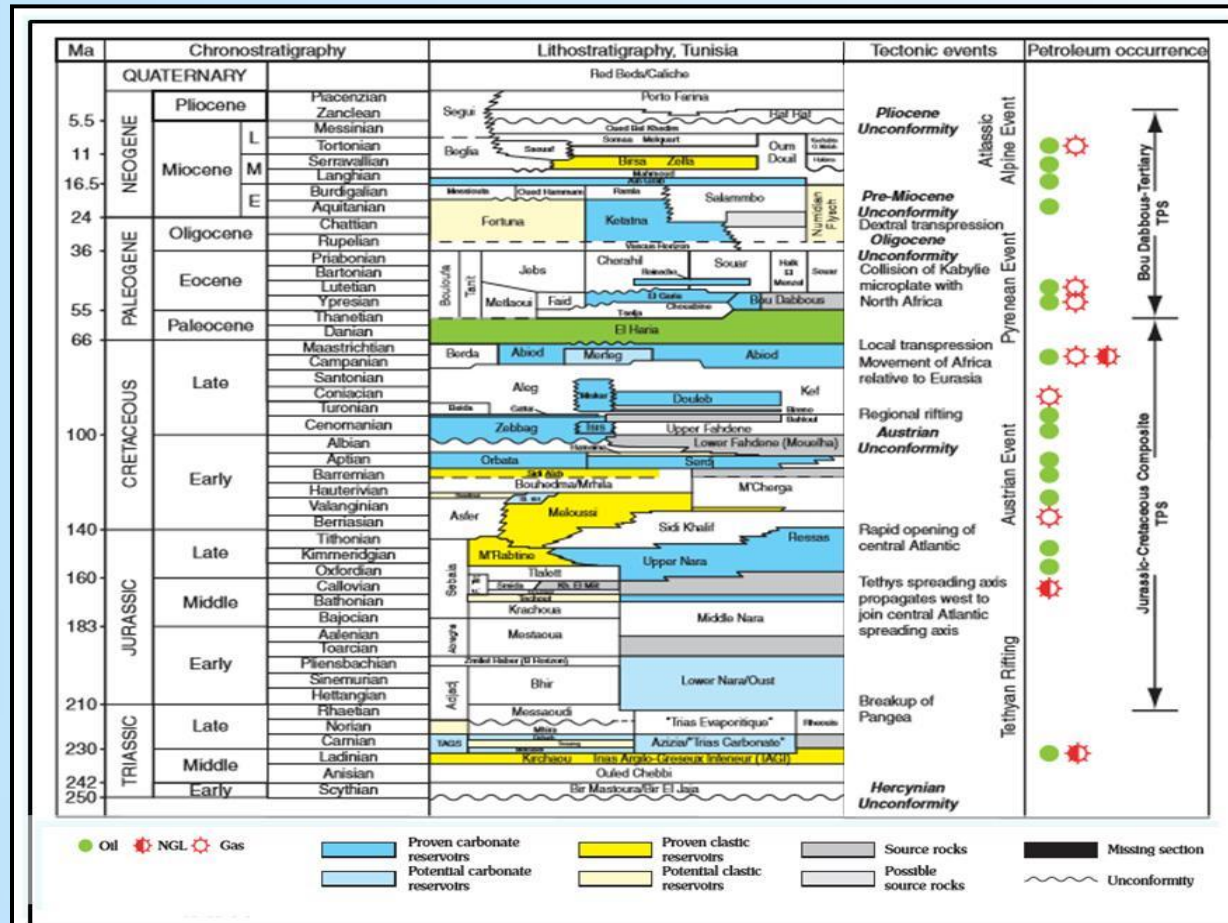
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ABSTRACT

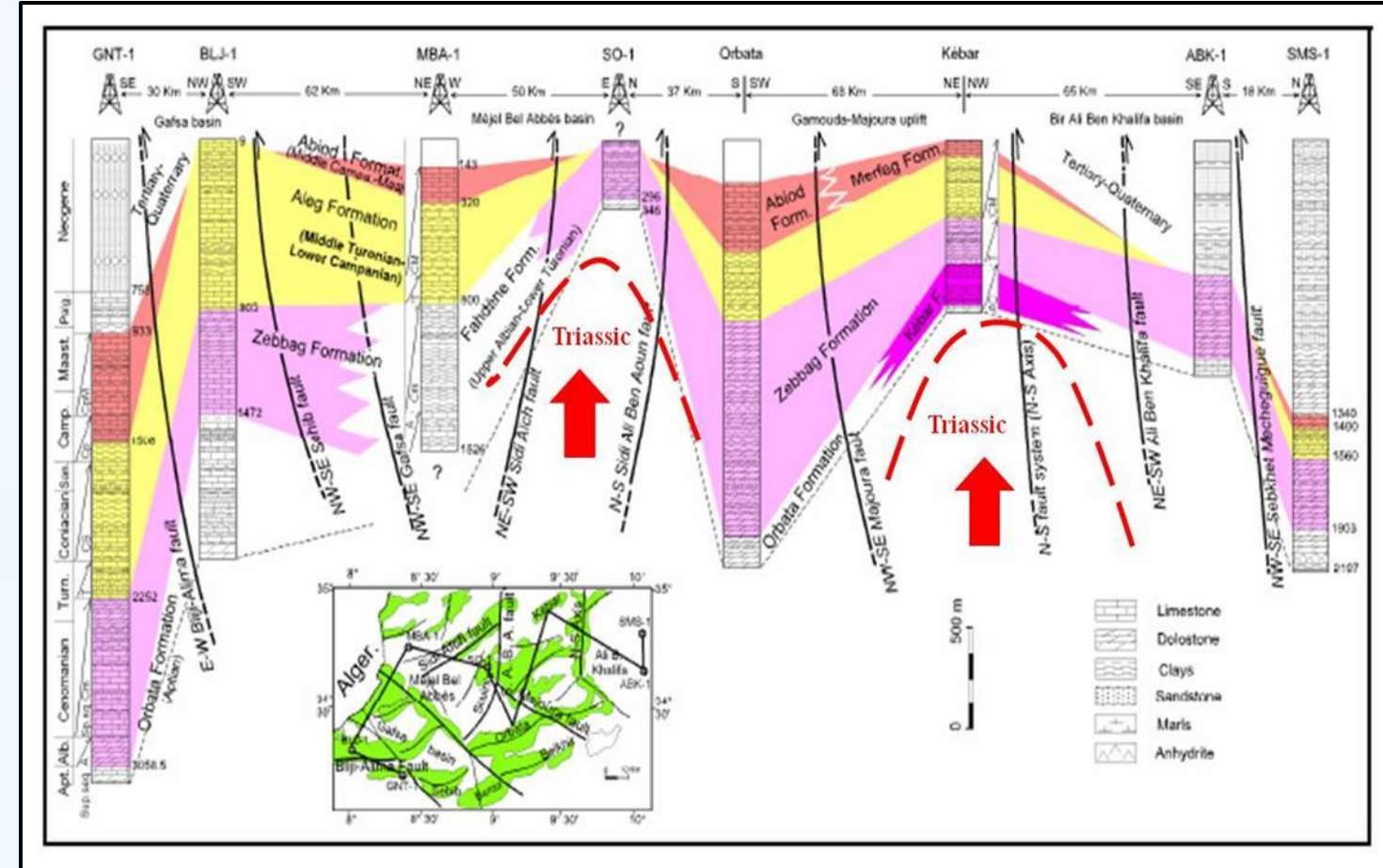
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Keywords: Tunisian margin, Petroleum systems, Meso-Cenozoic, Seismic, Basin Modeling

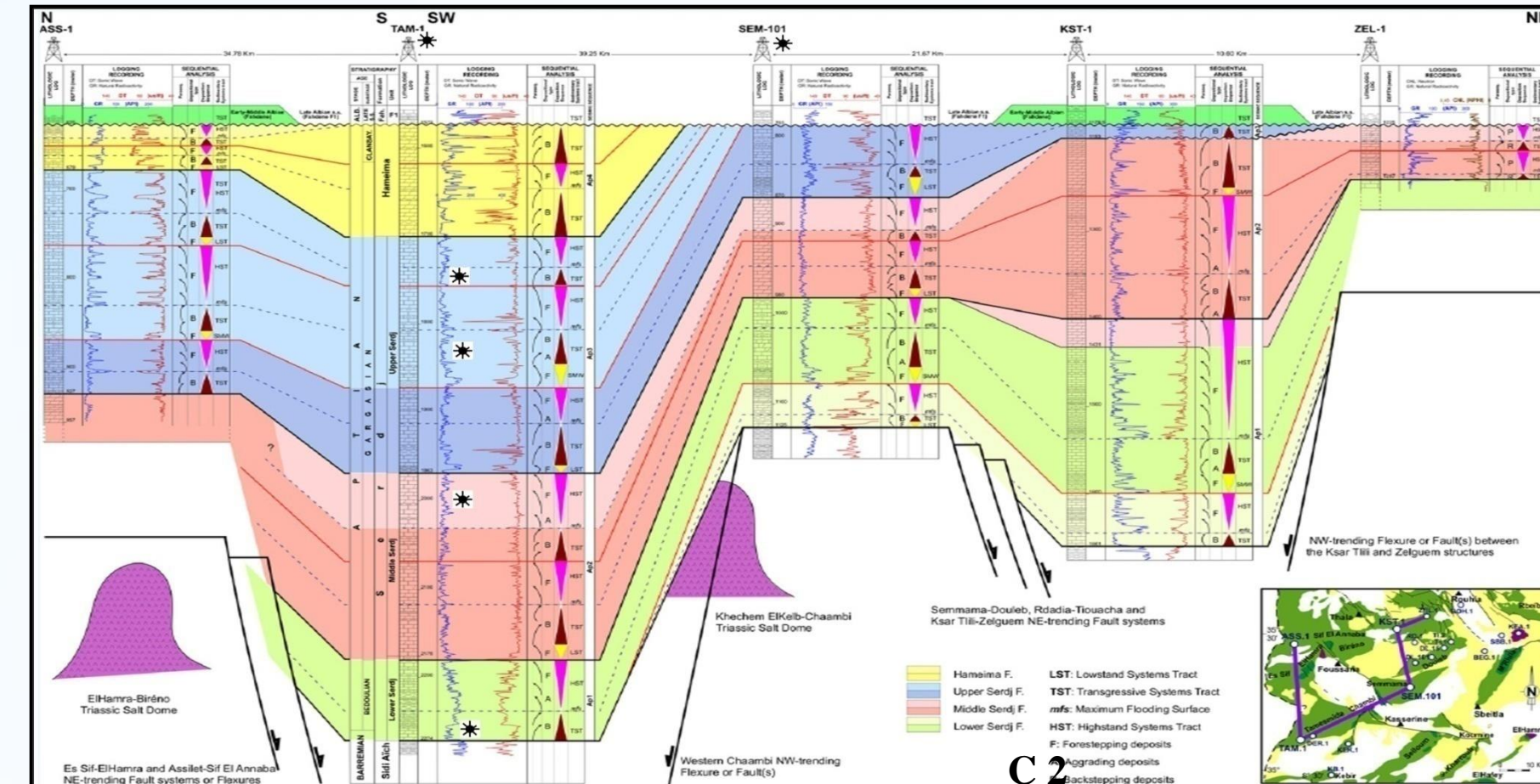
OIL AND GAS FIELDS PETROLEUM SYSTEMS DISTRIBUTION AND STRUCTURING



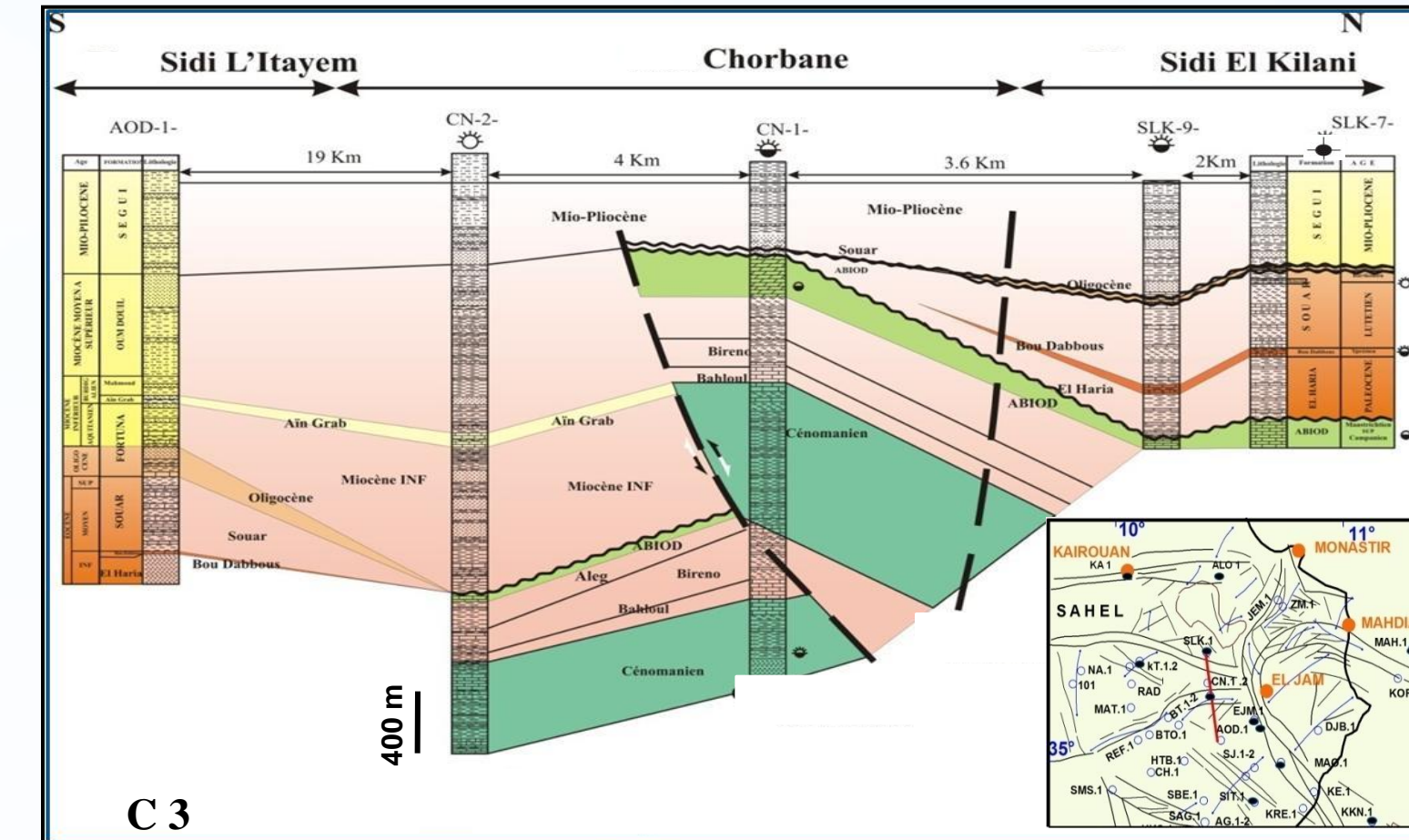
Tunisian Petroleum Systems Chart and Related Oil and Gas Fields Distribution (In Klett, 2001)



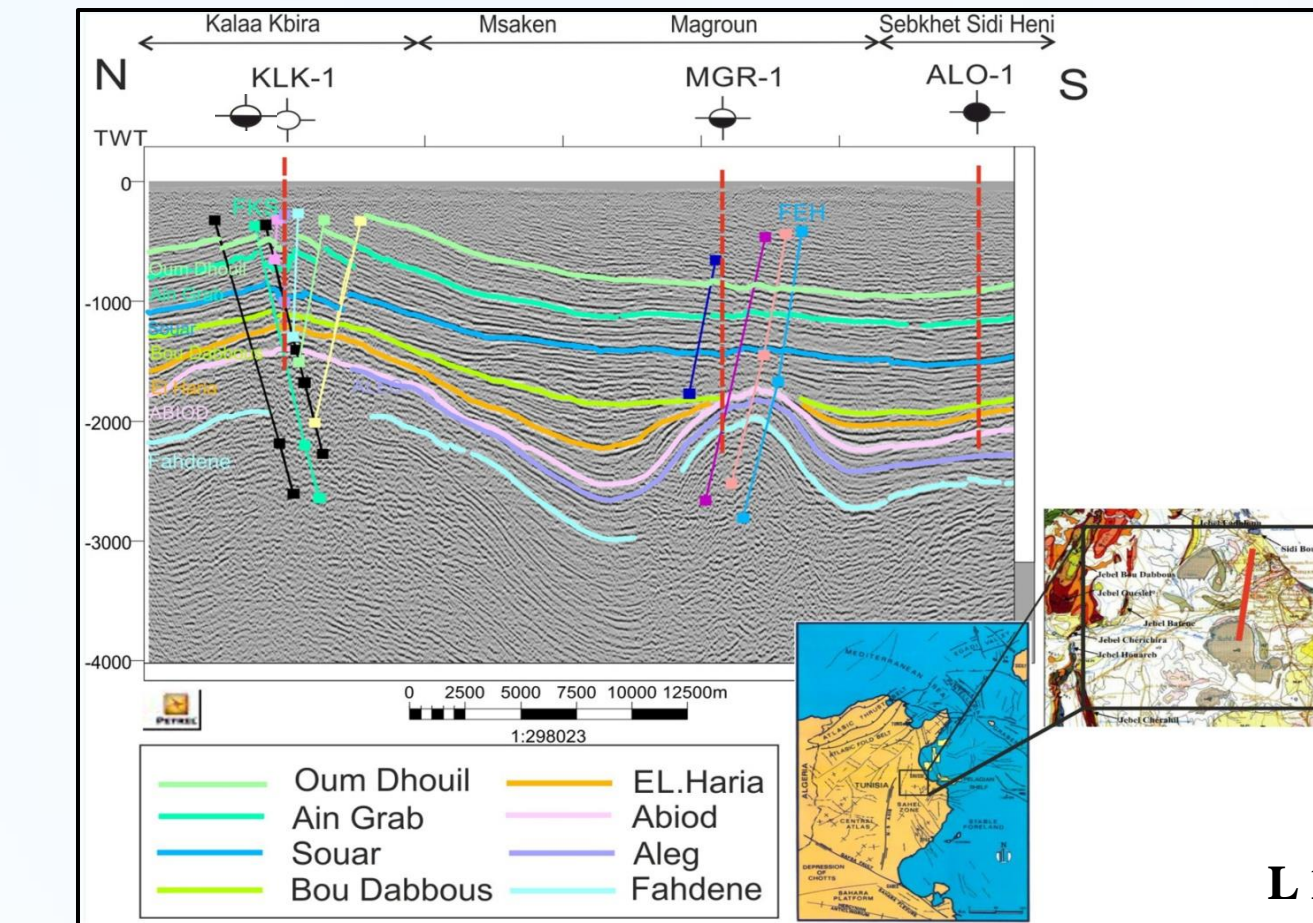
Well to Outcrops Log Lithostratigraphic Correlations of Cretaceous Carbonate Platforms and Basins guided by Triassic Salt Ridges and Faults in the Central Atlas Oil Fields



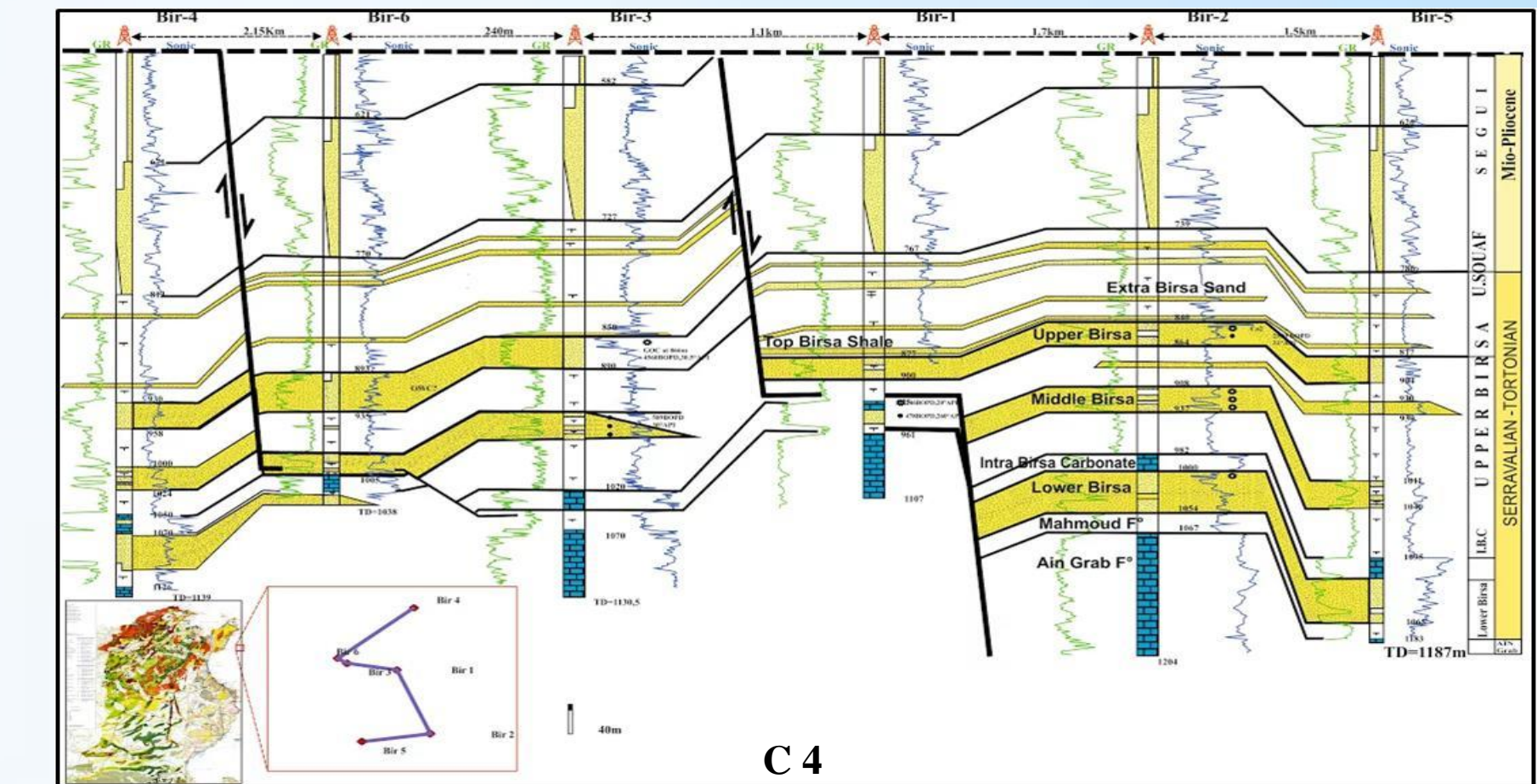
Wire Line Logging and Sequence Stratigraphic Correlation of Cretaceous Carbonate and Shales Petroleum System in Central Atlas Oil Fields



Well Log Correlation of Cretaceous Carbonate Reservoir System in Transpressive Thrusting Folds and related Oil Fields in the Sahel Block

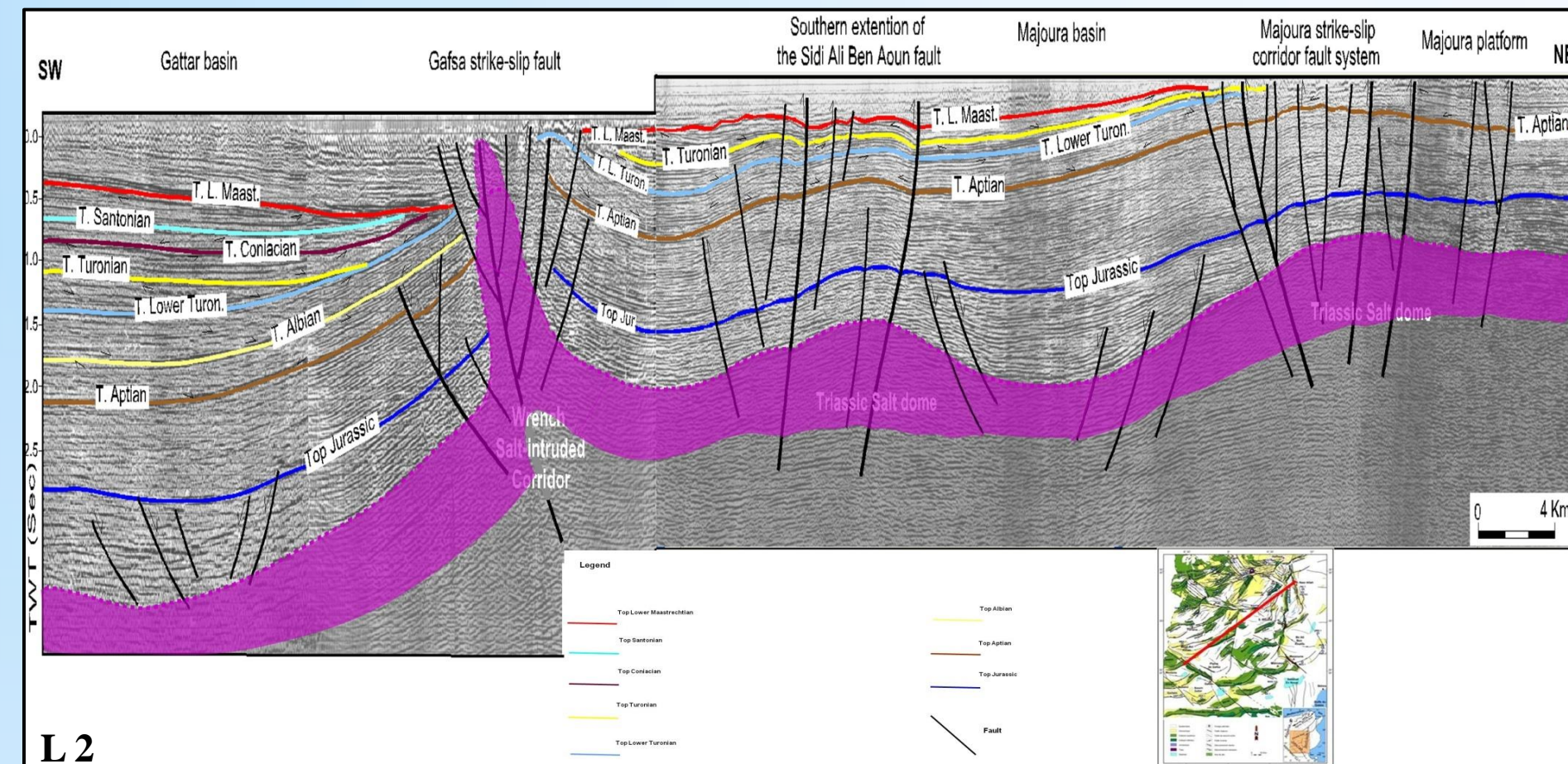


Seismic Line of Cretaceous Carbonate Reservoir System Traps in Transpressive Salt Tectonics Folds in the Sahel Oil Fields

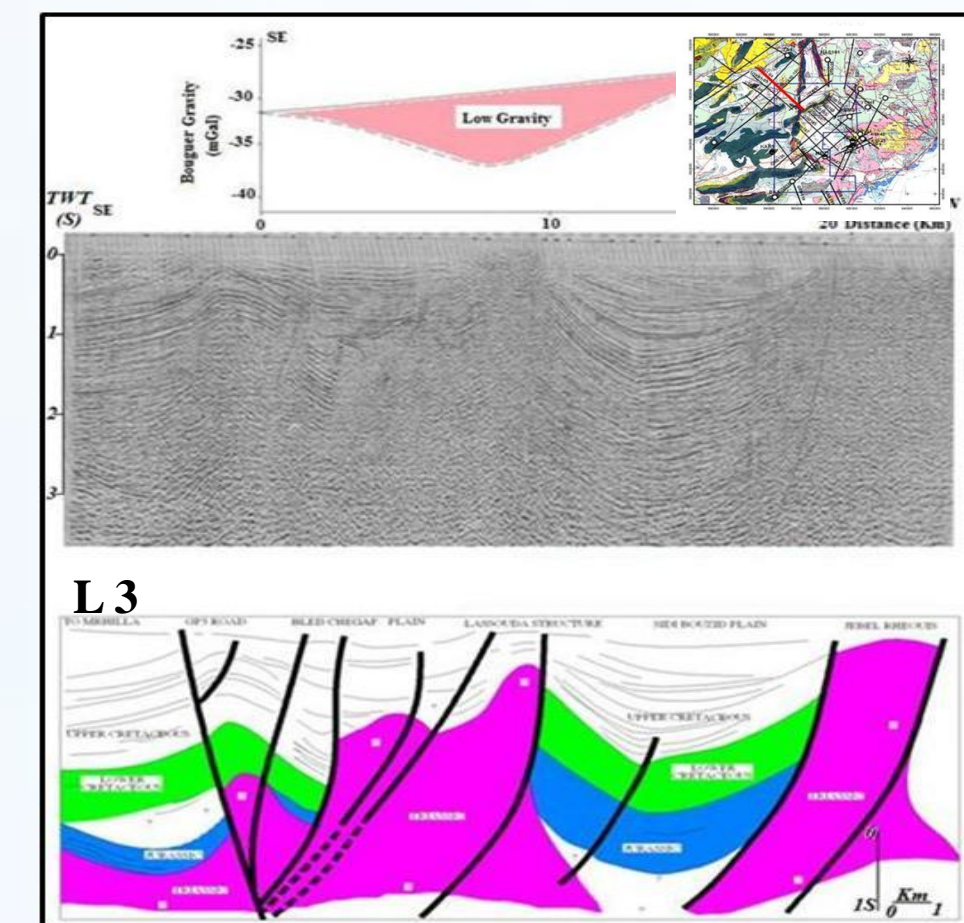


North-South Miocene Sandstones Reservoir Birsa wells Correlations of Oil and Gas Field Horst Folded Traps in the Gulf of Hammamet

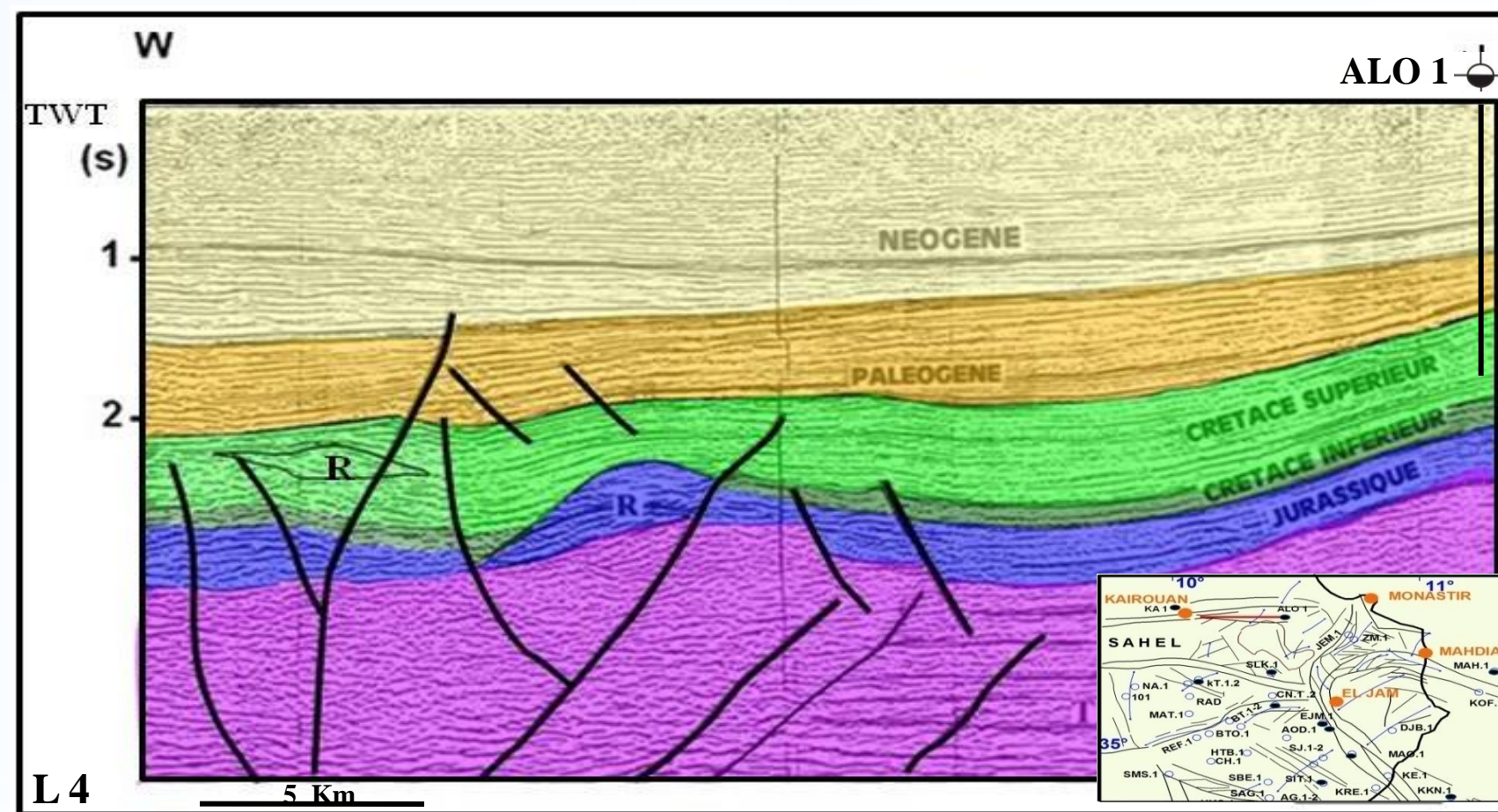
TRIASSIC SALT TECTONICS, FLOWER STRUCTURES AND PLATFORM TO BASIN RELATED PETROLEUM SYSTEMS TRAPS



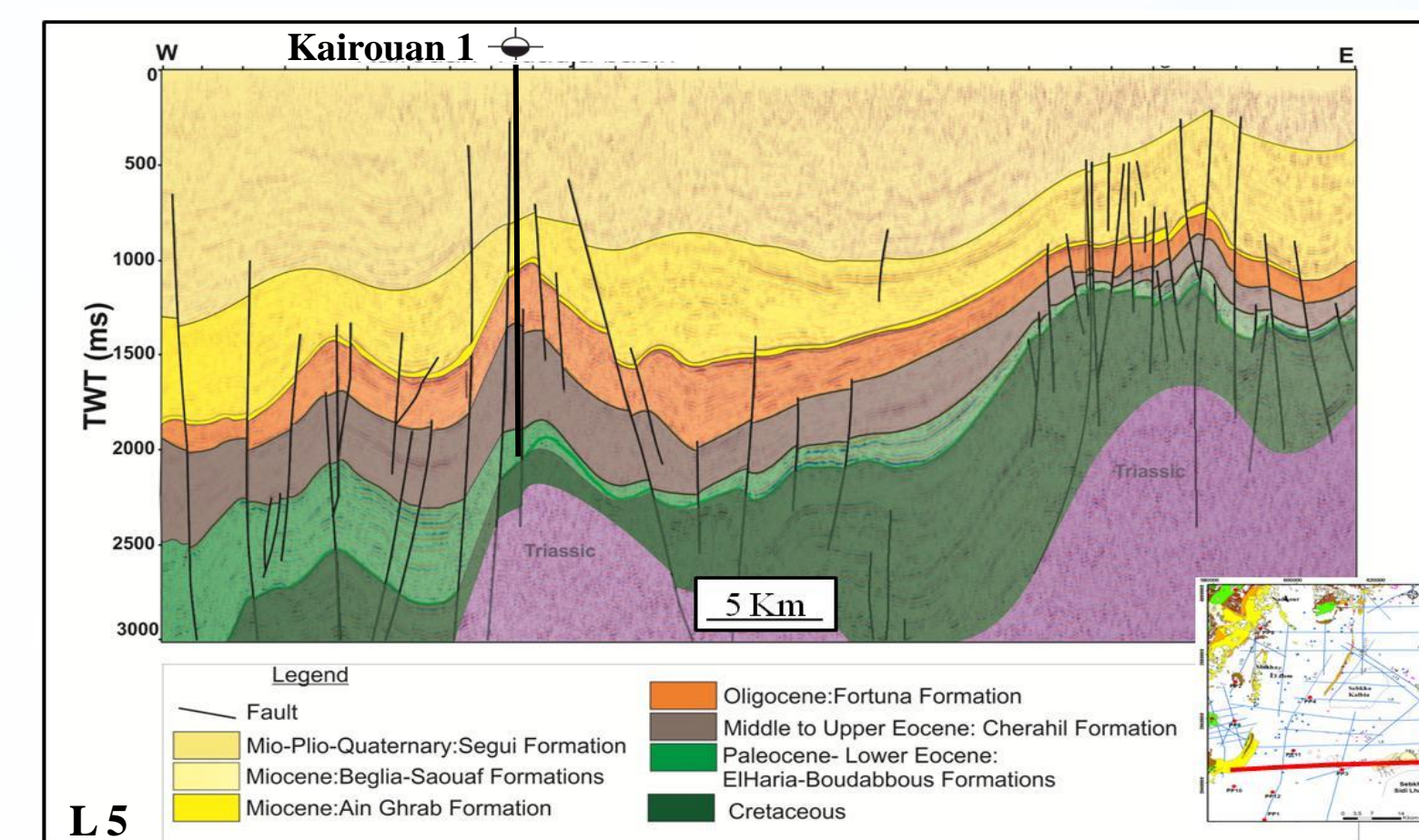
Regional Geoseismic Line of Central Atlas Meso-Cenozoic Folded Platforms to Basin Structuring and New Petroleum Prospects Associated to Triassic Salt Tectonics



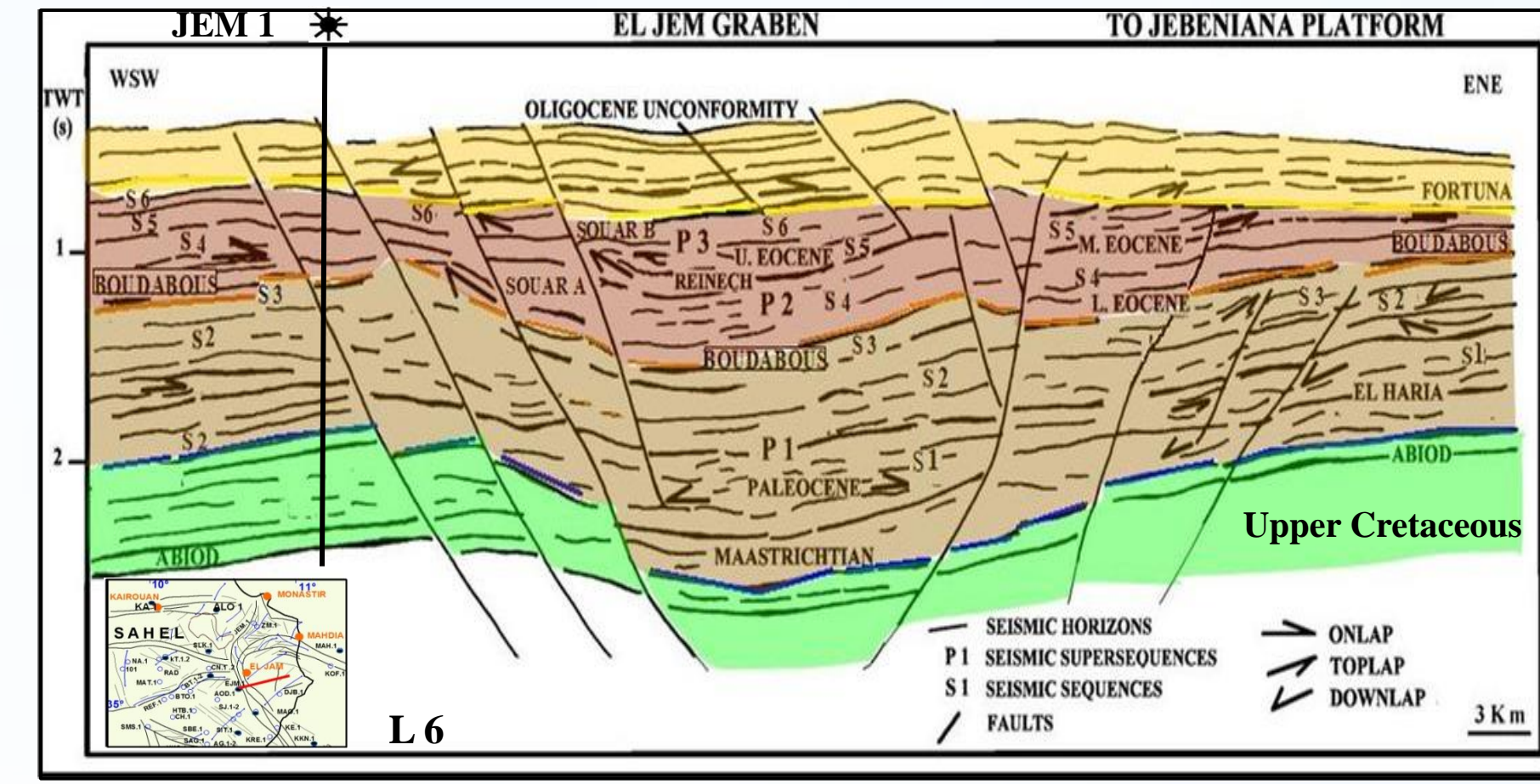
Geoseismic Line Showing Basin Control by Triassic Salt Tectonics Improved by Gravity Evidences in Central Atlas



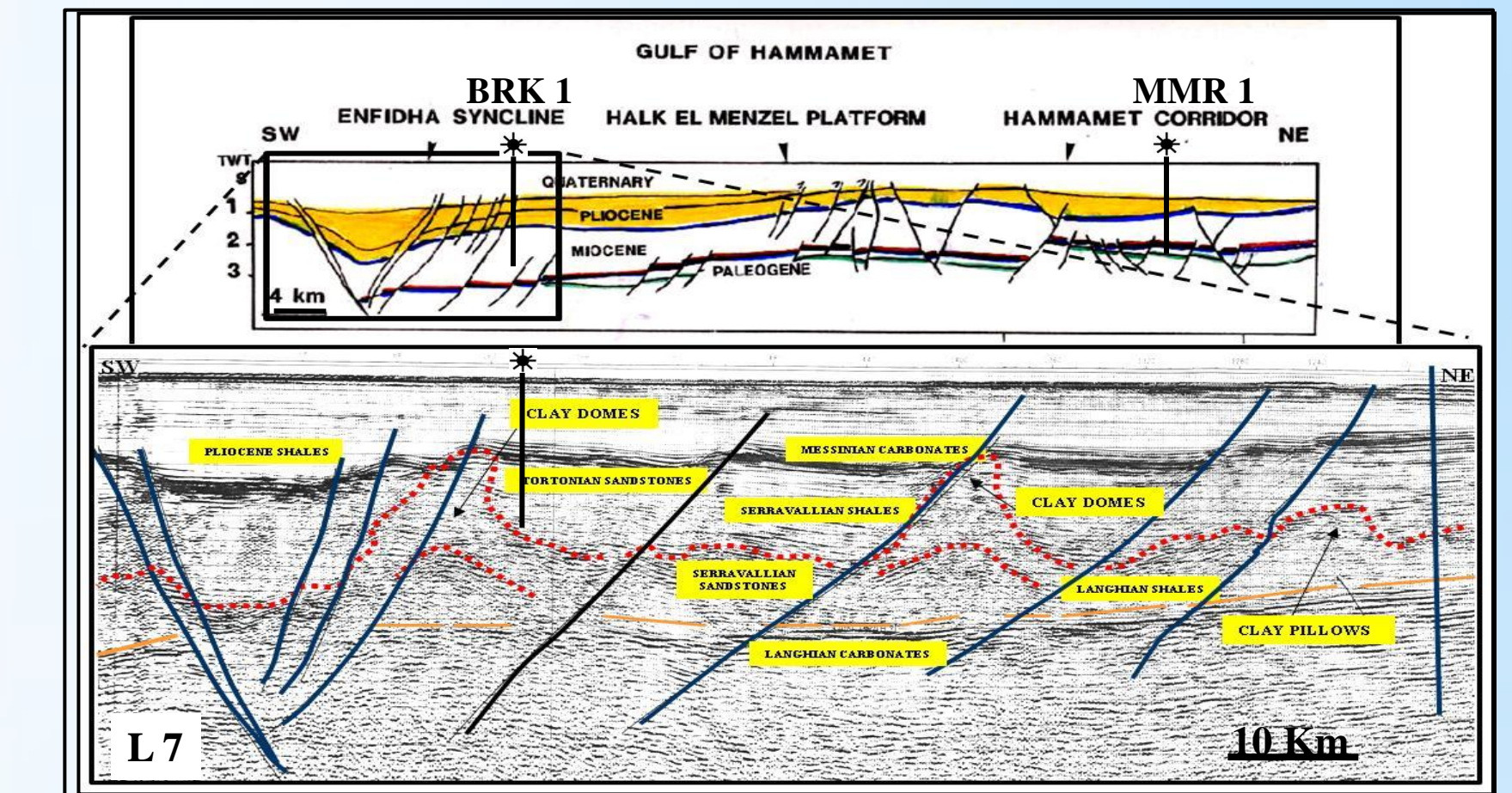
Regional Geoseismic Section of Folded Sahel Basin Structuring with Proven Oil Discoveries And New Petroleum Prospects



Regional Geoseismic Line of Transpressive Strike Slip Fault Salt Tectonics and New Petroleum Potential Prospects

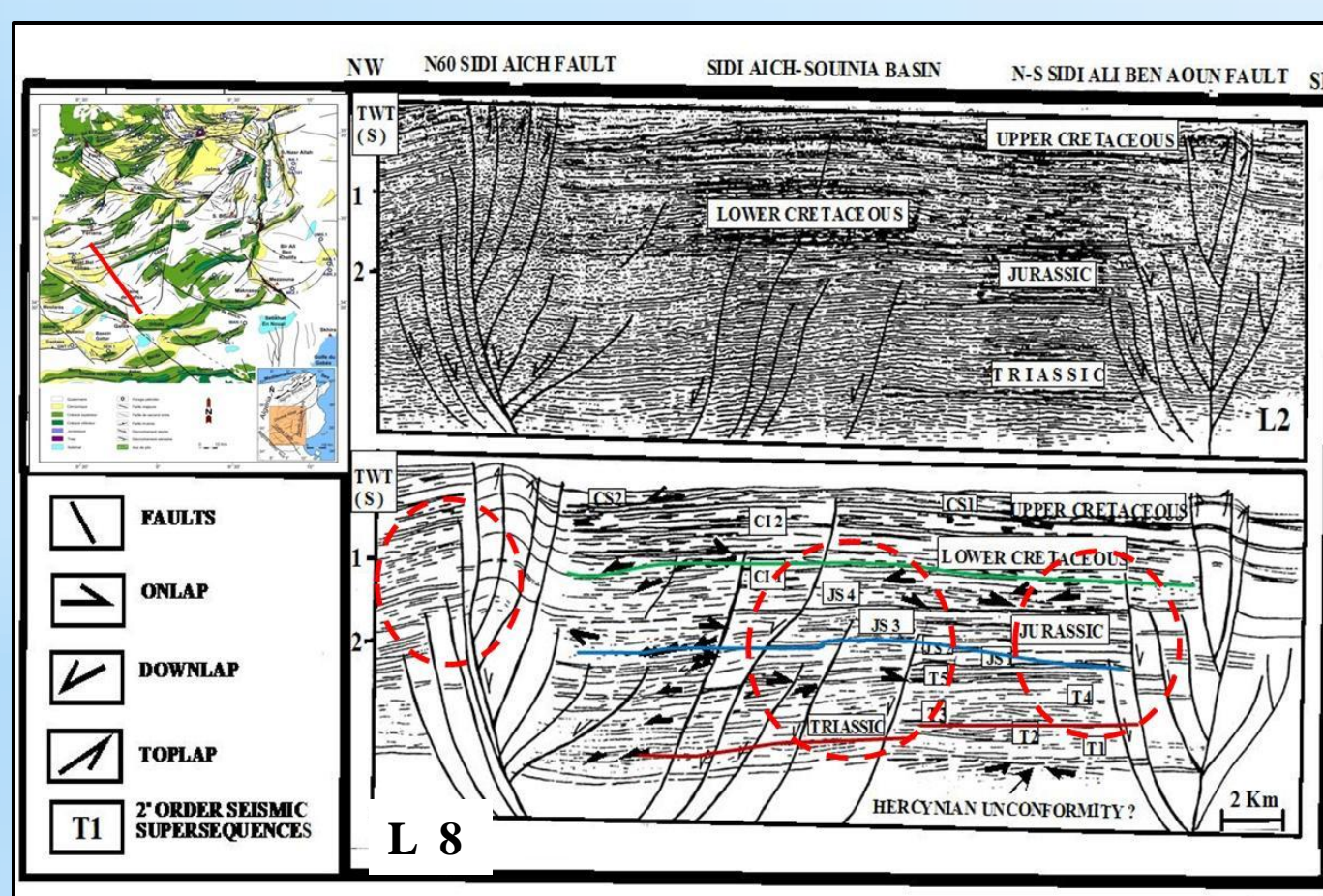


Regional Geoseismic Stratigraphic Section of Sahel Flower Fault Folded Graben and Platform to Basin Structuring with Proven Cretaceous Oil Field and New Prospects

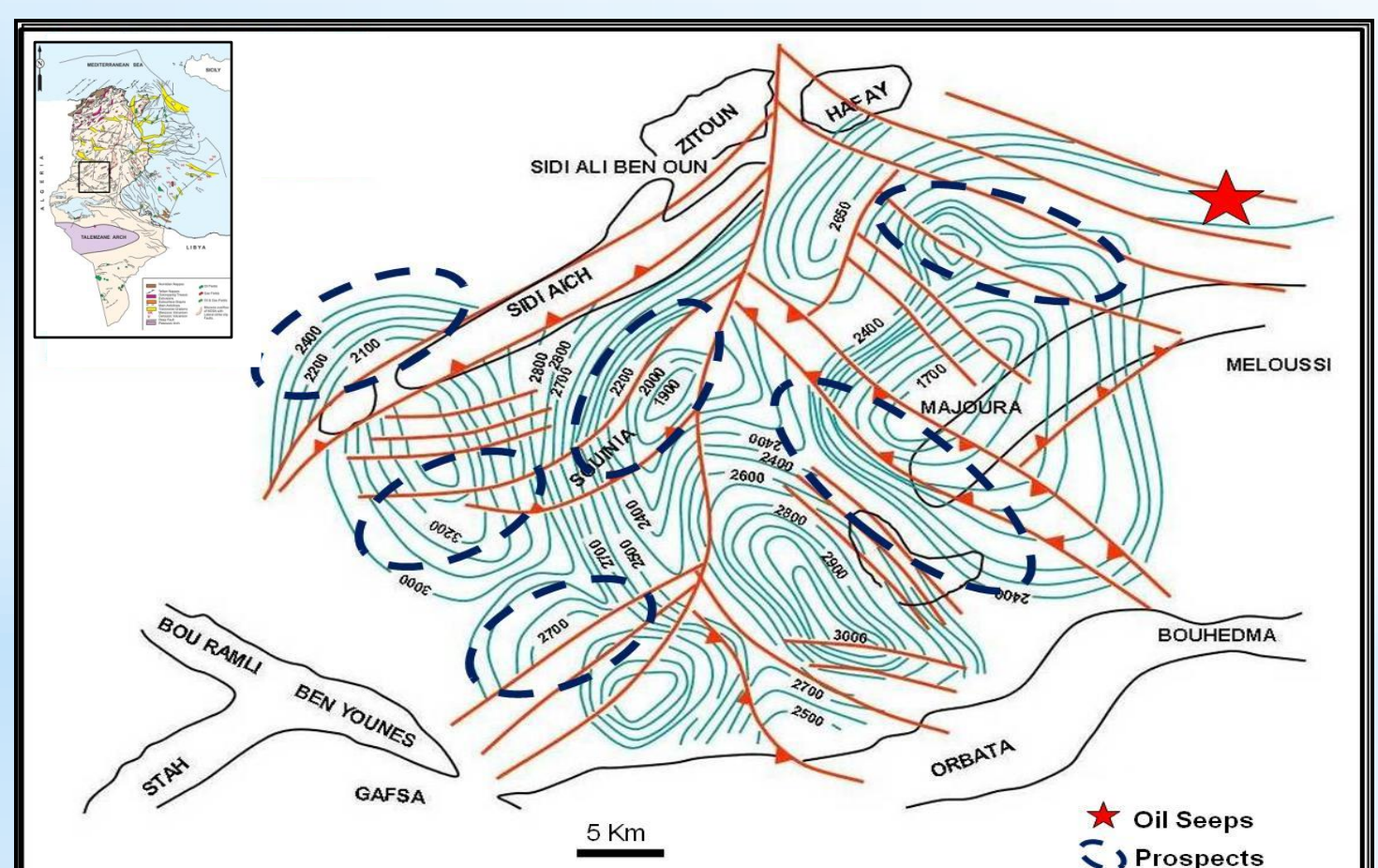


Gulf of Hammamet Regional Geoseismic Line Showing Flower Fault Grabens and Platforms with Miocene Clayiness and Proven Miocene and Upper Cretaceous Oil and Gas Fields

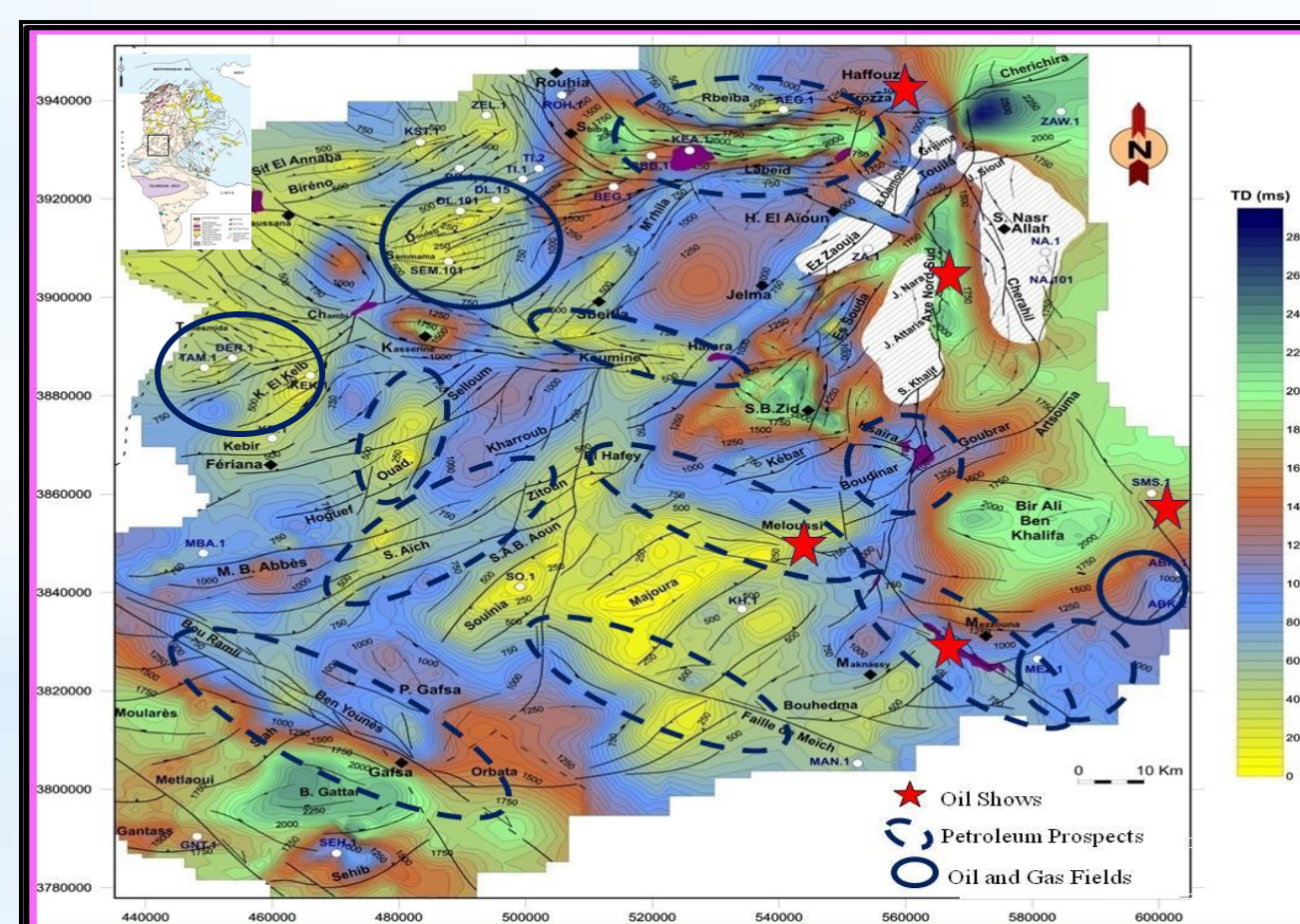
NEW PETROLEUM TARGETS RELATED TO STRUCTURAL-STRATIGRAPHIC TRAPS PROSPECTS



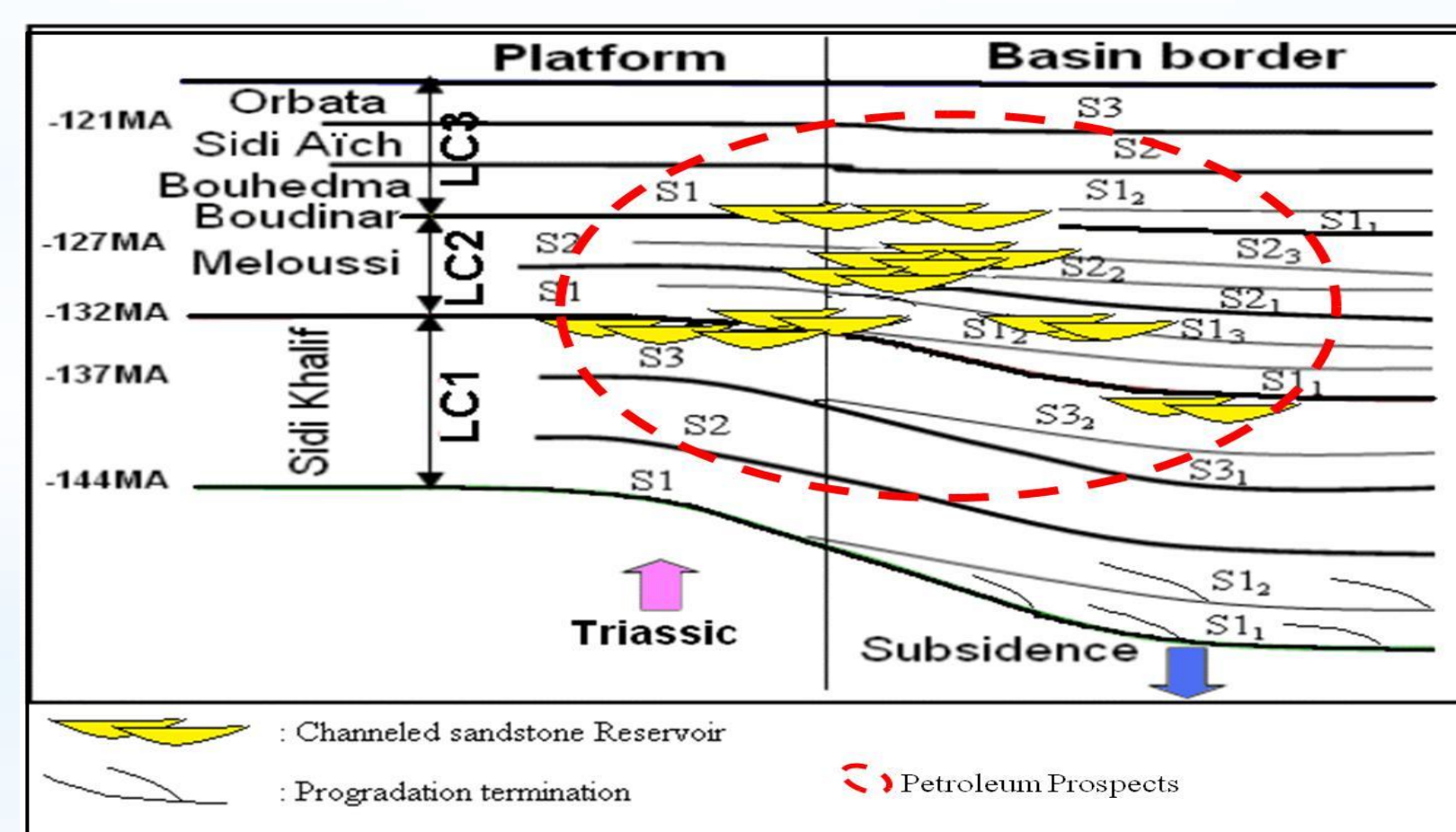
Mesozoic Folded Sealed Platforms and Grabens by Flower Faults and New Highlighted Prospects in Central Atlas



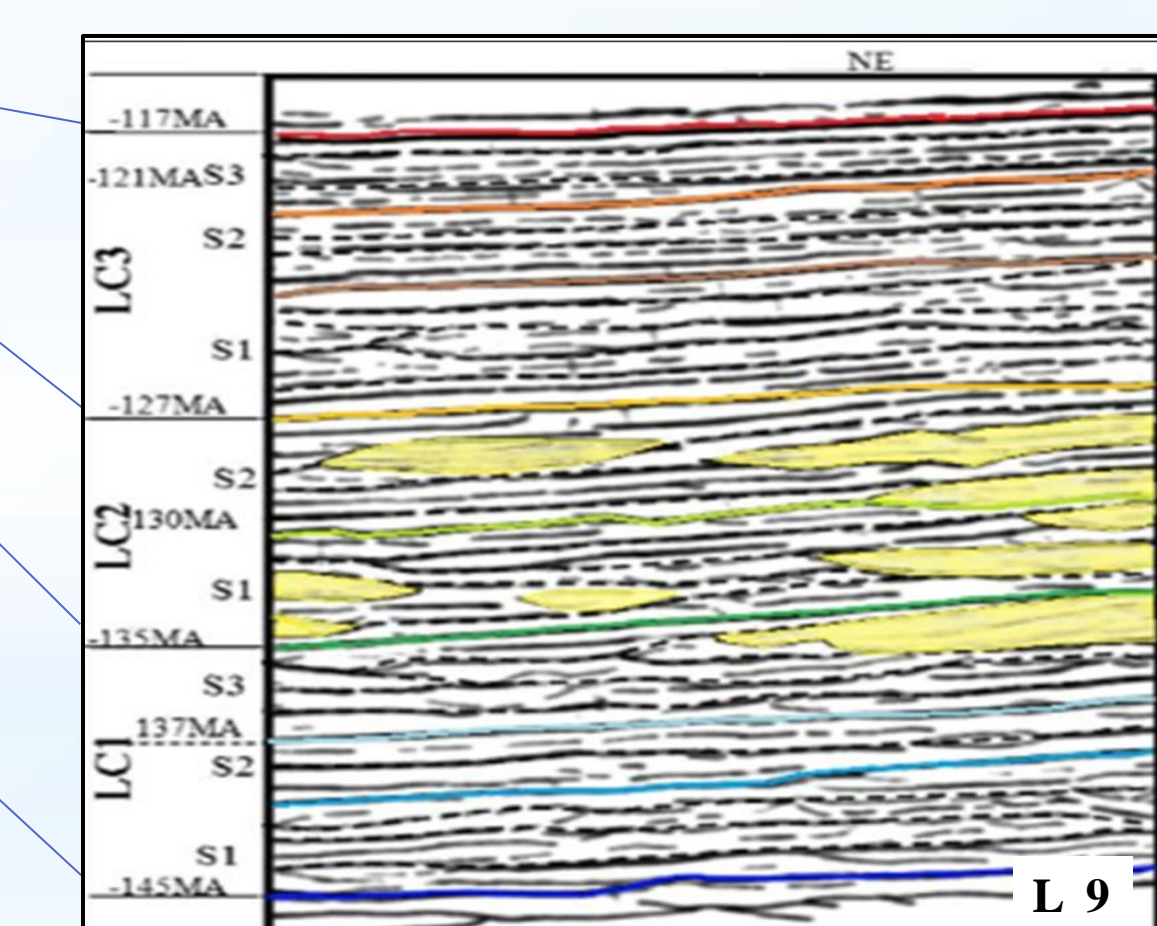
Top Jurassic Isochron Structural Map and Flower Fault Platform to Basin Structuring and New Highlighted Prospects in the Central Atlas



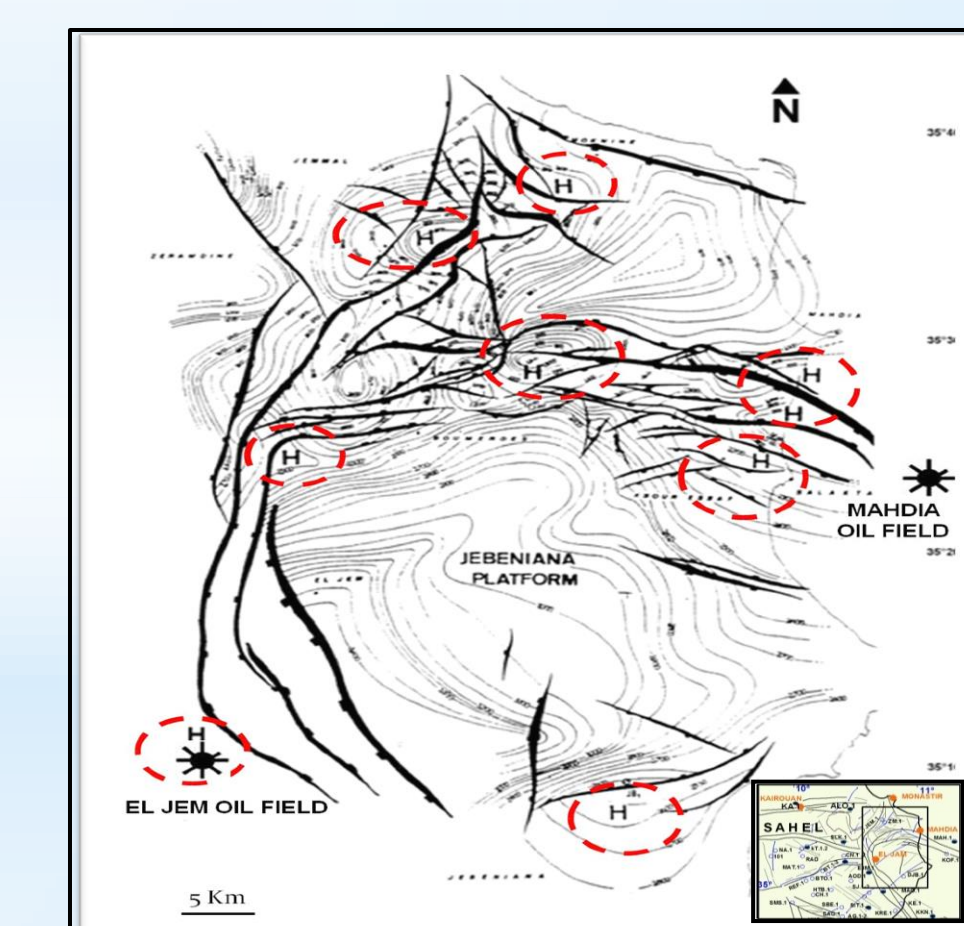
Top Aptian Isochron Structural Map and Flower Fault Platform to Basin Structuring and New Highlighted Prospects in Central Atlas



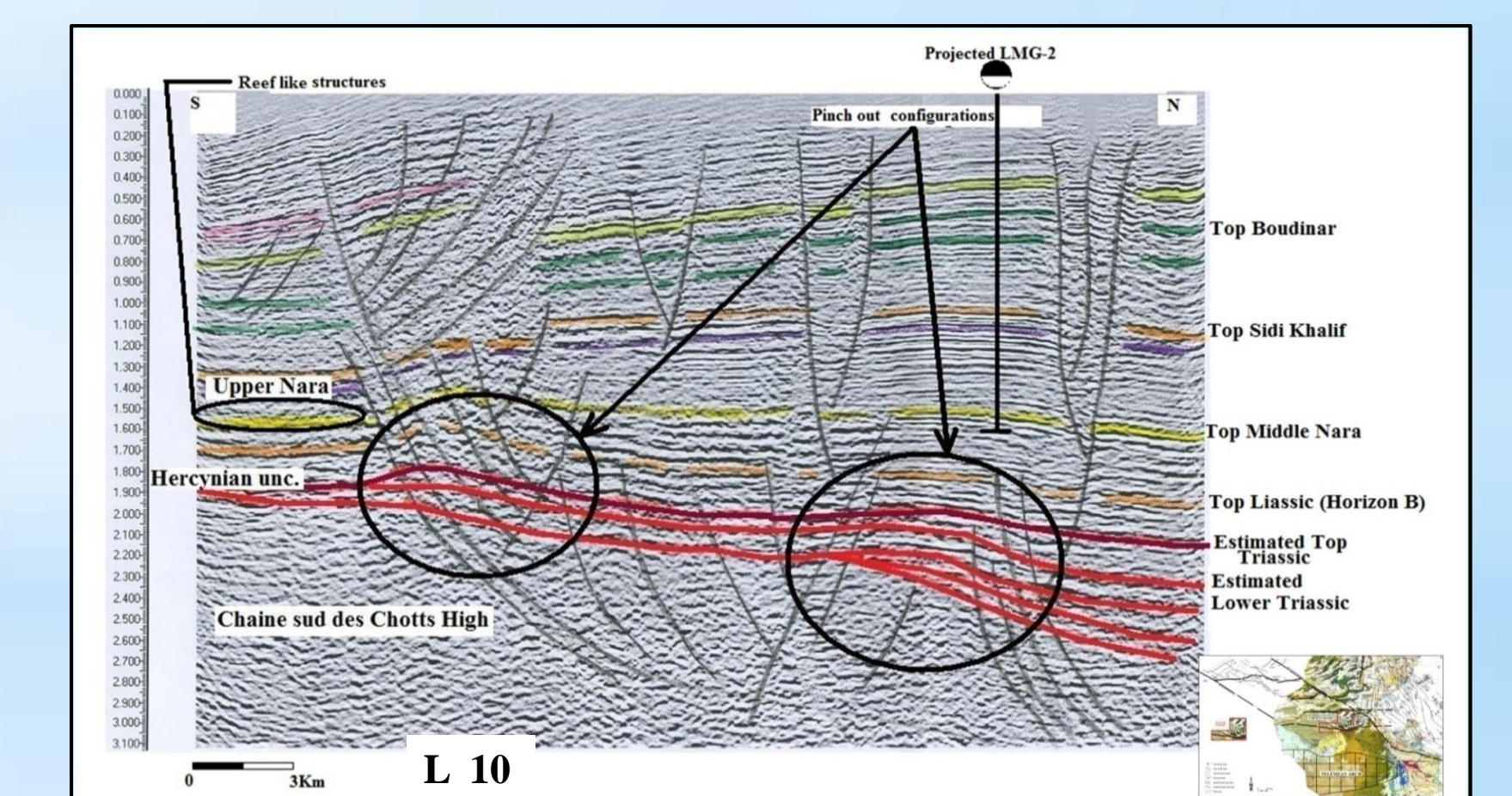
New Lower Cretaceous Sandstone Turbidites and Channels Reservoirs from Platform To Basin Distribution Controlled by Salt Tectonics in Central Atlas



Seismic Stratigraphic Line Showing Lower Cretaceous Sandstone Channels Reservoirs Architecture

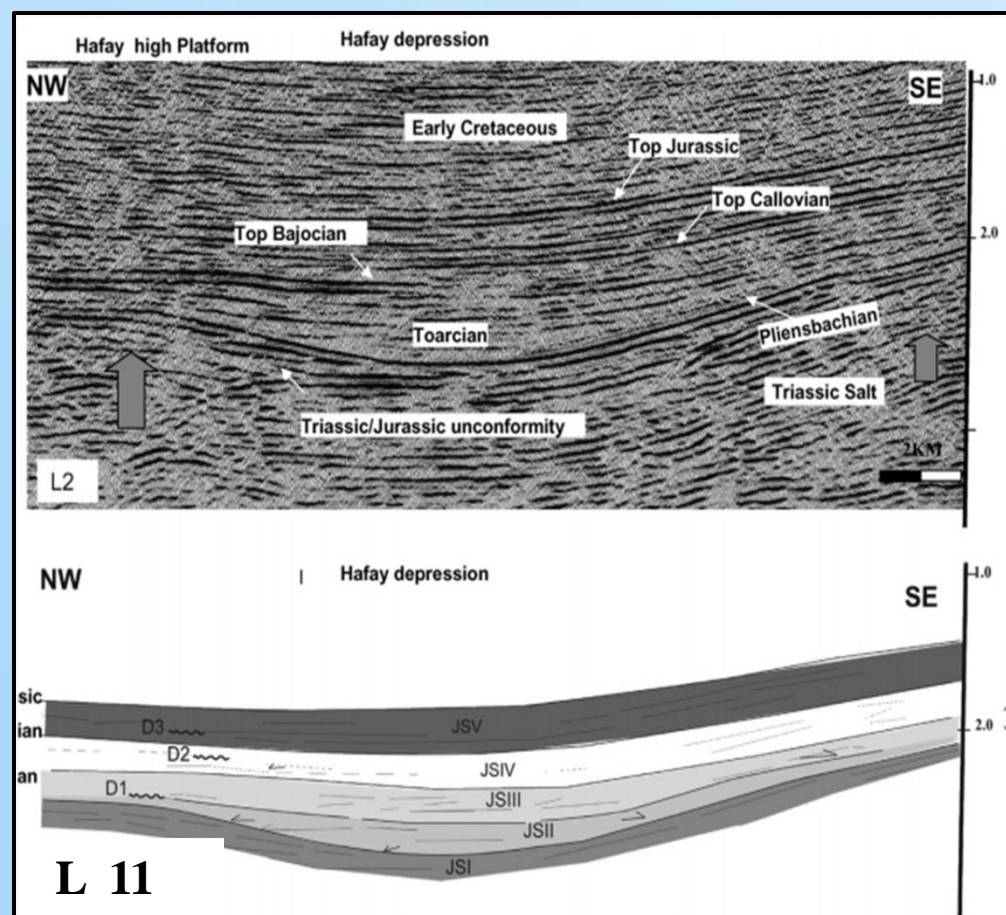


Top Aptian Reservoir Isochron Structural Map and New Highlighted Prospects in the Sahel Block

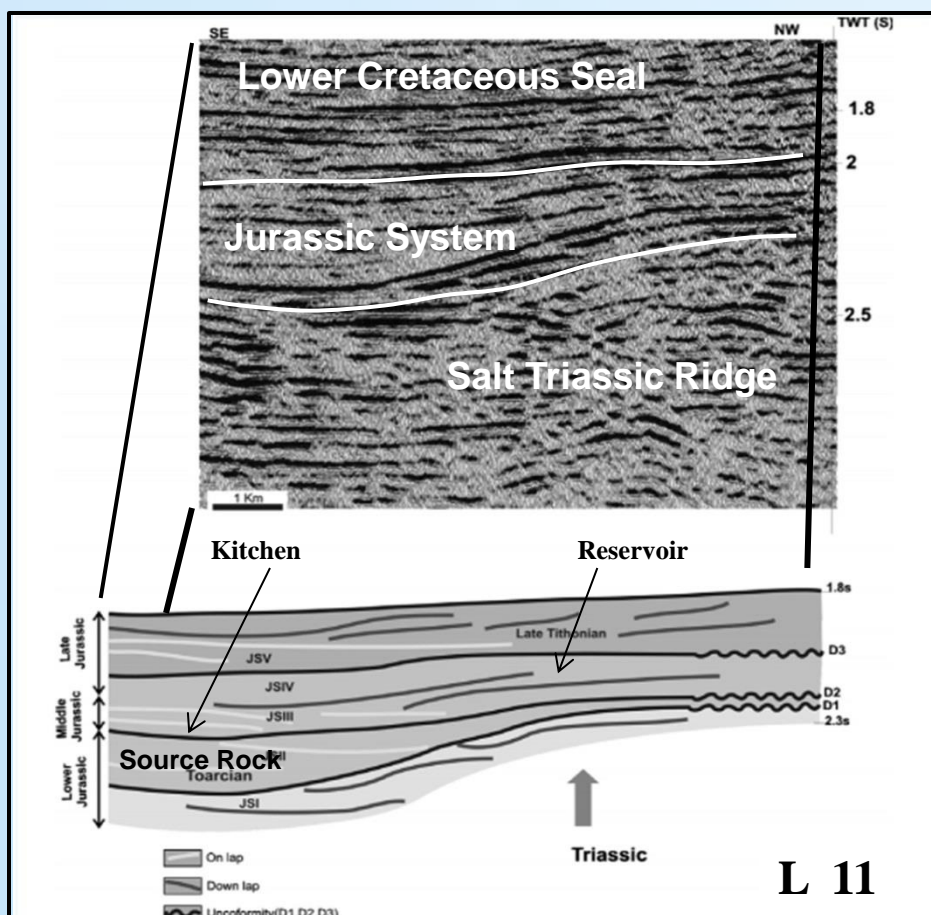


Seismic Line of Paleozoic and Mesozoic Folded Platform to Basin Structuring Controlled by Strike Slip Flower Faults and New Structural-Stratigraphic Traps in Southern Atlas

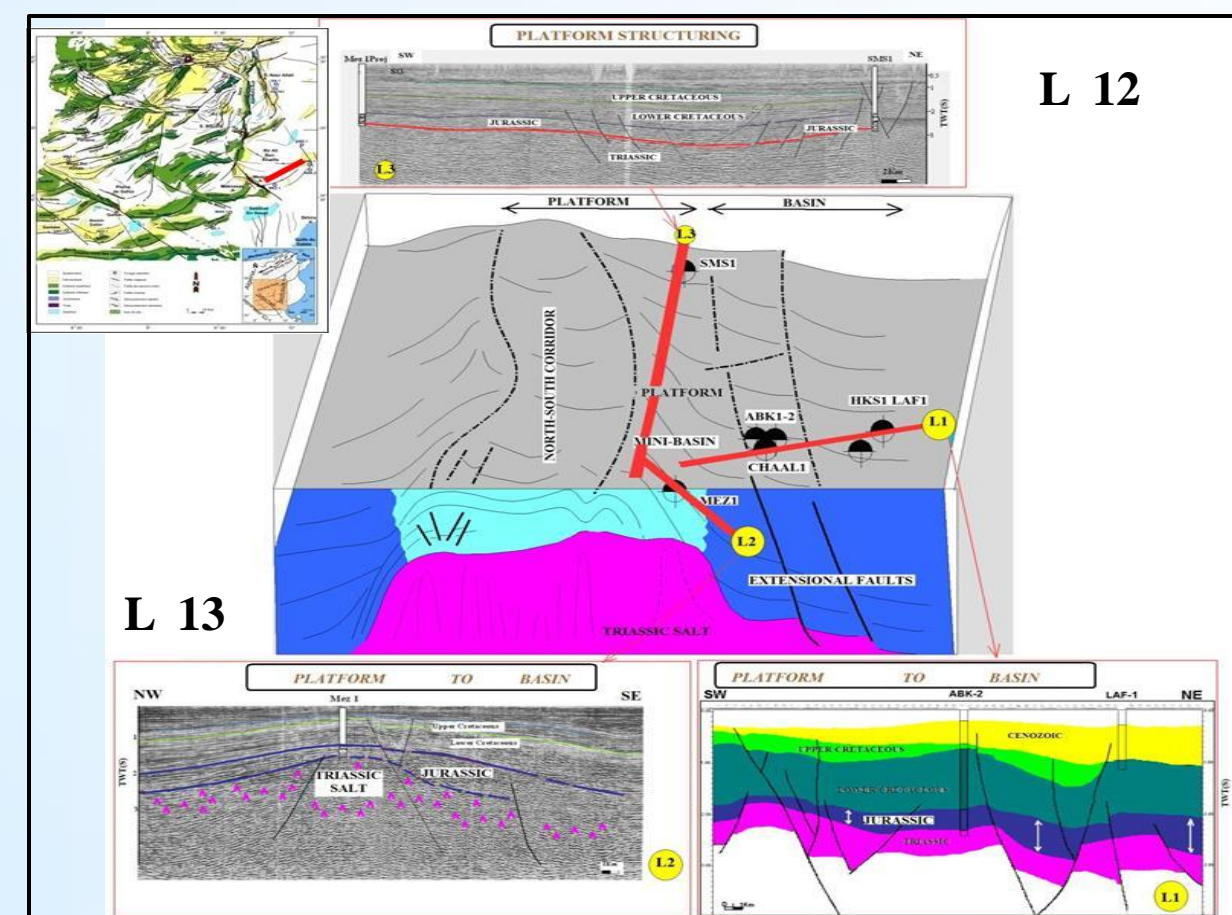
PETROLEUM BASIN MODELING



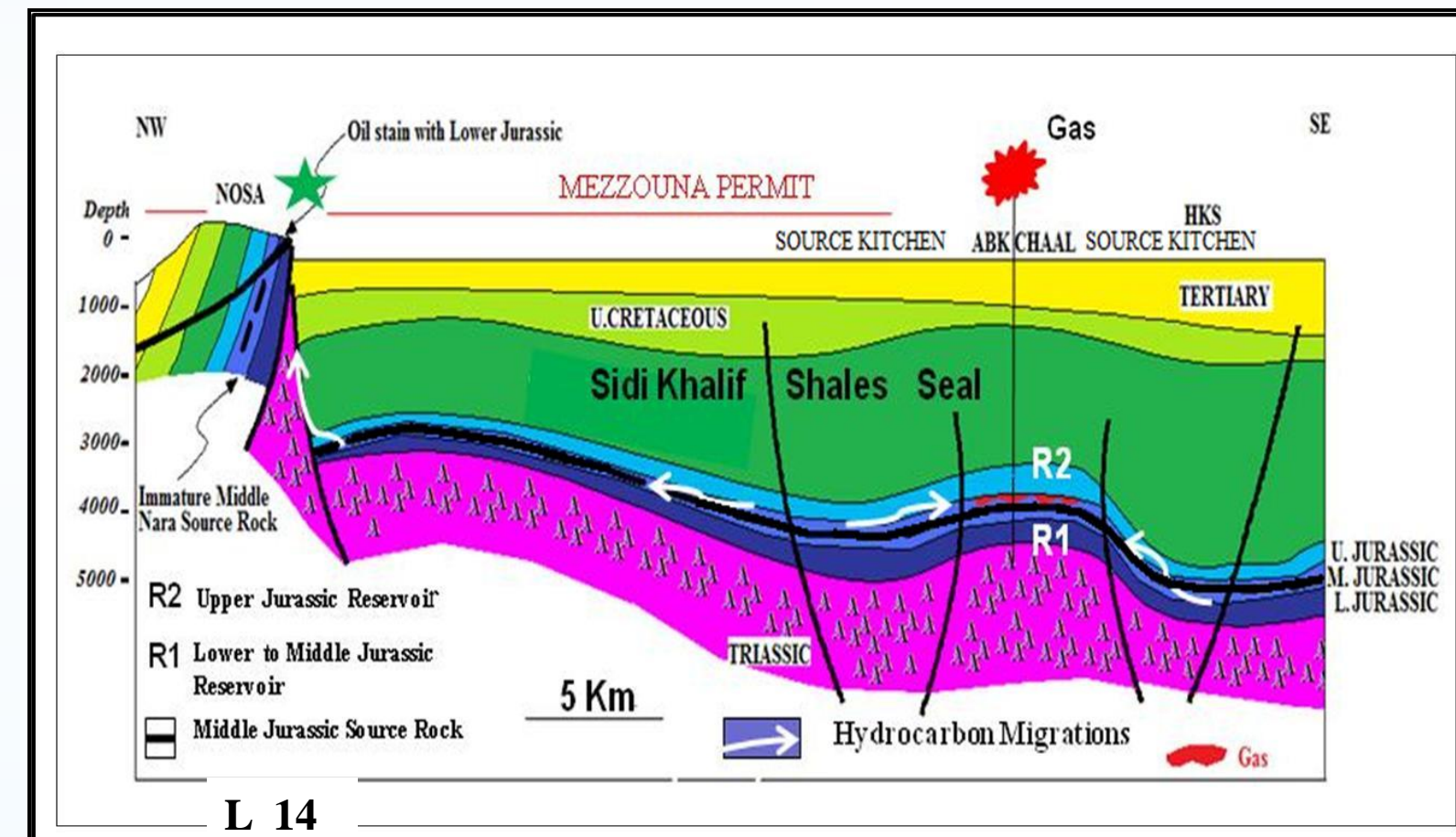
Geoseismic stratigraphic Line of Syn-Jurassic Rym Syncline Basin to Salt Ridge Platform in Central Atlas



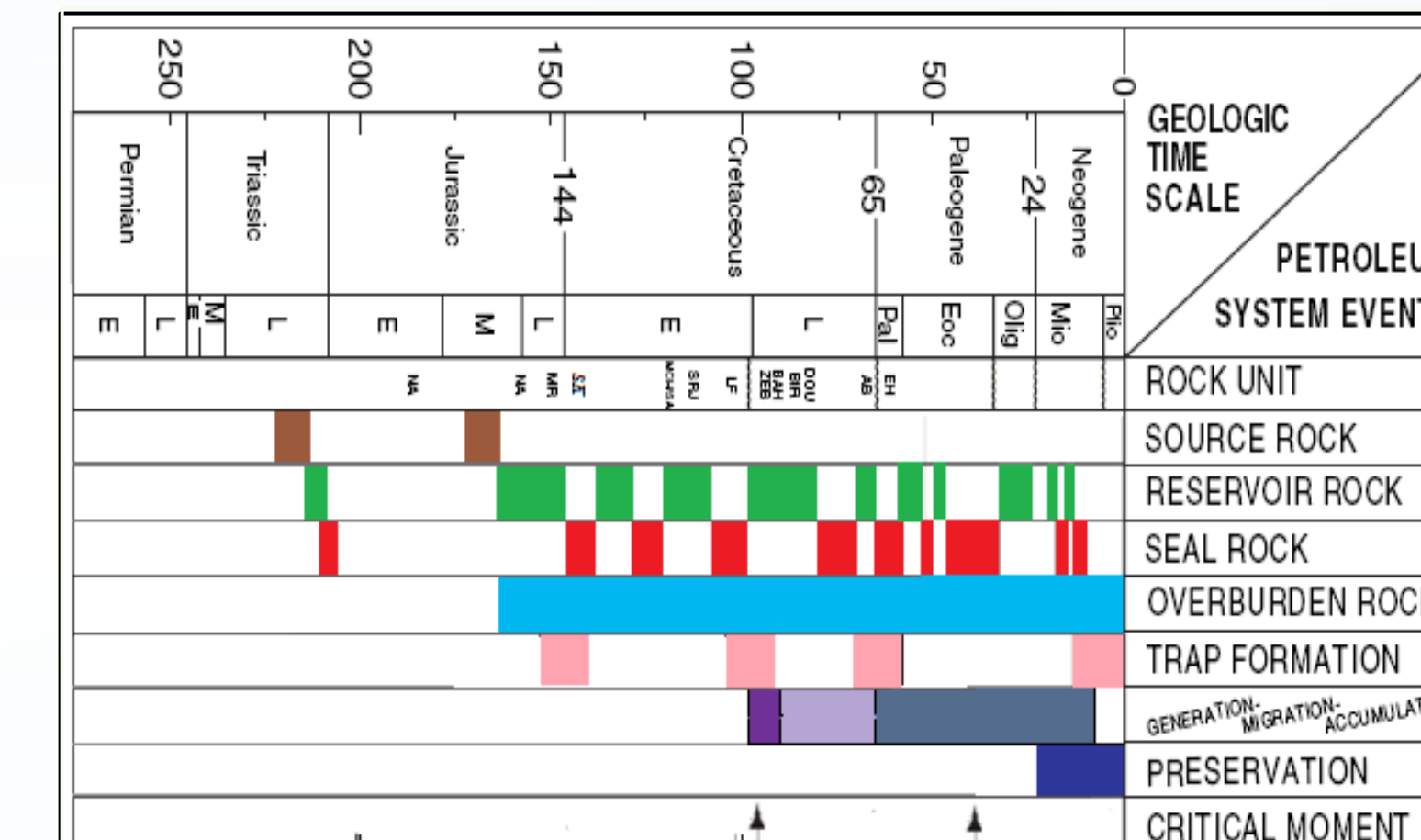
Jurassic Rym Syncline Basin Kitchen to Reservoir Salt Ridge Platform and Stratigraphic-Structural Petroleum System Traps New Concept in Central Atlas



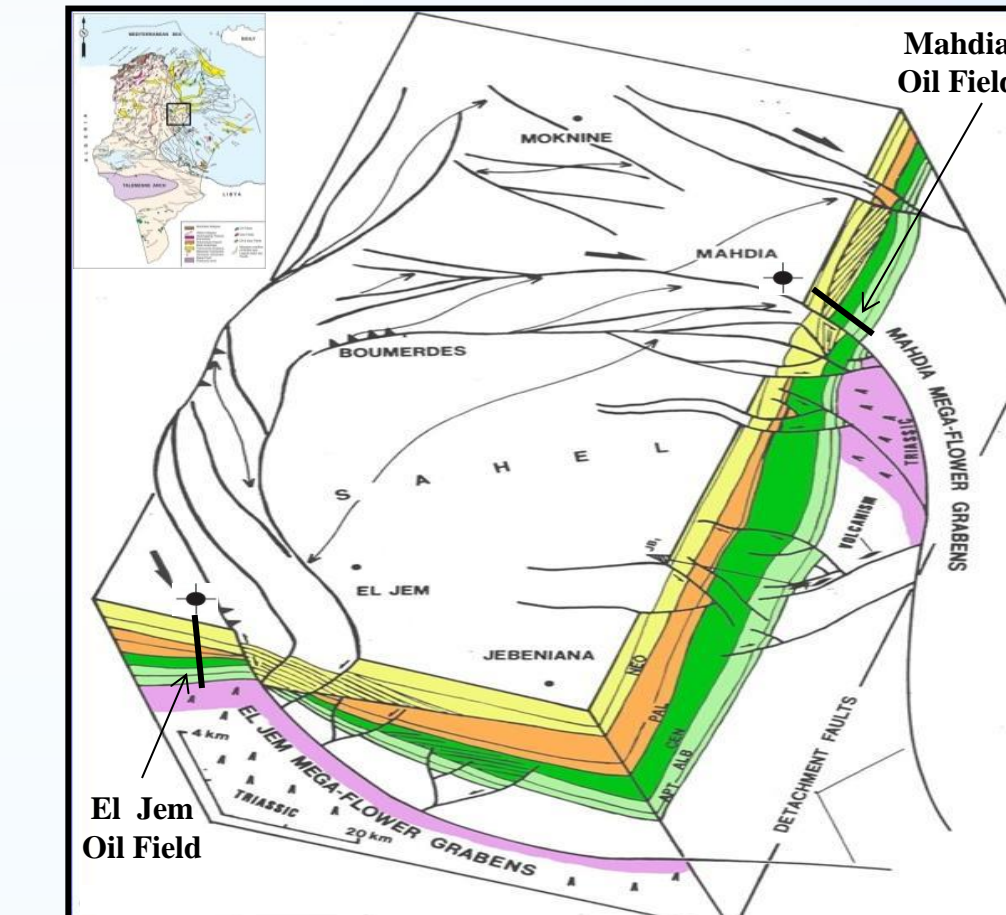
Salt Ridges, Inverted Rift Folded Grabens and Platform to Basin Modeling with Proven Petroleum System in the Sahel Block



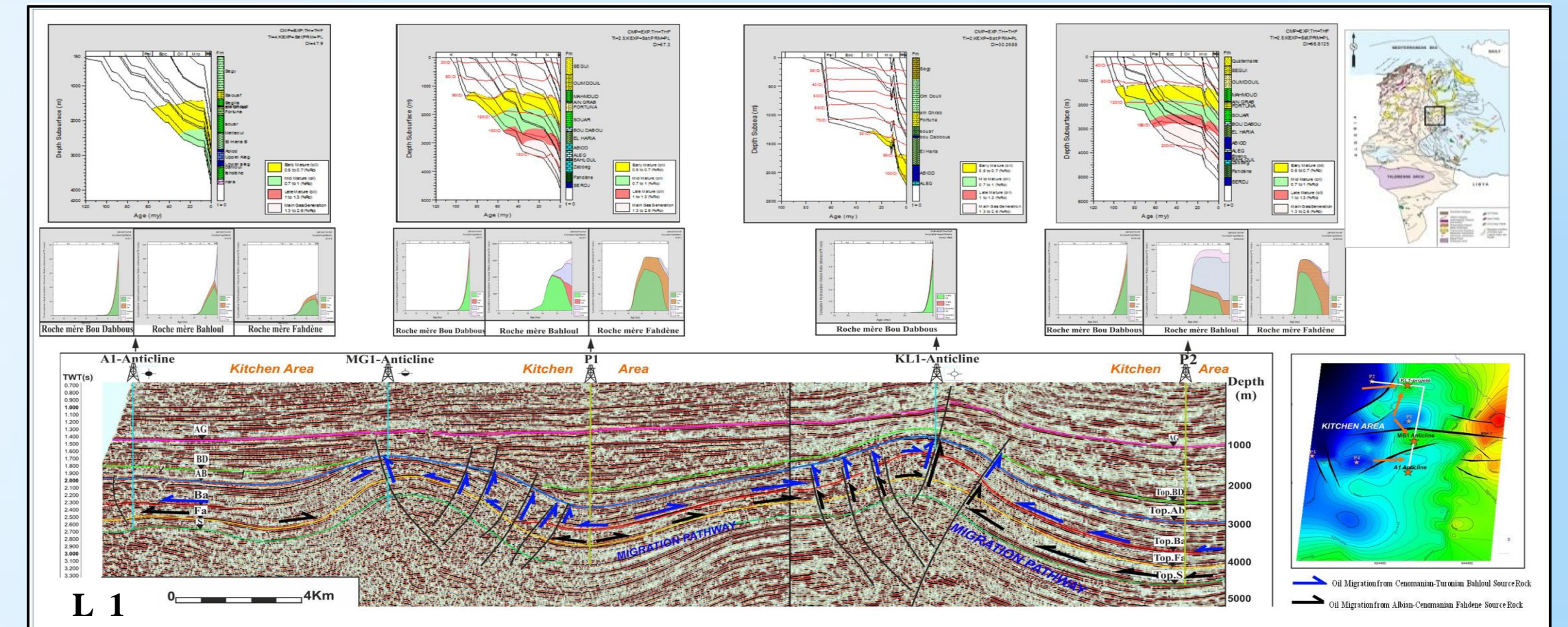
Geoseismic Structural Model of Jurassic Gas Shales in the Eastern ABK Source Rock Kitchen Inverted Folded Basin and Western Mezzouna-NOSA Thrust High with oil stains.



Events Chart for Triassic-Jurassic-Cretaceous and Tertiary Composite Petroleum Systems in the Sahel Block



3D Block Diagram Model of Salt Intruded Flower Fault Folded Platforms and Basins and Associated Proven Petroleum Prospects in the Sahel Block



Regional Geoseismic Line and Basin Modeling Event Charts for Cretaceous and Tertiary Composite Petroleum Systems in the Eastern Sahel Block