

## **BASIN MODELLING AND CHARGING HISTORY OF OUED-MYA BASIN (SOUTH-EAST, ALGERIAN SAHARA)**

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The Oued-Mya basin is located in the North East of the Algerian Saharian Platform. It shows a succession of Palaeozoic clastic deposits from Cambrian to Devonian age. These are unconformably overlain by the Mesozoic sediments. The structural and sedimentary elements of this basin have been affected by tectonics movements and orogenic phases related to the Pan-African; Caledonian; Hercynian and Alpine phases.

The present sedimentary and structural picture of the Oued-Mya Basin has been acquired during the Hercynian phase (faults, anticlines structures, erosions of high zones...), then rebounded during the Meso – Cenozoic (A. Boudjema, 1987).

Based on TOC and pyrolysis data, the source rock with the best characteristics is the Silurian radioactive (Hot Shales). The average original TOC values (prior to maturation and expulsion) of the fine-grained facies of the Silurian radioactive are estimated about 12 % in the North-western part (Oued-Mya). This source rock is assumed to be substantially type II kerogen (original HI 600 and more) and derived from marine algae and bacteria.

The spatial distribution and thickness of the basal Silurian hot Shales are laterally discontinuous. We interpret that they are controlled by the early Silurian paleorelief and subsequently shaped by the Hercynian erosion. The thickest and areally extensive basal Silurian organic-rich Shales occur particularly in the Northern of Oued-Mya basin.

The hydrocarbon generation and expulsion occurred rather later, after the major structuration, during early Cretaceous, except for the South-western area (South of Oued-Mya) where they occurred during the Devonian or Carboniferous time (Fig.1).

In the major part of the study area, the Silurian Hot Shales are within the oil window. During the second cycle of burial (Mesozoic), they reached the main stage of oil generation at the Cretaceous time, except for the southeastern part where it occurred during the Paleozoic (Devonian / Carboniferous).

Concerning the simulation 2D (Temispack), two (02) cross sections were used simulating the migration of hydrocarbons. These sections were chosen to cover preferential migration zones towards the tops drain areas (R. Soulali and A. Lassal, 2004).

Locally, the Oued-Mya basin represents the deepest part where the source rocks were buried and preserved from the Hercynian erosion. For these simulations, a variable heat flow

history (based on PRV data) was used to calibrate present-day temperature. It appears that the Upper Jurassic- Middle Cretaceous burial was the most important parameter that controlled the source rock maturation.

The Triassic-Liasic evaporates constitute a hydrostatic barrier between the Mesozoic and Palaeozoic formations. According to these simulations, most of the generated hydrocarbons, charging the local fields, come from the North and the North-West Oued Mya basin (Sonatrach.DES. EXP. 2003).

The models show a vertical downward and upward migration towards the immediate reservoirs which will then drain the hydrocarbons laterally. The reservoirs and faults are the main parameters controlling the migration pathways.

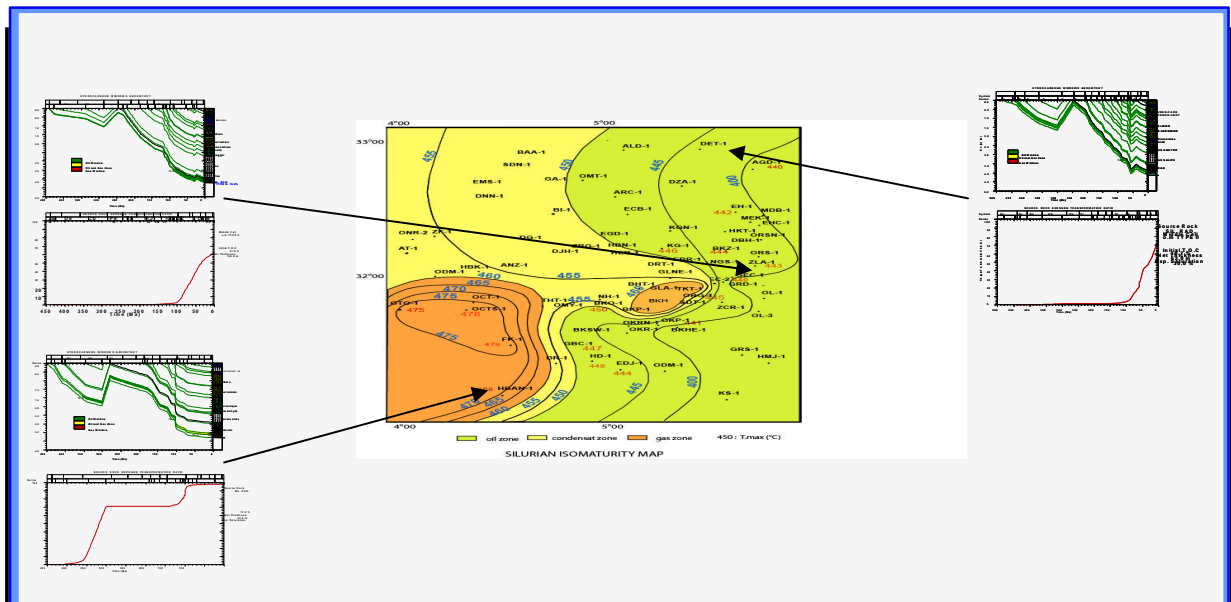


Figure 1. Silurian isomaturity map and geochemical modeling.

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