

## **The Palaeozoic Play of North Africa and Surrounding Areas: A historical Overview in a Palaeogeographic Context**

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### **ABSTRACT**

In the Lower Paleozoic, North Africa formed a consolidated block in the vicinity of the Proto-Tethys and Rheic Oceans. A direct connection existed with the Arabian Peninsula, and the Avalonia micro-continent linked NW Africa (Morocco) with South America throughout the Cambrian, forming the original Gondwana. As a result of the Pan-African orogenies, a series of NW-SE trending arches and troughs were established in North Africa. As a consequence of the Hercynian orogeny in Carboniferous times, this general NW-trending system was newly dissected by NE-SW-trending structures, thus creating a complex mosaic of individual basins throughout North Africa, each with its own tectono-stratigraphic history and petroleum potential. In many cases the Hercynian orogeny helped to enhance the petroleum potential of the Paleozoic strata, in others (e.g. most of southern Morocco, south-western Algeria) it destroyed or at least severely lowered the potential. The Paleozoic Play of North Africa contains two major source rock systems. The most important, the Lower Silurian “Hot Shale”, has generated about 85% of the nearly 48 BBbl Oil-equivalent Paleozoic-sourced hydrocarbons of North Africa. 5 Large Giants are included in these volumes, with 56% of total reserves being reservoired in the Hassi Messaoud oil- and the Hassi R’Mel gas fields of Algeria. The second main source rock is of Middle to Late Devonian age, often eroded by the Hercynian unconformity but a significant contributor to North African oil reserves especially in Libya and eastern Algeria. This is a truly global source rock, which besides North Africa also has delivered significant reserves in South America and in Australia. Reservoirs are Triassic pre-Salt sandstones, as well as Devonian, Ordovician and Cambrian clastics (plus Permo-Carboniferous in Arabia – and possibly Morocco). Triassic Salt in Morocco and in central Algeria forms a formidable seal; other traps are sealed by intra-Paleozoic claystones, or by the Silurian source rock itself. Exploration for the Paleozoic play started in the early fifties with field work in Morocco, Algeria and Libya. Initial success in Algeria and Libya was unspectacular, but with the finding of Hassi Messaoud and Hassi R’Mel activities in Algeria soon flourished. In Tunisia, major success was achieved in the sixties in El Borma, in the vicinity of which a new discovery was made public in 2016. In Libya, the tying-in of the Murzuq Basin into the pipeline system lead to intensified exploration in this remote area around the turn of the millennium. Success in the Egyptian extension of the Kufra basin is much more recent. In Morocco, initial success was restricted to small gas-condensate fields in the Essaouira Basin. The recent Tendrara discovery in the Meseta may be however of an entirely different scale.