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**THE STRUCTURE, STRATIGRAPHY AND PETROLEUM GEOLOGY OF THE
MURZUK BASIN, SOUTHWEST LIBYA**

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The Murzuk Basin covers an area in excess of 350,000km², and is one of several intra-cratonic sag basins located on the Saharan Platform of North Africa. Compared with some of these basins, the Murzuk Basin has a relatively simple structure and stratigraphy, probably as a result of its location on a craton. The basin contains a sedimentary fill which reaches a thickness of about 4,000m in the basin centre. This fill can be divided into a predominantly marine Paleozoic section, and a continental Mesozoic section.

The principal hydrocarbon play consists of a glacial-marine sandstone reservoir of Cambro-Ordovician age, sourced and sealed by overlying Silurian shales. The present day borders of the basin are defined by tectonic uplifts, each of multi-phase generation, and the present day basin geometry bears little relation to the more extensive Early Palaeozoic sedimentary basin within which the reservoir and source rocks were deposited.

The key to the understanding of the Cambro-Ordovician play is the relative timing of oil generation compared to the Cretaceous and Tertiary inversion tectonics which influenced source burial depth, reactivated faults and reorganised migration pathways. At the present day only a limited area of the basin centre remains within the oil generating window. Modelling of the timing and distribution of source rock maturity uses input data from AFTA and fluid inclusion studies to define palaeo temperatures, shale velocity work to estimate maximum burial depth and source rock geochemistry to define kinetics and pseudo-Ro. Migration pathways are investigated through structural analysis.

The majority of the discovered fields and identified exploration prospects in the Murzuk Basin involve traps associated with high angle reverse faults. Extensional faulting occurred in the Cambro-Ordovician and this was followed by repeated compressional movements during Late Silurian, Late Carboniferous, Mid Cretaceous and Tertiary, each associated with regional uplift and erosion.