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Outcrop Investigation of the Lower Palaeozoic Succession of Kufra Basin, SE Libya - First Steps of Targeting Effective Hydrocarbon Plays

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SUMMARY

As the only non-producing basin of Libya, Kufra Basin has recently re-captured the intention of oil companies for a detailed work in a bid to solve uncertainties still surrounding the basin hydrocarbon potential. In the same context, Remsa has conducted a field campaign to the area with the aim of investigating the depositional packages of the Lower Palaeozoic sequence as the main possible hydrocarbon plays may have exist in the subsurface counterpart.
The Kufra basin located in the southeastern part of Libya is an elongate SW-NE trending (?Hercynian) depression defining a zone of crustal weakness of the trans-Africa lineament (Turner, 1980; 1995). The basin covers an aerial extent of approximately 400,000 sq km extending into Chad, Sudan and Egypt. Two major tectonic elements are known to have significantly controlled the structural style of the basin and consequently affected lithology distribution namely the Hercynian and the Caledonian events of Early Carboniferous and Late Silurian age respectively (Bellini and Massa, 1980). The basin fill consisting of a clastic Mesozoic and essentially Palaeozoic sequence attains an approximate thickness of 4000 m in basin centre. Lower Palaeozoic strata are exposed in three major outcrops surrounding the basin; Jabal Dalma in the NE, Awaynat massif including Jabal Asba in SE and Jabal Eighe in the W-SW. The existence of these outcrops provided ideal opportunity to examine the Palaeozoic succession from within a sedimentological/stratigraphic framework.

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The systematic and/or genetic evolution of the Lower Palaeozoic succession of the Kufra Basin seems to have been largely affected by the interaction of tectonics and sea level changes demonstrating a pronounced variation in facies architecture and stacking pattern as it varies from proximal in the SE “Awaynat Massif-Jabal Asba outcrops” into distal setting of the “Jabal Dalma outcrop” which provided the key of reconstructing the palaeogeography of individual time slices and their inferred depositional models.