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**Sequence Stratigraphy, Depositional Environment and Diagenesis of the
Silurian sandstone Reservoirs, South-East Triassic province and Berkine
Basin, Algeria**

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The Silurian age rocks are known to contain one of the major hydrocarbon source rocks with the Frasnian in the Algerian Saharan platform. It may also reveal sand units within its upper part. The latter have produced oil and gas in different blocks of Berkine and SE Triassic province. Nevertheless, neither the distribution nor the reservoir quality evolution is well understood.

A detailed examination of more than 1100m of cores combined with good well log and biostratigraphical control allowed construction of a regional depositional model and an integrated sequence stratigraphy. Thus, three third-order sequences have been defined for the Silurian based on the P. Vail concepts using data from facies, facies successions, bounding discontinuities, and well log signatures. These sequences are complete and display a shelf margin, transgressive and highstand systems tracts.

The first S1 sequence represents a major transgression that followed the Ordovician glaciation (sea level drop) and allowed the deposition of the "hot shales" source rock member. The S1 lies therefore on a transgressive surface (TS) and its SMST belongs to the Ordovician. The biostratigraphic age of S1 is Ludlowvian reflecting the diachronism known to be associated with the Silurian.

Unconformities caused by relative sea level drop and materialised by facies variations limit the overlying S2 and S3 sequences. The latter, topped by the Caledonian unconformity, are of Ludlow to Pridoly age during which the conditions of sedimentation allowed the deposition of important sand units interpreted to have occurred on a shoreface environment characterised by a strong storm and tidal influence. In addition, the regional depositional model highlights two different shorelines, one located in the South whereas the other one located to the north of the basin reflects the existence of a second source of supply flanking the Dahar structural high.

Finally, the Silurian sands, which are composed of about 70% quartz, have experienced a complex diagenetic history dominated by clay, quartz and carbonate cementation (25% cement) which destroyed the primary reservoir qualities. On the other hand, an important process of dissolution affecting both the framework grains and cement produced a secondary porosity reaching 20% and enhanced the reservoir characteristics. The Silurian S2 and S3 sandstone intervals have a cumulative thickness of about 60m and may therefore constitute a non negligible hydrocarbon target in the area.