

## **Hydrocarbon Potential Evaluation of Albian Shales from Offshore Benin Basin (Benin, West Africa)**

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By concentrating more than 5% of the world production, the Gulf of Guinea is, since 1980, one of the key points of the world oil exploration. In this oil province, the Albian Formation has an oil interest and has a regional distribution in the basins of Tano (Ivory Coast), Saltpond (Ghana), Togo, Benin and Adje field (Nigeria). The offshore of the Benin coastal basin is at the heart of this great oil province and from this point of view arouses a proven interest. Lithostratigraphic and oil drilling data led to the evaluation of the hydrocarbon potential of the Albian parent rocks in four wells (R23, R24, G20 and G21) of the offshore part of Benin coastal basin. These albian source rocks are represented by black shales. Indeed, the unnamed "Albian Training" consists of marine sandstones and shales with some organic-rich black shales and minor limestone. The shale contains 300 m in deep water. Maturity ( $R_o$  and  $T_{max}$ ) and petroleum potential assessment (TOC and Rock-Eval pyrolysis) analyses enabled the characterization of 165 rock samples (cuttings and swc). The results of these analyses have (1) revealed that these source rocks contain Type II/III and Type III kerogens and are all mature with varying levels of maturity ( $R_o$  data between 0.69 and 1.10;  $T_{max}$  between 434°C and 465°C); (2) showed that these parent rocks are rich in organic matter (TOC data between 0.51 and 5.32%) and have medium to excellent oil potential ( $S_2$  data between 0.5 and 11.06 mg HC/g rock); (3) led to the realization of four geochemical logs. These logs constitute a determining stage towards the realization of the geochemical charts aiming to determine the geographical and stratigraphic extension active portions of source rocks. The attempts oil-oil and oil-source rock correlations based on the analysis of the geochemical ratios of markers (CPI ; Pr/Ph ; Pr/nC17 and Ph/nC18) did not allow to specify the origin of these oils but with all the same contributed to differentiate analyzed oils. Some complementary analyses by methods Gas Chromatography/Mass Spectrometry (GC-MS) will contribute to precise these correlations in order to reduce the risks of oil exploration.

**Keywords:** Offshore Benin Basin, Albian shales, hydrocarbon potential, geochemical markers