

## GEOLOGIC AND PETROPHYSICAL CHARACTERIZATION OF RESERVOIR ROCKS OF THE ETOKO/OKOYONG UNIT, MAMFE BASIN CAMEROON

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### Abstract

The Early Cretaceous sandstone unit of the Mamfe Basin is suspected to host hydrocarbons. Rocks of this unit are exposed in several localities in the eastern part of the Mamfe Basin. They were studied in the field, samples collected and subjected to laboratory analyses to determine their environment of deposition, porosity and permeability from which the reservoir quality of the rocks were determined. Preliminary studies of the lithofacies of the studied sections and the grain size analysis of the samples collected reveal the depositional environment of these sandstones. Porosity of the studied sandstones was determined by gravimetry and range from poor to high with an average value of 19.4%. The permeability (12.47md-53.86md) was low to moderate with an average estimate of 28.8md for 0.05bar and (9.66md-39.46md) with an average estimate of 21.51md for 0.25bar, determined by oedometry. Two dimensional (2D) interpolation contour maps plotted for these two petrophysical parameters indicate good quality sandstones in the North East (NE) part of the study area with low quality sandstones in the North West (NW). Sedimentological studies indicate intraformational clast supported conglomeratic facies (Gci), conglomeratic sandstone facies (Gs), Current ripples sandstone (Sr) facies, and massive fine to coarse grained sandstone (Sm) facies. Associating these facies types shows that these sediments form the bottom and middle part of a channel flow deposit (fluvial depositional environment). Grain size analysis carried out to confirm the environment of deposition of the sandstones shows sorting values of  $(0.45-2.95\phi)$  indicating moderately to poorly sorted sandstones; skewness values of  $(-2.94-0.45\phi)$  indicating negatively skewed and kurtosis values in the range  $(0.54-5.6\phi)$ , suggestive of platykurtic-leptokurtic. Using field evidences and scattered plots of sorting vs. skewness mean vs. sorting, mean vs. skewness, skewness vs. kurtosis, median vs. sorting, a fluvial depositional setting was interpreted for the sandstones.

**Keywords:** Sandstones, Reservoir Quality, Fluvial Depositional Environment.

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