
Sedimentology and Reservoir Characteristics of Yabus and Samaa Formations (Tertiary), Agordeed Belt, Adar Yale Field, Melut Rift Basin, Sudan

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The Melut rift-related basin of interior Sudan is regionally linked to the Mesozoic-Cenozoic central and west African rift system. The sandstone reservoir of Yabus and Samaa Formations, which occur at shallow burial depth, deposited within fluvial/lacustrine environments. This study included facies analysis based on cutting, cores and wire line logs. Thin section petrography, XRD and SEM analysis were also used to investigate the sandstone composition, diagenesis and porosity evolution. The reservoir sandstone heterogeneity shows vertical and lateral variation along and across the basin, reflecting tectonic, and depositional and post depositional controls within proximal to distal fluvial and lacustrine environments. The reservoir facies are dominated by channel and bar made of planner cross-bedded, trough cross-bedded and horizontally bedded sandstone interbedded with laminated to massive siltstone and mudstone. The sandstone of Yabus Formation ranges from subarkosic to arkosic arenite, while that in Samaa Formation is mainly arkosic arenite to litharenite. The sandstone is fine to medium grained, poorly to moderately sorted and sub angular to sub rounded. Quartz and feldspars dominate the grain framework; rock fragments are rare in Yabus and dominate in Samaa Formation. Heavy minerals contents generally are low in both formations. Clays and mica predominate as matrix and carbonate and clays are the main cements. Porosity of sandstone ranges from 3 to 50 % with an average of 19 %. A number of factors have significantly reduced porosity by combined the affect of kaolinite precipitation, presence of clay matrix, carbonate cement and pore filling, moderate grain packing and mild compaction. The reservoir quality is improved by the development of secondary porosity through dissolution of feldspars, partial dissolution of carbonate cement and grain-coating hematite.
