

## **Depositional Environment and Reservoir Heterogeneity of Bentiu Formation (Albian-Cenomanian), Muglad Rift Basin**

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### **ABSTRACT:**

Bentiu Formation is a major oil sandstone reservoir in the Muglad rift basin of interior Sudan. Subsurface lithofacies analysis allows the subdivision of Bentiu Formation in lower, middle and upper parts and each part is characterized by distinct facies assemblage and different depositional pattern. The lower part indicates deposition in moderately deep mixed-load high sinuosity stream showing transition to lacustrine delta. The middle part suggests deposition in low sinuosity braided sand-bed dominated stream. The upper part which is dominated by gravelly sandstone and sandstone facies indicates deposition in outwash plain of low sinuosity braided shallow channels. The sandstone facies range from trough and planner cross-bedded to massive and horizontally bedded sandstone. Fine grained facies include rippled fine grained sandstone and laminated to massive siltstone/mudstone facies. The facies assemblages suggest deposition within channels, bars, overbank and floodplain environments.

Large scale heterogeneity and dimensions of Bentiu sandstone bodies and the siltstone/mudstone barrier/baffle units vary within the lower, middle and upper parts of the formation. Small scale reservoir heterogeneity includes sandstone composition, grain size change and diagenesis such as quartz overgrowth, clay infiltration and authigenesis, feldspar alteration and carbonate cementation and dissolution. The later appear to have influence on secondary porosity production and enhancement

The reservoir heterogeneity of Bentiu Formation reflects the intra-basinal and extra-basinal control on the lacustrine/fluviial system through space and time. Understanding of these controls within a depositional model framework is essential for the prediction and assessment of reservoir quality of Bentiu Formation.

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