

## Sedimentological and Petrographical Studies on the Cored samples from Bentiu Formation Muglad Basin

**Authors :** Yousif M. Makeen

**Abstract :** This study presents the results of the sedimentological and petrographical analyses on the cored samples from the Bentiu Formation. The cored intervals consist of thick beds of sandstone, which are sometimes intercalated with beds of fine-grained sandstone and, in a minor case, with a siltstone bed. Detailed sedimentological facies analysis revealed the presence of six facies types, which can be clarified in order of their great percentage occurrences as follows: (i) Massive sandstone, (ii) Planar cross-bedded sandstone, (iii) Trough cross-bedded sandstone, (iv) Fine laminated sandstone (v) Fine laminated siltstone and (vi) Horizontally parted sandstone. The petrographical analyses under the plane polarized microscope and the scanning electron microscope (SEM) for the sandstone lithofacies types that exist within the cored intervals allowed classifying these lithofacies into Kaolinitic Subfeldspathic Arenites. Among the detrital components, quartz grains are the most abundant (mainly monocrystalline quartz), followed by feldspars, micas, detrital and authigenic clays, and carbonaceous debris. However, traces of lithic fragments, iron oxides and heavy minerals were observed in some of the analyzed samples, where they occur in minor amounts. Kaolinite is present mainly as an authigenic component in most of the analyzed samples, while quartz overgrowths occur in variable amounts in most of the investigated samples. Carbonates (calcite & siderite) are present in considerable amounts. The grain roundness in most of the investigated sandstone samples ranges from well-rounded to round, and, in fewer samples, is sub-angular to angular. Most of the sandstone samples are moderately compacted and display point, concavo-convex and long grain contacts, whereas the sutured grain contacts, which reflect a higher degree of compaction, are relatively observed in lesser amounts, while the float grain contact has also been observed in minor quantity. Pore types in the analyzed samples are dominantly primary and secondary interparticle forms. Point-counted porosity values range from 19.6% to 30%. Average pore sizes are highly variable and range from 20 to 350 microns. Pore interconnectivity ranges from good to very good.

**Keywords :** sandstone, sedimentological facies, porosity, quartz overgrowths

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