

Abstract

The Eocene sediments of the Khasi and Jaintia Hills were developed in the shelf facies. The present area of investigation around Cherrapunji, Meghalaya, is bounded by $25^{\circ}11'65''$ and $25^{\circ}22'45''$ N latitudes and $91^{\circ}42'0''$ and $91^{\circ}45'0''$ E longitudes. Shella Formation developed within the area and includes the Lakadong limestone and Lakadong sandstone. The lower part of the Lakadong limestone is represented by the dolomitic limestone and the upper part by the magnesian limestone.

The dolomitic limestone is petrographically classified as sparry allochemical and microcrystalline allochemical types and named as Dolomitized Biosparrudite, Dolomitized Biomicridutite and Dolomitized Biomicrite, Dolomitized Biopelsperite, Dolomitized micrite, Dolomitized fossiliferous micrite and medium dolomitized crystalline rock. The dolomitic limestone is constituted by high-magnesian calcite and low-magnesian calcite, dolomite and aragonite carbonate minerals. They are cemented by sparry calcite, nonferroan and ferroan calcite, ferroan and nonferroan dolomite and aragonite. The carbonate rocks were dolomitized by saline brine water at rapid rate of evaporation. The limestone contains pyrite and magnetite and formed in a reducing environment.

The low-manganese and phosphorus indicate that the depositional basin was under arid climatic condition. Chemically these limestones are classified as dolomitic limestone. Four types of diagenesis are identified and they are inversion, neomorphism, silicification and cementation.

The magnesian limestone is represented by sparry allochemical, microcrystalline and microcrystalline allochemical rock types. They include

Biosparite, Biopelsparite and fossiliferous micrite. The limestones were deposited in the beach environment. They are dominantly cemented by sparry calcite, non-ferroan low-magnesian calcite and subordinately by microcrystalline calcite matrix, ferroan low-magnesian calcite, dolomite and aragonite. The magnesian limestone possesses good to excellent porosity and good permeability. The metallic minerals found in the magnesian limestones are pyrite, magnetite and hematite.

The high calcium content of magnesian limestone indicates their deposition in closed basinal condition. Low phosphorus and manganese content indicate that deposition took place in the arid climatic condition. Based upon the chemical composition the limestone is again confirmed as magnesian limestone. Four types of diagenesis took place in the depositional area and they are inversion, neomorphism, silicification and cementation.

The Lakadong sandstone of the Shella Formation is represented by orthoquartzite. The texture of majority of the sandstone is sandy but occasionally it also becomes silty sand. The depositional environments of sediments are dominantly beach with a subordinate amounts of river environment. The clastic sediments were mainly derived from igneous terrain. However, evidences of derivation of the clastic materials from metamorphic and sedimentary terrain are also seldom seen in the sandstone. The clastic materials were transported to the depositional site by tractive currents. During the transportation, they suffer sufficient attrition. The sandstone is more mature towards the top of the formation. The sandstones are loosely cemented by iron oxide.