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Microfacies and Diagenetic Analysis of Lockhart Limestone, Shal Allah Ditta Area, Islamabad, Pakistan

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Paleocene and Eocene are very important and provide a major contribution to the evolution of the Larger Foraminifera. The microfacies and diagenetic setting of Paleocene Lockhart Formation were analyzed in Shah Alla ditta area, Islamabad. The Lockhart Formation is highly fossiliferous, comprising of thin nodular limestone with interbedded shale/marl. The Lower contact is unconformable with Jurassic Samansuk while the upper contact is conformable with Margalla hill Limestone.

Rock samples were collected from field, and then thin sections were prepared and were analyzed under microscope. On the basis of detailed petrographic study, three types of microfacies were identified and interpreted based on Dunham's textural classification, allochem type, and fossil content and sedimentary structures. The microfacies include, LH-MF 1: Foraminiferal Wackstone/Biomicrite, Microfacies LH-MF 2: Algal Foraminiferal Wackstone Microfacies, LH-MF 3: Mixed Bioclastic Mudstone Microfacies. A number of larger benthic foraminifera and lack of planktonic foraminifera in the Lockhart Limestone indicates shallow to deep water of restricted, inner to middle shelf environments of deposition. Larger foraminifera and dasycladacena algae are the two major fossil types present in the Lockhart Formation. Larger benthic foraminiferal species like *Lockhartia hameii* and *Lockhartia conditi* in the Lockhart Limestone confirm the Paleocene age.

The main digenetic fabric recognized in the Lockhart Limestone reveals mechanical and chemical compaction, deep burial water pressure, pressure dissolution and tectonics related fracturing. The nodularity in the Lockhart Limestone is credited to pressure dissolution.

