

## **Analysis of microfacies and diagenetic framework of the Lockhart Limestone, Northeast of Kohat City, Pakistan**

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The present study is intended to describe the carbonate microfacies of the Paleocene Lockhart Limestone in area northeast of the Kohat City. The succession is 65m thick and predominantly medium to thick bedded, nodular to brecciated and extremely fossiliferous. Thin interbeds of marl are observed in the main lithological unit. The lower contact of the Lockhart Limestone is faulted with the Samana Suk Formation of the Jurassic age while conformably overlain by the Patala Formation of Paleocene to Eocene age. The major lithological unit is mainly comprised of an abundance assemblage of the larger benthic and smaller planktonic foraminifers with accretion of ostracods, dasycladacean algae, echinoderms, gastropods and corals. On the basis of field and laboratory observations, two distinct types of microfacies have been identified as i) Dasyclad-Miliolid Foram Wacke-Packstone microfacies of the inner shelf, sub tidal lagoon, ii) Larger Foram Packstone microfacies of the middle shelf. The Limestone represents a carbonate cyclic sequence marked by three, transgressive, deepening up cycles representing a gradual sea level rise compensated by vertical accumulation of microfacies. The commencement of each cycle is clearly marked by the input of land-derived siliciclastic sediments and near shore restricted marine faunal/floral assemblage in the inner shelf microfacies gradually thinning up section where the microfacies become deeper offshore. The diagenetic modification is observed in the shape of compactional framework, dolomitization, aragonitic to calcitic alteration and spar-filled fractures in the main lithological unit of the Lockhart Limestone.