

**DEPOSITIONAL AND DIAGENETIC STUDIES OF THE PATALA FORMATION
CARBONATES EXPOSED IN PIR SOHAWA SECTION, HAZARA BASIN, PAKISTAN:
IMPLICATIONS FOR RESERVOIR CHARACTERIZATION**

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Abstract

A Section of the Patala Formation exposed at Pir Sohawa area, Hazara Basin is measured, logged, and sampled for microfacies analysis, depositional environment and reservoir potential assessment. Total measured thickness of the studied section is 60 meters. Based on Dunham (1962) classification two microfacies, mudstone and wackestone were identified and based on the recorded fauna and depositional fabric, seven sub-microfacies were interpreted including Algal-bioclastic mudstone (MF1), Miliolid-nummulitic mudstone (MF2), Miliolid mudstone (MF3), Unfossiliferous mudstone (MF4), Miliolid wackestone (MF5), Bioclastic wackestone (MF6) and Nummulitic-miscellanea wackestone (MF7). These microfacies indicate lagoonal, restricted to open marine inner ramp and lagoonal, restricted to open marine platform interior environment of deposition for carbonates of the Patala Formation. Micritization, neomorphism, compaction (physical and chemical) and cementation are the noticed diagenetic features in the studied formation. The micritization occurred in the shallow marine environment. The neomorphism and cementation evaluated in the meteoric diagenetic conditions. The compaction took place in the burial diagenetic settings. Porosity is grouped according to the microfacies types. Highest porosity (i.e. 6.89 %) is recorded from the MF4 then followed by 4.01% porosity in MF6. Likewise, 3.19 %, 2.94 % and 1.96 % porosity values are noted in the MF3, MF2 and MF5 respectively. The studied carbonates are highly fractured but filling of these fractures by calcite cement has greatly reduced the reservoir quality. Based on the present study, the Patala Formation is interpreted as poor quality reservoir.