Microfacies, Benthic Foraminiferal Biostratigraphy and Paleoenvironment of The Eocene Nammal Formation Exposed in Nammal Gorge, Western Salt Range, Pakistan

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Abstract

In this study, stratigraphic section of Nammal Formation (Early Eocene) of the Western Salt Range exposed in the Nammal Gorge is measured, sampled and logged. The 76m thick section of Nammal Formation at Nammal Gorge consists of predominantly slope forming limestone with interbedded shale, recessive limy siltstone and marl. The recessive beds are generally exposed above and below the limestone beds. The upper part of the Nammal Formation is exposed in a very steep cliff of wavy to flat bedded lime mudstone to packstone sequence. Four microfacies have been identified on the basis of petrographic studies; as Wackestone to Packstone Microfacies (NMF-1) deposited in middle ramp settings, Planktic Foraminiferal Mudstone to Wackestone Microfacies (NMF-2) representing open marine conditions of outer ramp settings, Wackestone Microfacies (NMF-3) showing deeper water environment of the outer ramp and Packstone Microfacies (NMF-4) depicting high energy conditions towards inner ramp.

The various allochemical constituents of the formation have been identified which include different varieties of foraminifers e.g. Benthic Foraminifera; *Assilina dandotica, Assilina laminosa, Assilina leymerie, Assilina spinosa, Nummulites globulus Leymerie, Nummulites atacicus Leymerie, Nummulites mammalitus, Discocyclina dispansa, Discocyclina ranikotensis, Lockhartia conditi, Operculina, Bigenerina, Miliolids, Textularia* and Planktic Foraminifera; *Globigerina* along with some *echinoderms and algal fragments* often embedded in sparry calcite or lime mud. The bioclasts outnumber all other grain types present. The occurrences of various key age diagnostic foraminiferal assemblages suggest maximum stratigraphic ranges through foraminiferal shallow benthic biozones (SBZ 8/9-11) of Ypresian time. On the basis of fossil assemblages and textural relationships, the environment of deposition is interpreted to occur dominantly in the middle to outer ramp and less dominant towards inner ramp settings of the carbonate platform.

Keywords: Western Salt Range; Nammal Formation; Microfacies; Biostratigraphy; Shallow Benthic Zones (SBZ); Paleoenvironment.