

Depositional Environment and Palaeoecology of the Sylhet Limestone from Dillai Parbat, Karbi Anglong District, Assam, India

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Abstract

The Dillai Parbat is known for its rich limestone deposits represented dominantly by wacke, grain and pack stones. In addition to that fine to medium grained sandstones and carbonaceous shale / shale are also present. Both epifaunal and infaunal forms of the microfossils have been observed. Plane/cross laminations, herringbone and hummocky cross stratifications are the sedimentary structures recorded in the study area. The sediments of the study area are intensely bioturbated which has imparted a mottled character to it. Benthic forms of the identified microfossils include *Bolivina*, *Lagena*, *Anomalina*, *Rotalia*, *Pararotalia*, *Neoepionides*, *Spiroloculina*, *Quinqueloculina*, *Triloculina*, *Bolivina*, *Bulimina*, *Trifarina*, *Nummulites*, *Operculina*, *Cibicides*. *Globigerina* and *Globorotaloides* represent planktic forms of the microfossils. Mega fossils such as gastropods, echionoides and varieties of crabs have also been encountered. Trace fossils including *Skolithos verticalis*, *Palaeophycus tubularis* and *Thalassinoides* horizontalites have also been observed. Based on the above evidences a shallow marine warm water, rich in nutrients and oxygen within a lagoon /shallow marine environmental set up with fluctuating regime have been envisaged for these limestones.

Keywords: Depositional Environment, Palaeoecology, Shallow Marine, Environment, Dillai Parbat, Nagaland

Introduction

Early Paleogene period had experienced many short and long duration changes in palaeoclimate, and reorganization of tectonic plates. During this period there was extensive development of shallow water carbonates globally. Important occurrence of limestones has been reported by many (Oldham, 1859; Evans, 1932; Nagappa 1956, 1959). The fossil assemblage of late Paleocene - Early Eocene shallow water carbonate is dominated by larger foraminifers which show changes in their morphology and abundance (Scheibner *et al.*, 2005; Zili *et al.*, 2009; Bhattacharya and Gogoi, 2018). The foraminiferal assemblage from Sylhet Limestone has also been reported by many (Pandey, 1981; Jauhri *et al.*, 2006; Gogoi *et al.*, 2009; and Bhattacharjya and Gogoi, 2018). According to Garg and Ateequzzaman, (2000) both the limestone and intermittent clastic facies were developed in this region which continued during Paleocene-Eocene time.

The Dillai Parbat limestones belong to the Eocene Sylhet Limestone Formation. They are inter-bedded with sandstones and shale and are rich in fossil contents both vertebrates and invertebrates. In addition to that many forms of trace fossils; not documented so far, have also been observed in these rocks. According to many (Zili *et al.*, 2009; Bhattacharya and Gogoi,

2018), these fossiliferous Eocene deposits have yielded both vertebrate and invertebrate faunas consisting of shark, ray, crocodile, conical tooth, gastropods and echinoderm spines. Based on the rich fossil assemblage they have not only suggested that these sediments were deposited in a shallow marine environment but also that during Eocene time Tethys was connected with other marine water bodies of the world.

In the present study for the first time an attempt has been made to infer the palaeoenvironment and palaeoecology on the basis of the foraminiferal assemblage and the trace fossils. As not much published literature is available on microfossils and the trace fossils assemblages of the study area, this study would enhance our understanding of the depositional environment and palaeoecology of Dillai Parbat limestones.

Study Area

The Dillai Parbat limestone quarry (Fig.1a) is a part of Karbi-Anglong district of Assam and is bounded by 25°49'45" N and 26°01'00" N latitudes and 93°35'40" E and 93°35'50"E (SoI toposheet No. Nos.83F/12 and 83G/9). The limestone at Dillai Parbat limestone quarry, which lies on the south-eastern edge of the Karbi-Anglong Massif, belongs to the Sylhet limestone Formation. It overlies the Precambrian granite and granitic gneiss and is overlain by Oligocene Barail sediments. In Dillai Parbat quarry, limestones are highly weathered and at places exhibit brownish colour. The less weathered and fresh lime stones show grayish