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Microfossils from Neo-Proterozoic Limestones (Chanda Limestone) of the Penganga Group, Central India: Paleo-Environmental Significance

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Abstract:

The Penganga sediments (Neo-Proterozoic) are well exposed in the Chandarpur - Adilabad sector of the central India. These sediments of the Penganga Group are mostly represented by a shallow –marine siliciclastic and a deep-water carbonate-shale succession. In the present investigation, biogenic and hybrid stromatolites, filamentous and non-filamentous cyanobacteria have been studied and identified. These cyanobacteria are represented by order Chroococales and Oscillatoriales. The present of stromatolites along northern side of the Penganga Basin in Yavatmal district of Maharashtra indicates that the shallow water marine environment during the deposition of the Bilari Member of the Chanda Limestone Formation and closing of the Neo-Proterozoic sea towards the northern side of the basin.

Keywords: Penganga sediments, Microfossils, Central India

1.0 Introduction:

The Proterozoic sediments of the Pranhita-Godavari basin were first classified by Heron (1949). The sediments of the Neo-Proterozoic Penganga Group comprises a shallow –marine siliciclastic and a deep-water carbonate-shale succession, which has been classified into three formations, the Pranhita Sandstone, the Chanda Limestone and Sat Nala Shale, in ascending order and the Rb-Sr age determination from the glauconitic minerals at the lower part of the succession yielded two results 770+/- 30Ma and 790+/-30Ma (Chaudhari et al, 1989 and Chaudhari 2003). Recently, Mukhopadhyay and Chaudhuri (2003) have classified lithographic limestones of the Chanda Formation of the Penganga Group. In the present investigation, the author has attempted to study stromatolites and microfossils from the northern side of the Penganga Basin (map-1) to discuss the depositional paleo-environment.

2.0 Material and Methodology:

In the present investigation, the samples have been collected from sixteen locations, namely, Gaurala, Bori, Wanjari, Warzadi, Kayar, Hiwardara, Mukudban, Lingoti, Patan, Patan-Bori, Rasa, Dhakal Bori, Shindhola, Kurai, Korpana, Mendholi and, limestones and dolostones are significant lithounits of the sequence in the study area with sub-ordinate siliciclastics. Stromatolites have been recorded from three localities, lamellar stromatolites from Gaurala quarry (Fig.1), lamellar and columnar stromatolites from Warzadi (Fig. 2) and columnar and domal stromatolites from Mukudban (Fig.3). In petrographical analysis of these samples, it has been found that most of the limestones are micritic, some of them are sparitic and very few are dolomitic. In many thin-sections, calcite has been replaced by chalcedony and replacement of micritic calcite by sparitic calcite is common. Micro-paleontological study of the rock samples collected from 16 localities incorporates the presence of cyanobacteria / blue-green algae in the limestones of the Bilari Member of the Chanda Formation.

3.0 Discussion:

Bandopadhyay (1989) have reported the presence of microfossils from the Proterozoic manganese ore-body of the Penganga Group, India and considered affinities of these microfossils within the Cyanobacteria. Riding and Sharma (1998) have documented the presence of microfossils from the late Proterozoic stromatolites from the Vempalle Formation of the Cuddapah Supergroup, south-eastern India. Pal et. al (2004) have recorded microfossils (cyanobacteria) from the Bijawar Group, Harda district, Madhya Pradesh, India. Sharma (2006) has studied stromatolites and cyanobacterial assemblage from the Mesoproterozoic Salkhan Limestone of the Semari Group of the Vindhyan Supergroup exposed in Rohtas district of Bihar, India. Thus this documentation of cyanobacteria enriches it's occurrence from the sediment of the Penganga

Group exposed along northern side of the Penganga river in Yavatmal district of central India.

Map 1: Location Map of the Study area

Many species of cyanobacteria have calcium carbonate in the enveloping mucilage of the cells. In the fresh /marine environment in the photosynthetic zone, during the day time there is growth of cyanobacteria, resulting in the covering of substrate and during night, growth ceases, and sediments accumulate on the surface forming sediments rich laminae. These alternating periods of growth and deposition give rise to laminate structure i.e. Stromatolite (Lee, 2008). Stromatolites may be biogenic, abiogenic and hybrid (2011). The stromatolites from Gaurala , Warzadi and Mukudban marks the presence of filamentous cyanobateria , order – Oscillatoriales (Fig. 4), lamellar to domal cyanobacterial layers which entrapped the clastic grains, are alternate with sparry calcite layer, suggesting the hybrid type of stromatolite. The dolomitic limestone from Mendoli consists of non-filamentous cyanobateria of order- Chroococales, the single cells or cells loosely bound into irregular colonies are well preserved (Figs. 5, 6). As the abiogenic / inorganic stromatolites are very common during the Proterozoic Era, the documentation of hybrid stromatolites and filamentous and non-filamentous cyanobateria are significant. The presence of stromatolites from these localities indicates that limestones of the Bilari Member of the Chanda Limestone Formation were deposited in shallow to deep water marine environment.

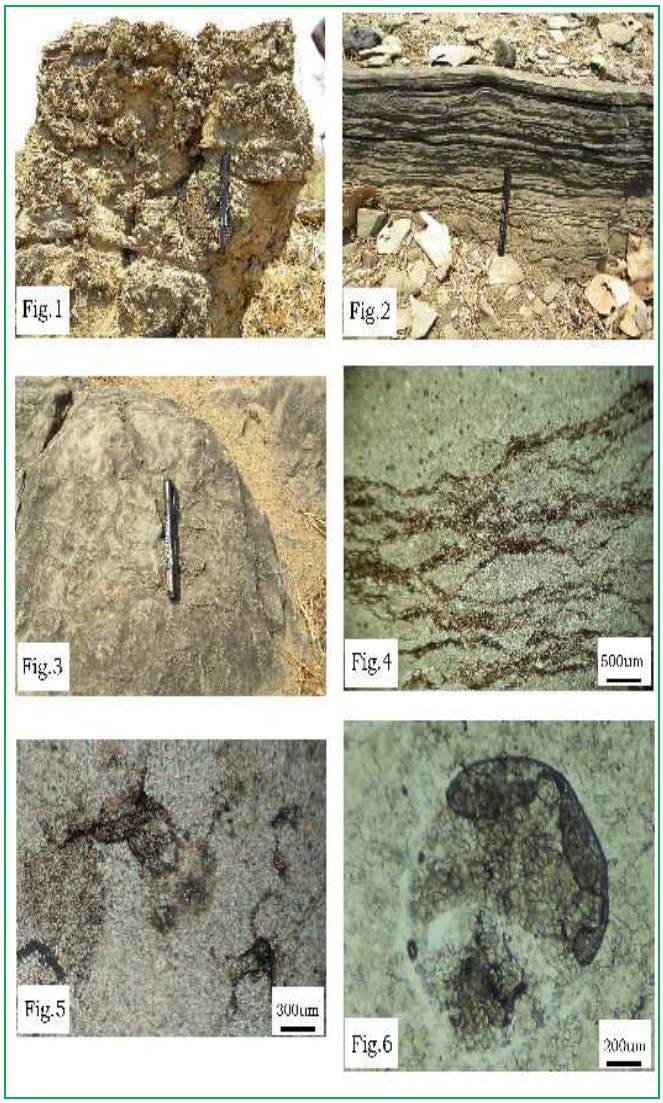

Figure 1: lamellar stromatolites from Gaurala quarry
Figure 2: lamellar and columnar stromatolites from Warzadi
Figure 3: columnar and domal stromatolites from Mukudban
Figure 4: filamentous cyanobateria, order- Oscillatoriales
Figure 5: non-filamentous cyanobateria of order- Chroococales
Figure 6: non-filamentous cyanobateria of order- Chroococales

4.0 Acknowledgements:

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References:

1) Heron, A. M. (1949): Synopsis of Purana Formations of Hyderabad. *Jour. Geol. Surv. India*, 5(2): 1-129.

2) Chaudhari, A., Daspupta, S, Bandopadhyay, G., Sarkar, S., Bandopadhyay, P.C. and Gopalan, A.K. (1989): Stratigrapghy of the Penganga Group around Adilabad, Andra Pradesh. *Jour. Geol. Soc. India*, 34: 291-302.

3) Chaudhari, A.K. (2003): Stratigraphy and palaeogeography of the Godavari Supergroup in the south-central Pranhita-Godavari valley, south India," *Jou. Asian Earth Scie.* 21: 595-611.

4) Mukhopadhyay , J. and Chaudhari , A. K. (2003): Stratigraphy of the Chanda limestone of the Proterozoic Penganga Group, Adilabad, Andhra Pradesh: New light of depositional setting and palaeogeograpgy. *Jour. Geol. Soc. India,* 62: 356-368.

5) Lee, R. E.(2008) : Phycology. Cambridge University Press India Pvt. Ltd, New Delhi, 2008, pp. 547.

6) Riding, R., (2011): Microbialites, stromatolites, and thrombolites, *In* J. Reitner and V. Thiel (eds) *Encyclopedia of Geobiology*. Encyclopedia of Earth Science Series, Springer, Heidelberg: 635-654.

7) Bandopadhyay, P.C.(1989): Proterozoic microfossils from manganese orebody, India. *Nature*, 339: 376-378.

8) Riding, R. and Sharma M. (1998): Late Palaeoproterozoic (-1800-1600 Ma) stromatolites, Cuddapah Basin, southern India: Cyanobacterial or other bacterial microfossils?. *Precam. Res.*, 92(1): 21-35.

9) Pal, A. K., Mishra, M. N. and Chhatri, K.K. (2004): First report of early Proterozoic microfossils from the Bijawar Group of rocks in Harda district, Madhay Pradesh. *Jour. Geol. Soc. India*, 63: 540-544.

10) Sharma Mukund. (2006):Palaeobiology of Mesoproterozoic Salkhan Limestone, Semari Group, Rohtas, Bihar, India: Systematic and significances," *Jour. Ear. Syst. Sci.*, 115(1) : 67-98.