

DISCUSSION

Comment

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(A comment on the paper 'Palaeoenvironmental Reconstruction of the Early Proterozoic Kolhan Siliciclastic Rocks, Keonjhar District, Orissa, India' by S. K. Ghosh and B. K. Chatterjee published in the Journal of the Geological Society of India, Vol. 35, No. 3, 1990, pp. 273-286).

We congratulate the authors for their valuable contribution on sedimentary structure, lithofacies description and interpretation on the palaeoenvironment reconstruction. We wish to comment essentially on the authors contention in posting the lithotypes in the vicinity of river Baitarani of Keonjhar district, Orissa (Bhondgaon to Nayagarh as mentioned by them as the southern unit) under Kolhan Group.

'The sandstone with occasional conglomeratic bands' (Misra, 1961) is definitely older than the volcanics and the Iron Ore Group to its west (Horse-shoe) and is not to be regarded as Kolhans as concluded by the authors.

The study area comprises mainly of a lithotype that can broadly be grouped as a sandstone. However, in different parts, it appears as gritty quartzite, quartz-arenite, lithic-wacke, proto-quartzite, siliciclastic rock or the likes. As a matter of fact the sandstone extends up to south of Tomka, surrounding the granite and unconformably overlies the folded Daiteri-Tomka Iron-Formations. This sandstone has been made equivalent to Dhanjori and the Daiteri-Tomka Iron-Formation is older (BIF-2 of Acharya, 1976, 1984). It may incidentally be mentioned here that Kolhans are reported as outliers in the top of Khandadhar hill and north of Nandugira hill in the down-buckled area of the iron ore basin (Sarangi and Acharya, 1970). The Kolhans may occur north of the road joining Remuli and Joda and this area is rather a delicate location that creates confusion.

Three more points need to be mentioned here (i) The location of Joda (Fig. 1) is wrongly plotted. It should be inside the Horse-shoe at $22^{\circ}01' : 85^{\circ}26'$ west of the present position. (ii) The volcanics should be shown in between the siliciclastic rocks and the Iron Ore Group. (iii) In the conceptual model (Fig. 7), the tectonic-related volcanics should be shown in between sandbars and banded iron-formation.

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References

- ACHARYA, S. (1976) Iron Formations and Iron ores of Orissa—their stratigraphy and correlation. Proceedings : Symp. Geol. etc. of Ferrous and Ferro-alloy Minerals, Bangalore, pp. 86-100.
- (1984) Stratigraphy and structural evolution of the rocks of Iron Ore Basin in Singhbhum, Orissa. Iron Ore Province. Journal of Earth Sciences. Crustal Evolution of the Indian Shield and its bearing on Metallogeny. Seminar Volume, pp. 19-28.
- SARANGI, S. K. and ACHARYA, S. (1970) The southernmost Kolhan outliers in Iron Ore geosyncline. Symp. on Purana Formations, Saugar University, Saugar.

Reply

The authors express their sincere thanks to Prof. Acharya and his colleague for showing keen interest in the above paper. The main objection raised by them is about the stratigraphic position of the siliciclastics. Our study mainly concerns with depositional environment of the siliciclastics and strictly speaking not on their stratigraphic position. The siliciclastics have been earlier interpreted as belonging to Iron Ore Group, Kolhan Group, Dhanjori Group from time to time. It is quite obvious that such presumptions resulted due to lack of proper exposure of the litho-contacts and structural complexities of various litho-units of the area. The authors, however, feel that the siliciclastic rocks of this region belong to the Kolhans on the basis of the following observations: (1) The architectural pattern of different lithofacies of the siliciclastics of the area when compared with those of the type area of the Kolhan basin (Chatterjee, 1967) is similar. (2) The trend of outcrops around the western part of the Singhbhum granite massif and their persistently low westerly dip values suggest similar tectonic and stratigraphic framework. (3) The variation in lithology does not necessarily point to different stratigraphic horizons but merely represents lithofacies variation of the same unit. Lithofacies and changes in their distribution are dependent on a number of interrelated controls such as sedimentary processes, sediment supply, climate, tectonics, sea-level changes, water chemistry, bathymetry, etc. (4) Rock fragment composition of the siliciclastics shows the presence of microcrystalline chert, red jasper, banded hematite jasper, microgranite, opaque hematite subangular grains, felsic and basic volcanic fragments, spherulitic chert-iron oxide, quartz-mica schist, tourmaline-quartz and garnet fragments indicating younger age than I.O.G. and granite. (5) The heavy minerals include tourmaline, both normal and recycled, zircon, rare rutile, garnet, kyanite which show similarities in their abundances and type with that of the type area of the Kolhan basin. (6) The Kolhan basin is a shallow epicontinental basin and probably had a wide extension than what is envisaged. Chatterjee and his co-workers have carried out a detailed paleocurrent study of the Kolhan basin of Singhbhum and adjoining southern extension in Keonjhar districts. The dominant paleocurrent directions N-W and S-W, particularly for granular lag and granular sand facies throughout siliciclastics, indicate the persistence of similar paleoslope during sediment transport and deposition.

It appears, therefore, that the siliciclastic rocks of the present area of investigation and that of the type area represent contemporaneous lithofacies variation of the same sandstone unit. Tectonics during sedimentation cause local facies changes through relative vertical movement and tilting of fault blocks. The location of Joda in Figure 1 is wrongly placed. This has been done through oversight and is very much regretted.

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Reference

CHATTERJEE, B. K. (1967) Sedimentological studies of the Kolhan basin, Singhbhum district, Bihar. Unpublished Ph.D. thesis, Banaras Hindu University, 158 pp.