

MAGNETITE PEBBLES IN THE CONGLOMERATE OF SILPUNJI AREA, SUNDARGARH DISTRICT, ORISSA

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An unusual occurrence of magnetite pebbles of variable shapes and sizes is recorded in the matrix supported conglomerate band exposed around Silpunji, in the eastern part of Sundargarh district, Orissa. The metasediments (Chandiposh Group) with which the paraconglomerate band is associated, is intruded by 2809±12 Ma old Tamparkola Granite which suggests the conglomerate to be of Archaean period. Although Koira (Iron Ore) Group is very close to the Chandiposh Group, it is unlikely to be the source area for the magnetite pebbles, as Banded Iron Formation of Koira (Iron Ore) Group is dominantly haematitic in composition. The magnetite pebbles thus indirectly suggest the existence of a rock sequence other than Koira (Iron Ore) Group having iron ore bearing lithologic unit.

Introduction

The metasedimentary rock sequence that lies to the northwest of Bonai Granitic Complex has recently been mapped in detail and has been assigned an independent group status by Naik (2001). It is named as Chandiposh Group after the village Chandiposh which lies in the central part of the curvilinear belt. The rock sequence is composed of a number of conglomerate and quartzite horizons with a few bands of basic volcanics, schists and tuffites. An important feature of the conglomerate beds/horizons is that the conglomerates are different in matrix and clast composition from one another. Krishnan (1937) who mapped the Chandiposh area for the first time, did recognise the conglomerate band of Silpunji but did not discuss much on the significance of its composition. In course of detailed mapping around Chandiposh, the authors discovered magnetite pebbles of various shapes and sizes occurring in profusion. The characteristic features of the conglomerate are presented and the possible significance of these pebbles is indicated.

Geological Setting

The metasedimentary rock sequence with which the magnetite pebble bearing paraconglomerate is associated

constitutes a part of the Sundargarh-Singhbhum mobile belt. Silpunji village, where the conglomerate band is exposed, lies close to the southern margin of the mobile belt. The area figures in Survey of India toposheet No. 73 C/13. Detailed mapping suggests that the conglomerate band of Silpunji represents a part of a thick rock unit named Barghat Formation that is composed of green coloured quartzite, conglomerates with chloritic matrix and green schists showing both lateral and vertical gradation (Fig. 1). The western extension of the Chandiposh Group is intruded by a medium grained Tamparkola granite. The granite has been dated to be 2809±12 Ma (Chakrabarty et al. 1998). Thus, the Silpunji Conglomerate is of Archaean age.

The Silpunji conglomerate is a matrix supported polymictic conglomerate (Fig. 2a). It has a typical green colour because of the chloritic matrix. The clast lithology comprises quartzite, banded jasper, banded jasper quartzite, chlorite schist, gabbro and magnetite and suggests their derivation from a mixed source. The size of the clasts varies from a few cm to as high as 20 cm along their long dimensions. While the quartzite, gabbro and greenschist pebbles are rounded to very well rounded, the banded jasper, banded jasper quartzite pebbles are sub-angular to subrounded. The magnetite pebbles clearly fall into two groups, namely, (a) smaller pebbles, angular to sub-angular in roundness and irregular to rectangular to lensoid in shape (Fig. 2b), (b) larger pebbles, subrounded to well rounded having spheroidal to irregular shape (Fig. 2c). Their size varies from 1 cm to 4 cm along their long dimension.

Significance

Occurrence of the magnetite pebbles cannot be taken as a very unique feature, because such pebbles are expected in any rock unit that has received sediments from a magnetite bearing rock unit. But, in the present area, it is of stratigraphic significance, for Krishnan (1937) considered the rocks of Chandiposh belt as a part of Iron Ore Group. The present finding proves that the Chandiposh Group, with which the magnetite pebble bearing conglomerate is associated, is definitely younger than the Iron Ore Group. Further, majority

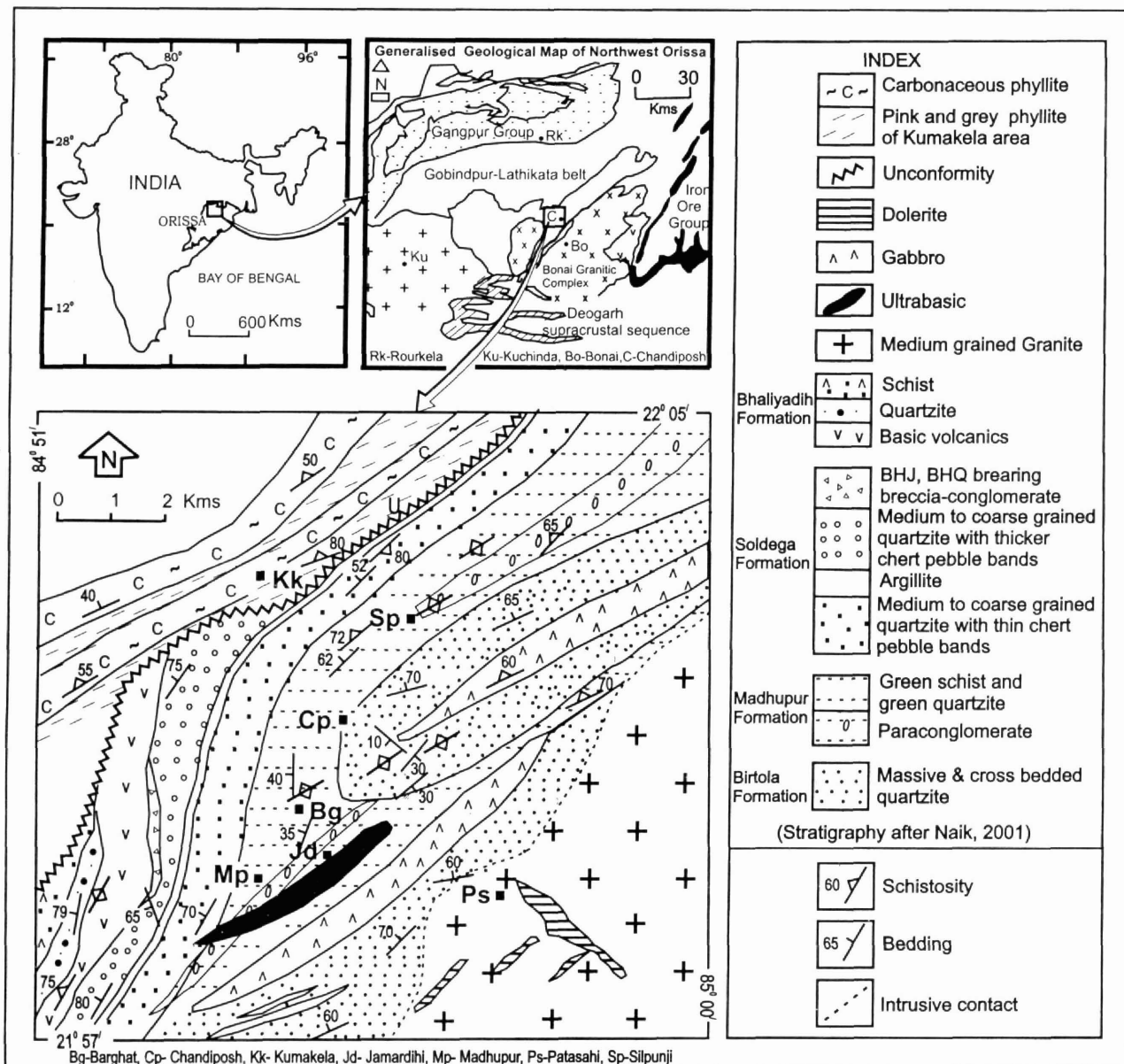


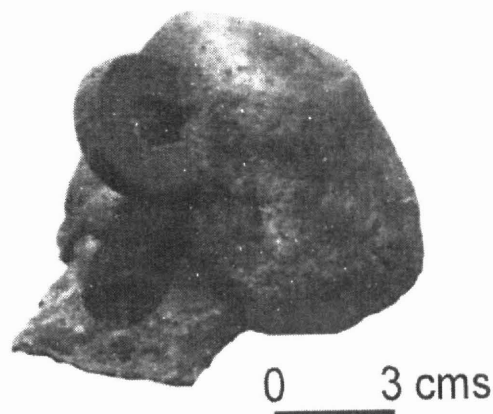
Fig.1. Geological map of the area around Silpunji.

of the magnetite pebbles being angular to subangular suggests that they have been derived from a nearby source. Sedimentary structures like cross bedding in the green quartzite associated with the conglomerate indicate that during deposition of the sediments, water current was from northeast. The nearness of the source area and movement of sediments from northeast makes one to suspect the Koira (Iron Ore) Group to be the source area. However, the iron ore bearing horizon of Koira belt being predominantly haematitic in composition negates the above interpretation. The well rounded pebbles of larger sizes clearly suggest that they are either transported from a greater distance or

are polycyclic in origin. The situation naturally compels one to think of the existence of another rock sequence having a magnetitic iron ore horizon. Whether that sequence constitutes the Badampahar (Iron Ore) Group or Older Metamorphic Group remains to be proved. The task appears to be difficult as a very few number of lithological units of Badampahar (Iron Ore) Group as well as that of Older Metamorphic Group have survived being extensively intruded (and assimilated?) by the granitic rocks. It is expected that the totality of major, minor, trace and rare earth element geochemistry of the pebbles, which is under study, will help to establish the source of magnetite pebbles.



a



c



b

Fig.2. (a) Field photograph of Silpunji matrix supported conglomerate showing pebbles of various shapes and sizes floating in green coloured schistose matrix. Locality 2 kms NE of Jamardiha. Width of Brunton compass is 7.5 cm. (b) Angular to sub-angular pebbles recovered from Silpunji matrix supported conglomerate, 1 km east of Silpunji. (c) One of the large well rounded pebbles of magnetite Silpunji matrix supported conglomerate, same locality.

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