

## DISCUSSION

**PETROLOGY OF MAFIC-ULTRAMAFIC ROCKS ALONG NORTH PURULIA SHEAR ZONE, WEST BENGAL** by Aditi Mandal and Arijit Ray. *Jour. Geol. Soc. India*, v.74, July, 2009; pp.108-118.

**B. Goswami and C. Bhattacharyya**, Department of Geology, Univ. of Calcutta, Kolkata – 700 019 comment:

We are sorry to comment that the above paper of Mandal and Ray (2009) is largely a replication of a paper published earlier by us including Mandal (Mandal et al. 2007). In our paper of 2007, apart from Mandal, there were 5 other authors; this paper was written on the basis of compilation from two M.Sc dissertations and two Ph.D. dissertations including that of Aditi Mandal; and all the 5 researchers were co-authors of our paper and all of them carried out their research work in the North Puruliya shear zone under the supervision of C. Bhattacharyya. Now we are surprised to see that Mandal and Ray (2009) have suppressed the above mentioned publication Mandal et al. (2007), in which Mandal was an author! This is unfair and unexpected. The reasons may be clear from some of our following comments.

1. We observe that the main part of Fig.1 in Mandal and Ray's paper (2009) has largely been copied from our paper of 2007. In our paper (Mandal et al. 2007) the country rock through which North Puruliya shear zone passes is shown to be granitoid gneiss. In the Fig.1 of Mandal and Ray's paper (2009) the identity of the country rock is not mentioned. Not only this a new occurrence of ultramafic body near Chholari has been mentioned without showing its plot in their Fig.1, the lithological composition of its host rock, and even its modal analysis is not presented, not to speak of its chemical analysis.
2. Regarding mineragraphic characters of amphibole Mandal and Ray (2009) appear to have messed while duplicating, and write just opposite of our observation in our 2007 paper in which Mandal was an author. In our paper we wrote "Amphibole is of two types: (i) the predominant type is greenish brown or brownish green hornblende, occurring along the contact of pyroxene-olivine or pyroxene-plagioclase; the greenish colour is stronger just along the contact with plagioclase; (ii) the other type is greenish tremolite-actinolite with fibrous and spongy appearance and occurs generally

forming the outer rim of hypersthene corona (around olivine) in contact with plagioclase."

3. The Geochemistry section of Mandal Ray's (2009) paper is a photocopy of first paragraph of the Analytical Procedure of our paper of 2007 (p.130). Mandal and Ray (2009) were so desperate while copying that they even did not care to know that the Central Petrological Laboratory of the Geological Survey of India, Kolkata uses CAMECA SX 100 Electron Probe Micro Analyzer, while instrument calibrations are done using mineral standards supplied by BRGM, France. JEOL, JXA 8600 M probe was used once upon a time in IIT, Roorkee.
4. In the caption of Fig.6 of Mandal and Ray's (2009) paper the central part of the plagioclase grain is stated to be untwined. But it is clear from the photograph that twinning is generally continuous throughout the grain; twinning, however, appears to be absent only in the altered patches in the central part of the plagioclase grain.
5. In Petrochemistry section of our paper (Mandal et al. 2007, p.133) we have asserted that the geochemical characteristics of these ultramafics may be the result of one of the following: "(i) either the metasomatic alteration of the source rock of the present area caused initially by subduction of the crustal materials, (ii) interaction of the ultramafic magma with crustal rocks took place during emplacement or (iii) combination of (i) and (ii) was responsible." At the concluding part we have voiced that "the subduction-induced mantle metasomatism (Roden et al. 1984) might be the process by which the mantle below the CGGC could be enriched....". So Mandal and Ray's (2009) conclusion that the parental magma originated from fertile mantle is nothing new, and has already been established elaborately in our paper (Mandal et al. 2007).

**Aditi Mandal and Arijit Ray** Department of Geology, Presidency College, Kolkata - 700 073 reply:

We are grateful to B. Goswami and C. Bhattacharyya for critical reading of our above mentioned paper and

commenting on several aspects. Our lapse in the omission of earlier work of Mandal, A., Goswami, B., Mukherjee, S., Das, S., Bhattacharyya, I. and Bhattacharyya, C. (2007) on ultramafic rocks of Chhotanagpur Granite Gneiss Complex (CGGC) of Puruliya district, West Bengal is unintentional and deeply regretted. Our specific response to their comments are given below:

1. Our paper contains new information on modal, mineral and whole rock composition of mafic ultramafic rocks of the study area and conclusions derived from these data. So it is not a replication of the earlier publication of Mandal et al. (2007). The omission of the reference of Mandal et al. (2007) is unintentional and is regretted. Incidentally A. Mandal is the first author in both the papers and our study area is on eastern extension of the earlier one by Mandal et al. (2007) with some overlap. We do not have any intention to suppress the earlier paper of Mandal et al. (2007). It is an important contribution on ultramafic rocks along North Puruliya shear zone (NPSZ). Our work further adds new information on mafic-ultramafic suite along NPSZ
2. Figure 1 of our paper is based on the geological map by GSI (1977). We used, after slight modification, a small portion of map showing the locations of mafic-ultramafic rocks with Map of India in the inset. The figure has similarity with Fig.1 of Mandal et al. (2007) as study area in both cases has overlap. The occurrence at Cholari is a very small one and that is why it is not shown in the map. It was not studied in detail. However, the rock type at Cholari is clinopyroxenite with more than 90% diopside and little amount of plagioclase. The country rock in Fig.1 is granitoid gneiss, same as reported earlier by Mandal et al. (2007).
3. We accept that there is a similarity in the petrographic

description of ultramafic rocks (we do also have petrographic description of mafic rocks in addition) in both the papers with some addition in the present paper. As stated earlier, the present study area is an eastern extension of the study area of Mandal et al. (2007) with some common parts. Some of the rock types are common. Hence the similarity and repetition appeared in the petrographic description. There was no intention of duplication. We consider this part as a repetition with some addition.

4. We appreciate the mineragraphic description of amphibole by Mandal et al. (2007) and do not contradict it. However our description is based on additional observations.
5. We are sorry for the mistake in analytical procedure and like to thank B. Goswami and C. Bhattacharyya for pointing it out. But that does not affect the precision and accuracy of compositional data of minerals generated by us. We have requested the Editor to publish a corrigendum in this regard.
6. We have stated only our observation on twinning of plagioclase.
7. The conclusion (two alternatives) made by Mandal et al. (2007) regarding metasomatism of mantle source in the petrochemistry section is a valuable contribution. According to them the mother magma of the ultramafic rocks was ultramafic in composition. We have concluded from our chemical data that the mother magma was *mafic* (not ultramafic) in nature generated from a fertile mantle source and the ultramafic rocks were formed by crystal accumulation from this *mafic* magma. Our focus was thus on the process of formation of mafic-ultramafic rocks from a parent *mafic* magma. Similar conclusion has also been documented from such petrologic assemblages elsewhere.

### References

- MANDAL, A., GOSWAMI, B., MUKHERJEE, S., DAS, S., BHATTACHARYYA, I. and BHATTACHARYYA, C. (2007) Mantle metasomatism of ultramafic intrusives in Chhotanagpur Granite Gneiss Complex, Puruliya district, West Bengal, Eastern India: Evidence from trace element and REE geochemistry. *In*: J.S. Ray and C. Bhattacharyya (Eds.), *Igneous Petrology: 21st Century Perspective*, Allied Publisher, New Delhi, pp.122-142.
- MANDAL, A. and RAY, A. (2009) Petrology of Mafic-Ultramafic Rocks along North Puruliya Shear Zone, West Bengal. *Jour. Geol. Soc. India*, v.74, pp.108-118.

### CORRIGENDUM

In the paper "Petrology of Mafic-Ultramafic Rocks along North Purulia Shear Zone, West Bengal", *JGSI*, v.74, 2009, pp.108-119. The first para under Geochemistry (p.113) should read as: Mineral compositions were determined with an automated wave-length dispersive CAMEC Sx 100 electron microprobe and associated software at the EPMA Lab., CPL, CHQ, Geol. Surv. India, Kolkata. Analysis were performed with 15 Kv accelerating voltage, 12 nA current, 1 micron beam size. All natural standards were used except for Mn and Ti for which synthetic standards were used. The replicate analyses show identical results. The precision of analyses is within the error limit of  $\pm 3\%$