DISCUSSION

Tectono-Metamorphic and Geochronologic Studies from Sandmata Complex, Northwest Indian Shield: Implications on Exhumation of Late-Palaeoproterozoic Granulites in an Archaean-early Palaeoproterozoic Granite-Gneiss Terrane by A.B. Roy, Alfred Kröner, Sanjeev Rathore, Vivek Laul and Ritesh Purohit. Jour. Geol. Soc. India, v.79, 2012, pp.323-334.

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comments:

I appreciate authors for presenting the Tectono-Metamorphic and Geochronologic Studies on Sandmata Complex, Northwest Indian Shield. The following points are to be clarified to make it more useful.

1. The paper creates confusion for the meaning of Sandmata Complex. For this various terms like: BGC-II (Gupta, 1934), Sandmata Complex (Gupta et al. 1980) and Sandmata Complex (Buick et al. 2006; Saha et al. 2008) are discussed. Present authors included Sandmata-Bhinai granulites and banded gneiss-amphibolites metasedimentary assemblage in the Sandmata Complex. It is mentioned in abstract that a new term "Sandmata Complex" is proposed for the BGC-II terrane. It is not clear from the paper why authors were more interested in the use of the term "Sandmata Complex".
2. The Geochronologic data from Darwal granite (sample DR 03/2) and Nagar (NAG 2000/1B) are dated at ca. 2905 Ma and ca.2500 Ma respectively. This clearly indicates its resemblance with BGC-I (Gupta, 1934) of Mewar region. This fact is accepted by authors in Results and interpretation part of the paper (page 328). Looking at this, there is no need to classify these rocks under the new term "Sandmata Complex". GC/2002/2 gives an age of 2357 Ma and interpreted as late crystallization of the end-Archaean magmatism. These studies reflects an Archaean crustal evolution of central Rajasthan and Mewar as unified land mass.
3. The location of N/S 2 is not correct in the Fig.1 and is not part of "Sandmata Complex". It has mentioned in the text that the sample is collected from the Narayan-Sagar dam located southeast of the Rampura-Agucha Lead-Zinc mine. The correct location of N/S 2 lies in the Aravalli Supergroup region of Fig.1. The result of N/S 2 corroborated with Sandmata Complex seems to be unrealistic.
4. There is a description of a sample number GC/2000/1B (page 329). This sample is not shown in the Fig.7 and Table 1.
5. The discussion section (page 329) describes that the banded gneiss assemblage (ca. 2905 and ca.2500 Ma) reworked during Aravalli orogeny at ca. 1900 Ma in Sandmata- Bhinai region (Sandmata Complex). This was followed by granulites exhumation at 1725 and 1622 Ma (Buick et al. 2006; Roy et al. 2005). All these events are interpreted as tectono-thermal reconstitution of the basement with polyphase crustal history. There is a big time gap between 2905 Ma to 1622 Ma, and all the events that took place in the region cannot be summarized as tectono-thermal reconstitution of the basement. It requires more elaborative explanations.
6. By suggesting a new term "Sandmata Complex" and with the help of isotopes from Darwal granite- gneiss, authors are trying to camouflage status of Sandmata-Bhinai granulites, as tectono-thermally reconstituted basement with the presence of Archaean component. Sinha-Roy et al. (1992) and Guha and Bhattacharya (1995) have restricted the nomenclature of the Sandmata Complex to the shear-bound high-grade granulite facies rocks. As a matter of fact the term "Sandmata Complex" (*sensu* this paper) is ineffectual for describing interrelationship between Archaean rocks and exhumed granulites. This is creating confusion in the lexicon of Rajasthan geology. By redefining the established "Sandmata Complex" term defies the code of stratigraphic nomenclature and unfair.
7. Figure 3 clearly shows linear parallel disposition of Archaean component, Aravalli Supergroup, Sandmata-Bhinai granulites and Delhi Supergroup in the region. The presence of high grade rocks within Palaeo-proterozoic-Archaean gneissic rocks is suggestive of thickening and high temperature recrystallisation of crust at depth. The presence of norite dykes and two pyroxene basic granulites (Sharma et al. 1987) in Sandmata region suggests underplated magma generation.
8. The present study suggests Archaean status of the Darwal granite. However, in Table 2, the age of Darwal granite is indicated 1850-1900 Ma, marking closure of Aravalli

orogeny. The zircon age of ~2905 for the Darwal granite sample (DR 03/2) is one of the significant outcome of the paper. This is not referred in Table 2, which summarizes Geochronological framework of Precambrian rocks in the Aravalli Mountains, NW India. It seems that the authors are not completely convinced about the Archaean genesis of Darwal granite.

A.B. Roy, *Email: ashitbaranroy@gmail.com* replies:

We sincerely thank Kamal Kant Sharma (KKS) for his critical reading of our paper and for some insightful comments needing clarifications. Our response is as follows:

1. The main reservation of KKS is about the use of the term Sandmata Complex in the paper (hiring the term from SN Gupta et al. 1980) in place of BGC-II of BC Gupta (1934). We request KKS to go through our paper carefully, especially the description given in 2nd paragraph on p. 324 to find the answer himself.
2. We fully agree with KKS that central Rajasthan (*possibly meaning the terrane marked as BGC II by BC Gupta, 1934 or Sandmata Complex by SN Gupta et al. 1980*) and the Mewar (*BGC I of BC Gupta, 1934*) constituted a 'unified Archaean landmass' (*read basement*) for the deposition/formation of younger sequences. While advising us that *there is no need to classify these rocks under the new term "Sandmata Complex",* KKS perhaps inadvertently failed to note the explanation provided by us on the usage of the term (see p.324). We used the term Sandmata Complex as an Archaean basement which has undergone repeated tectono-thermal reconstitution during Palaeoproterozoic: firstly during orogenic closing of the Aravalli rocks and later during the granulite exhumation. We sadly fear that KKS's comments in this respect are uninformed, sans scientific rationality.
3. About location of NS/2 in Fig. 1, the confusion is due to mistyping of the sample location in the text (p. 327), which should be 'southwest' (of the Rampura-Agucha lead-zinc mine) instead of 'southeast'. We regret the error.
4. We are also sorry for the typographical error in the sample no. mentioned in p. 329. The correct sample no. is GC/2002/B.
5. The closing age of the Archaean event in the terrane is 2500 Ma and not 2905 Ma as presumed by KKS. He also remained oblivious of the probable depositional (~2022 Ma?), and closing age (~1900 Ma) of the Aravalli cycle while mentioning the unusually long time gap (between 2905 and 1622 Ma) between the events. Hopefully, this would help in removing his confusion KKS.
6. The comment by KKS that the term 'Sandmata Complex' (*sensu* this paper) is "ineffectual for describing interrelationship between Archaean rocks and exhumed granulites" possibly stems from his unfamiliarity with the field and geochronological relationship of the different ensembles present in the terrane, and to a great extent on the uncritical acceptance of the usage of the term 'Sandmata Complex' by some authors. We are not aware of the existence of 'the lexicon of Rajasthan geology'. And if at all it exists can it be considered a scientific document to settle geological problems? We also failed to understand in which way redefining the term "Sandmata Complex" in our paper defies the code of stratigraphic nomenclature'!
7. The interpretation of KKS that 'the presence of norite dykes and two pyroxene basic granulites in Sandmata region suggests underplated magma generation' is too simplistic an idea, and sounds like an out of place comment.
8. We are convinced about the Archaean evolution of the Darwal granite, but have also mentioned (on p. 329) about the preserved record of possible re-homogenization of the Rb/Sr isotope system for the suggested 1906±0.4 Ma age, which is indicated in Table 2 (based on the data of Roy, 2006).

References

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