

DISCUSSION

PETROGRAPHY AND GEOCHEMISTRY OF THE KRISHNA LAMPROITE

FIELD, ANDHRA PRADESH by T. Ajit Kumar Reddy, M. Sridhar, S. Ravi, V. Chakravarthi and S. Neelakantam. Jour. Geol. Soc. India, v.61, 2003, pp. 131-140.

A.R. Nambiar, Geological Survey of India, Op.: Karnataka and Goa, Vasudha Bhavan, Bangalore - 560 078 comments:

The authors deserve to be congratulated for locating a large number (30) of lamproites from the granite gneiss terrain, close to the northeastern portion of the Cuddapah Basin, though the credit for the first discovery of lamproite in the area (at Ramanapeta) goes to Nayak (1991). The authors have given fairly detailed description on the mineralogy and geochemistry of the different petrological variants of the lamproite suite of rocks, though they admit that the nomenclature and classification of these rare ultramafic rocks was difficult. However, there are a few comments to be made:

1. In the paper, it is mentioned that 30 lamproite bodies are located around 1. Ramanapeta, 2. Peddavaram, 3. Veadri-North, 4. Veadri-South, 5. Pochampalle 6. Jayanthipuram, 7. Gopinenipalem, 8. Tirumalgiri 9. Sher Mohammadpeta, 10. Anumanchipalli, 11. Ramapuram, 12. Nallabandagudem and 13. Reddikunta. But, in the geological map (Fig.1), many of these localities are not shown and only 20 of the bodies are plotted (3 around Ramanapeta, 6 around Veadri, 7 around Jaggayyapeta and 4 around Tirumalgiri). It would have been more informative on the distribution of lamproites, if all the occurrences were represented in a geological map of a little larger scale.
2. The statements like "Radiometric age determinations suggest emplacement of these lamproites took place around 1224 ± 14 Ma" (in abstract) and "Interestingly the Krishna lamproites are of similar age and are with comparable mineralogy as the Argyle lamproites of Western Australia" (in Geological Setting) give an impression that the newly discovered lamproites of the area have been dated. The age of 1224 ± 14 Ma for the Krishna lamproites referred is presumed on the basis of the published data of Anil Kumar et al. (2001) on a single lamproite body of Ramanapeta, located by Nayak (1991).
3. Representative composition of 4 xenocrystic (?) grains of garnet are presented (Table 5), of which 2 analyses (2 and 3) have very high FeO (33.92% and 35.75%) indicating that the grains are almandine rich and poor in pyrope molecule. It is interesting to note that most of the garnets recovered from Undraddi kimberlite of Raichur, Karnataka are similar in colour (red-orange) and morphology (<1 mm) and have a very similar chemical composition. Most lamproites of West Kimberley and Argyle contain scant mantle-derived garnets (Lucas et al. 1994). So, these garnets from Krishna lamproites and Undraddi kimberlite are most likely derived from crustal rocks, rather than disintegrated crystals from mantle rocks.
4. It is stated, "These rocks are typically characterised by high TiO_2 , K_2O , P_2O_5 and MgO and very low levels of Na_2O (< 1%). In granite-lamproite breccia (S.No. 9), and the dyke body, which is contaminated by crustal (granite-gneiss) xenoliths (S. No. 6), these values are relatively low. It is not clear to which oxides 'these values' refer. A perusal of the analytical data indicates that these two samples have relatively higher alkalis (both Na_2O and K_2O), compared to other samples. No other distinction is seen in these two samples.
5. The statement that "These lamproites have very high molar ratios: $\text{K}_2\text{O}/\text{Na}_2\text{O} > 5$ (ultrapotassic). $\text{K}_2\text{O}/\text{Al}_2\text{O}_3 > 1$ (perpotassic) and $\text{K}_2\text{O} + \text{Na}_2\text{O}/\text{Al}_2\text{O}_3 > 1$ (peralkaline)" seems to be not true. Only 1/3rd of the 9 analyses show molar $\text{K}_2\text{O}/\text{Na}_2\text{O}$ ratio > 5 ; all samples have molar $\text{K}_2\text{O}/\text{Al}_2\text{O}_3 < 1$, and only one sample (S.No.6) has molar $(\text{K}_2\text{O} + \text{Na}_2\text{O})/\text{Al}_2\text{O}_3 > 1$. Hence, describing these rocks as ultrapotassic/perpotassic/peralkaline seems to be incorrect.
6. The chemical data presented suggest distinctly low K_2O content in these rocks (except S.Nos. 6 & 9) compared to average lamproites (Rock, 1990) or the lamproites of Western Australia (Jaques et al. 1986). Further, in the (I) Al_2O_3 - MgO - FeO and (ii) the K_2O - Al_2O_3 - MgO ternary diagrams (Bergman, 1987), most of the present samples plot in the field of lamprophyres

and the remaining in the overlapping field between lamprophyres and lamproites.

7. There is a typographical error in the first sentence of the conclusion; instead of 1224+14 Ma, it is shown as 1124±14Ma.

T. Ajit Kumar Reddy*, M. Sridhar, S. Ravi, V. Chakravarthi and S. Neelakantam, *3-5-17Q/G, Narayanguda, Hyderabad - 500 029 reply:

The extensive geological investigations with sustained effort carried out in the vicinity of palaeochannels of river Krishna in Andhra Pradesh state has resulted in the discovery of a lamproite field. The author's claim is for a 'Lamproite Field' with a vast areas of occupancy. A detailed account of tectonics, mineralogy, chemistry, textures and different variants together with xenocrysts and xenolith phases present, has been brought out in the present work. The detailed mineralogy of the isolated small lamproite occurrence at Ramanapeta has been worked out during the present investigation and is classified as diopside-leucite-lamproite which was reported as olivine-lamproite (Nayak, 1991).

1. It was not possible to show all the 30 lamproite occurrences in the map appended with the paper. These lamproites referred occur around the 13 localities mentioned in the text.
2. Although the radiometric age referred is of a single

body, based on the tectonic setting, mineralogy, chemistry and identical/similar disposition and morphological characters, it is opined that the 'KLF' bodies are of similar age.

3. Although few of the garnets analyzed show high FeO, the morphological characters and association with other xenocrystic phases, especially chormediopside indicate their derivation from mantle rocks only, with compositional variation.
4. In the lamproite breccia (S.No. 9) and the dyke (S.No. 6) these values (Na₂O) are relatively high, (the word *low* in the text may please be read as *high*).
- 5&6. Except the olivine-lamproite body (S.No.8) all the 'KLF' bodies show high K₂O/Na₂O ratios (Either in wt% or molar values). By any definition, these rocks are ultrapotassic (with over 3 values). The low K₂O values (~3) are also observed in the Argyle lamproite and in some classical lamproite occurrences. Also plotting in overlapping fields is observed in many of the Kimberlite and Lamproite occurrences.

The KLF lamproites, occur with a unique, intrusive history in a complex tectonic setting and posses characteristic mineralogy, chemistry, diagnostic of lamproite magmas. The presence of mantle xenoliths and xenocrystic minerals indicate deep seated mantle derivation of KLF lamproites.

7. The typographical mistake in the first sentence of the 'Conclusion' is regretted. The radiometric age 1124±14 Ma may please be read as 1224±14 Ma.

(Comment received on J2-3-03 and the reply on 26-5-03)

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