GEONEWS

GROUP DISCUSSION ON THE CARBONATITE-KIMBERLITE COMPLEXES OF INDIA

The success of the several group discussions which the Geological Society of India organised during the last two years has emphasised the need for enlarging this line of activity and focusing attention more and more on topics of current geological interest. The study of the Carbonatite-Kimberlite Complexes of India was considered to be one such topic requiring detailed study, not only because of the economic importance of these rock types but also on account of their interesting petrology. A two day discussion was arranged at Bangalore commencing 31st July 1976. As has become usual with such group discussions, a conducted tour to some of the well known carbonatite occurrences of Tamil Nadu was arranged prior to the meeting on the 29th and 30th of July. Dr. M. V. N. Murthy of the Geological Survey and Sri V. Gopal of the Tamil Nadu Department of Mines and Geology had made excellent arrangements.

In the course of the tour the participants were shown the Sevattur-Koratti carbonatites; the associated pyroxenites and syenites; the three palmyra section where a carbonatite breccia showed numerous angular fragments of gneissic rocks indicating forceful intrusion; the vermiculite mine operated by the Tamil Nadu Government; The Koratti syenite; the spectacular Pambar shear zone; the pipe like body of lamprophyre at Uthangarai and the carbonatite complex of Samalpatti.

The actual group discussion was held in the Oldham Hall of the Geological Survey of India. Sri T. V. Viswanathan of the Geological Survey of India had taken great trouble in getting together typical specimens of carbonatites reported from different parts of India. These together with type specimens of carbonatite from S. Africa and elsewhere were displayed in the room adjoining the meeting hall and proved to be most instructive.

The discussion was inaugurated by Prof. C. S. Pichamuthu, President of the Society and the key note address was delivered by Prof R. N. Sukheswala. In his address Prof. Sukheswala traced the development of ideas on carbonatite, the genetic link between carbonatite and kimberlite, composition of primary carbonatite magma and the distribution of carbonatite and kimberlite in space and time. He made a special plea for more intensive studies on geochronology, geochemistry and petrology of the Indian carbonatite and kimberlite rocks. The full text of his address is printed separately in this issue (pp. 429-436).

In the course of his talk *G. R. Udas* recalled the several recorded descriptions of rocks similar to carbonatites in the older Records of the Geological Survey and stressed the importance of re-examination of these areas.

V. Gopal gave an account of the carbonatite alkali complexes of Tamil Nadu. He considered the syenite bodies of Pattikonda, Paravatamalai, Kavuthimalai, Elagiri, Koratti, Samalpatti, Pakkanadu and Hogenakal as constituting an alkali province. The age of the suite was referred to be 700 m.y.

R. Srinivasan projected a series of slides based on Landsat imagery emphasising the close association of carbonatites and kimberlites with deep linear faults. He

suggested examination of the Chandragutti syenite in Karnataka for possible carbonatite affinities.

R. Ramaswamy presented detailed petrographic description of the Tirupattur carbonatites.

The Samalpatti carbonatite complex occurring 30 km south of Tirupattur was described by *V. Subramanyam* as fracture fillings in pyroxenites and as dykes in syenites. Quartz-baryte-galena veins were closely associated.

Sugavanam detailed the work carried out by him and his colleagues on the alkali syenite—carbonatite occurrences of Dharmapuri and North Arcot Districts. The occurrence of carbonatite complexes within the high grade granulitic terrain was considered unique. The alkali syenite at Yelagiri formed a high level phacolithic intrusion. The highly epidotised hornblende gneisses within charnockites far away from known carbonatite bodies indicated possibly concealed occurrences of carbonatites.

D. Vasudevan described an interesting occurrence of carbonatite rock with concentration of baryte and phlogopite as conformable sheets within a cogenetic volcanic sequence of intermediate to acid rocks from Vinjamur, Udayagiri taluk, forming part of the Nellore schist belt.

K. Sreramachandra Rao pointed to the kimberlite affinities of some intrusives of Zangamrajupalle area, closely comparable with the kimberlite dykes of Chelima.

A. Dharmaraj felt that the metavolcanic lavas of Chitradurga schist belt containing euhetral carbonate phenocrysts represented carbonatite lavas! His argument did not carry conviction as it was not supported by petrological and geochemical data.

G. R. Narayan Das and his associates described the carbonatites of Sarnu and Dandali areas of Barmer District, Rajasthan. These consisted of tinguaite, teschenite, trachyte and syenite, containing abnormally high values of Sr, Ti and Zr with enrichment of Ce and Y in the carbonatites. The carbonatite was described as located close to the Luni graben associated with Aravalli rifts of late Cretaceous age.

Another interesting group of rocks consisting of olivine-gabbro, nepheline-syenite, sodalite-syenite, basalt, dolerite and tinguaite was described by the same author forming the Mundwara complex in Rajasthan. Geochronological studies indicated an age of 56 m.y.

A detailed description of the carbonatite of Hogenakal was presented by *V. Srinivasan* of Tamil Nadu Department of Geology. The carbonatite was described as a sovite occurring in the form of fracture filling dyke.

Several interesting papers were presented on the second day dealing with petrological and geochemical aspects of the carbonatite rocks.

N. P. Subrahmanyam gave a detailed account of the geochemistry of the carbonatite of Mundwara and the Mer Pluton in Rajasthan. The parent magma of the Mer Pluton was considered to be olivine basalt that underwent calc-alkali trend of differentiation producing carbo thermal liquids in equlibrium with Na and Fe rich vapour phase as residual products of differentiation.

The major and trace element compositions of the Sevattur carbonatites were presented by *P. Krishnamurthy* in an interesting paper. The Sevattur carbonatites were described as belonging to the apatite-magnetite type. According to Krishnamurthy Sr (4109-9375 ppm: mean 6427) exceeded Ba (1000-2420 ppm: mean 1663) in all the types of carbonatites by a factor of 2 to 5. The lighter rare earths such as

La and Ce were enriched in the calcite types (La + Ce, 892-1351 ppm) when compared to the beforsites which were richer in Ba, Nb, Ta and Sc. No systematic variation was found in the Sr content of the different carbonatitic minerals within a particular carbonatite type. Krishnamurthy emphasised the importance of chemical data as one of the essential parameters in identifying carbonatite complexes from doubtful occurrences and in tracing their evolutionary trends.

K. N. Rao described a small sovite in the form of a vein intruding nepheline syenite near Elchuru, Prakasam District, Andhra Pradesh. This was considered genetically related to the alkaline complex of Elchuru emplaced along a NE-SW deep-seated fracture.

C. Suryanarayana Rao detailed the geochemical characteristics of the carbonatites of Pakkanadu and Mulakkadu, Salem District.

B. Krishnamurthy in a talk well illustrated with convincing case histories, pointed to the utility of aeromagnetic data in defining the surface configuration of carbonatite bodies. He pointed out that Th/U ratio less than 1 can be correlated with tantalum-niobium mineralisation, whereas Th/U ratio greater than 1 pointed to essentially niobium mineralisation.

A. Dharmaraj presented a paper on behalf of M. L. Deshpande. He took the extreme position of calling the 'oolitic' cherts in the Vempalle sequence of Cuddapahs as silico-carbonatite flows and the oolites as devitrified volcanic glass.

G. Ramalingaswamy speculated on the possibility of diamonds in the gravels south of Giddalur being derived from kimberlite dykes, similar to those emplaced in the Nallamalai at Chelima and recommended close examination of the catchment area of Enumaleru river.

Rayberman briefly referred to some preliminary carbon and oxygen isotopic studies on the carbonate rocks of Samalpatti and calcite samples drawn from Koratti and Pakkanadu. The author felt that the carbonate inclusions in the carbonatitic matrix of Samalpatti were metasedimentary.

P. S. Rao gave an account of the quartz-barytes veins of Alangayam and Odugattur which occur as flat and steeply dipping swarms within epidotised hornblende gneiss (derived by fenitization of charnockitic rocks) around the syenite plutons of Elagiri and Kavuthimalai.

At the end of the group discussion, it emerged

1) that knowledge about Indian carbonatites and kimberlites was fragmentary and that more intensive investigations should be initiated;
2) that the Landsat imagery interpretations should be followed by intensive ground checks;
3) that information on kimberlite was scanty especially regarding petrography and geochemical characters. The mineralogy and structure of the eclogitic and peridotitic nodule assemblages have to be studied;
4) that the study of apatites from carbonatite complexes should be undertaken. Since apatites crystallised early, the study of the liquid inclusions and their composition may shed some light on the initial composition of the carbonatite magma (suggested by P. Krishnamurthy);
5) that there was need for more precise information on the age of the different carbonatite complexes;
6) that the powerful tool of carbon, oxygen and strontium isotopic studies should be made use of in understanding the genesis of the carbonatites.

B.P.R.