## **BOOK REVIEW**

JOURNAL OF ASIAN EARTH SCIENCES – SPECIAL ISSUE ON ALKALINE AND CARBONATITIC MAGMATISM AND ASSOCIATED MINERALIZATION. L.G. Gwalani and J.L. Lytwyn (Guest Editors), v.18, no.2, April 2000, Pergamon Press, 251p.

Journal of Asian Earth Sciences has brought out a special issue on the above subject which has been vigorously pursued since last century, as the alkaline rocks and carbonatites represent samples of deep-seated mantle melts and provide information about tectonic processes and ore genesis. The volume is aptly dedicated to the memory of Prof. N.M.S. Rock, an early pioneer responsible for improving and simplifying the nomenclature of lamprophyres. A volume of this kind may not address all problems related to the alkaline-carbonatitic magmatism, but it does provide ample new information on these rocks. L.G. Gwalani and J.L. Lytwyn as guest editors of the volume deserve our congratulations for assembling a set of valuable thematic papers. The present volume is the outcome of the workshop held under the IGCP Project 314 as part of the 30th IGC.

Sethna and Javeri describe the occurrence of essexite from the Deccan volcanic province of Saurashtra, western India and propose that the essexite magma is not a differentiated product of tholeiitic magma, but represents a separate melt derived as a 5 to 10% partial melt at shallower depths within the upper mantle. Melt inclusions in olivine and pyroxene phenocrysts from lamprophyres of Chhaktalao area, M.P., India have been studied by Hari et al. The melt inclusions found in olivines exhibit a temperature range of 1215° to 1245°C, whereas the melt inclusions in pyroxenes show a temperature range of 850°-1100°C. These melt inclusions are considered as evolved types, forming daughter minerals of olivine, pyroxene, spinel, mica, titanomagnetite and sulphide. Based on the study of density of CO, bubbles inside these melt inclusions, it is inferred that the depth of entrapment of melt inclusions varies between 10-15 km and that the lamprophyres are derived from a shallow depth and low pressure region, possibly within the spinel-lherzolite zone. In a detailed study of complexly zoned Ti-rich garnet phenocrysts from Amba Dongar carbonatite-alkaline complex, Gwalani et al. concluded that the garnets are primary liquidus phases. From this study, an attempt is made to piece together a history of the alkaline host magma that experienced several events such as polybaric differentiation, magma-mixing and kinetic effects. Ray et al. provide isotopic and REE chemistry of carbonatite-alkaline complexes of the Deccan volcanic province (Amba Dongar, Mundwara and Sarnu-Dandali). Based on minimum strontium isotope ratios of the three complexes, they not only support the hypothesis of Reunion plume origin of these complexes, but also suggest their derivation from a common parent magma, probably through liquid immiscibility. Further, based on stable carbon and oxygen isotopic compositions, they infer that all the complexes have been derived from isotopically average mantle, except for a particular batch of parent magma at Amba Dongar, which appears to have incorporated recycled crustal carbon. Such incorporation, according to the authors, indicates the entrainment of  $^{13}$ C enriched subcontinental lithospheric mantle by the plume. Morbidelli and others provide information about four of the most important K-alkaline magmatic complexes of southern Brazil. On the basis of geochemistry, it is inferred that the melts are derived by low degree melting of garnet or garnet and phlogopite-bearing lithospheric mantle. Further, the coexistence of distinct liquid lines of descent in these complexes is ascribed to vertical heterogeneity in the lithospheric mantle.

New geochemical data on meimechite series of rocks (meimechite-alkali picrites-katangites)

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of Polar Siberia has been obtained by Kogarko and Ryabchikov. They suggest that these rocks are products of parent magmas which are very similar in composition. These melts, according to them, were formed during the melting of lithospheric harzburgites enriched in incompatible elements by infiltration of diapir melts with low degree of partial melting. The geological position and probable origin of alkali-feldspar syenite (pulaskite) found within foyaite of the Khibina Pluton, Kola Peninsula are discussed by Korobeinikov et al. According to them, the formation of alkaline syenite (pulaskite) within foyaite can be explained preliminarly by fractional crystallization of an almost eutectic phonolite initial melt. This process, which was responsible for the formation of both pulaskite and foyaite was probably complicated by the contamination of the mantle derived magma by crustal material which resulted in the production of less silicaundersaturated portion of the liquid that was parental for pulaskite. Arzamastev et al. have used gravity data to create 3D models of the deep structure of the Kola alkaline intrusion in the NE Fennoscandian shield down to the upper crustal level. The data obtained give strong evidence for the different internal structures of the Khibina and Lovozero complexes. Both complexes at deeper levels are suggested to be composted not only of agpaitic nepheline syenites but also of alkaline ultramafic rocks. It is also inferred that these complexes have no common magma conduits within the uppermost crustal levels. For the carbonatites of the Kola Peninsula, the results support the idea of uniform vertical zonality, which may have had initially uniform magmatic reservoirs. It is also suggested, based on the morphology and internal structure of carbonatites, that the erosion levels were variable in different parts of Kola Peninsula.

An overview of the economic aspects and potential of the carbonatite complexes of India and genetic aspects of the mineral deposits have been given by Krishnamurthy et al. Nasraoui and Bilal have presented a detailed account of the compositional variation in the pyrochlores from Lueshe carbonatite complex of Republic of Congo. The authors have inferred that the variation in the chemical composition of the pyrochlores represent geochemical memories of the different alteration conditions, including the variation in the oxidation-reduction environment.

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## ANNOUNCEMENT

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Editor