Petrological and Structural Characters of Khammam Granitoids in the Areas Adjacent to Eastern Ghats Mobile Belt and Dharwar Craton: Implications for Crustal Growth

Sampa Hazra, Jyotisankar Ray, Pritam Saha and Abhijit Podder

Department of Geology, University of Calcutta, 35 Ballygunge Circular Road, Kolkata-700 019, India

The porphyritic granite body (~ 600 Ma) around Mylliem ($25^{0}32$ 'N : $91^{0}52$ 'E), east Khasi hills district, Meghalaya occurs as a distinct intrusive body into the host rock of low- grade meta-sediments belonging to Proterozoic Shillong Group. This porphyritic granite represents youngest phase of magmatic pulse in the Shillong plateau. The porphyritic granite body manifests prominent lath- shaped feldspar phenocrysts giving rise to dominant porphyritic texture. Further, this porphyritic granite body is characterized by primary foliation (defined by parallely arranged feldspar laths), tongues and appophyses and xenoliths of older metamorphics. Petrographically, the Mylliem porphyritic granite is grey leucocratic, coarse grained, phanerocrystalline with modal variants ranging from granite to granodiorite tending to tonalite. We have found that application of simple statistical studies based on correlation coefficient values involving modal variables of the Mylliem porphyritic granite bodies appear significant in majority of the cases indicating magmatic crystallization. Mineral- chemistry by electron probe microanalyses of constituent phases has been presented for systematization of the species. Use of relevant thermometric method indicates temperature of equilibration of the body in the range of 369° C to 507° C. The crystallization of the Mylliem porphyritic granite pluton initiated at an average lithostatic pressure in the tune of ~11 Kb followed by dominant P_{H2O} controlled milieu. Spatially projected mineralogical parameters suggest a general trend of the magmatic cooling of the body from margin inward with sudden influx of volatile matters, that occasionally offsets mineralogical trends. Therefore, Mylliem porphyritic granite represents a differentiation lineage from a parent magma.

Keywords: Mylliem porphyritic granite, Mineral chemistry, Magmatic crystallization, Statistical studies, Correlation coefficients, Meghalaya.