

Evidence for magma mixing and mingling processes in a granitic pluton: an example from Sirsilla Granite pluton, Southern India.

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Magma chamber processes involving mixing and mingling of mafic and felsic variants in a single granitic pluton formation were subject of interest for the current study. Field, petrography and geochemical tools were applied for studying these processes in order to understand the processes leading to the pluton emplacement. The round and ellipsoidal mafic magmatic enclaves (MME) are abundant in the pluton, more so along the peripheries of the pluton. The abundant presence of K-feldspar in the MMEs are the first order field evidence for the mixing of the mafic and felsic units. Resorption textures, quartz ocelli, poikilitic nature of the K-feldspar offer the petrographic evidence for the magma mixing and mingling processes in the magma chamber dynamics. These features are comparable to those reported from other plutons world wide [1]. Prismatic apatite and bladed biotite in mafic magmatic enclave probably due to supercooling and resulted due to magma mixing process.

The MME displays of Molar $Al_2O_3/CaO+Na_2O+K_2O$ (A/CNK) ratio indicate the metaluminous character. Harker's diagram exhibits of the major and trace elements define linear magmatic trends generated by the mixing of felsic and mafic magmas. REE ratios of MME display LREE-enriched and HREE-depleted patterns in chondrite normalized diagram. Low fractionation of MME in REE patterns with demonstrate positive to negative Eu anomaly.

The evidence of combined field, petrographic and geochemistry study suggest the divergent flow of mafic magma intruded into the felsic magma chamber, resulting in the occurrence of magma mixing/mingling during different stages of crystallization.

[1] Barbarin et al.(2005) *Lithos.* **80**,155-177.