Geophysical Research Abstracts
Vol. 12, EGU2010-6079, 2010
EGU General Assembly 2010


# The role of felsic microgranular enclaves on the evolution of some Neoproterozoic granite plutons in SE Brazil

Adriana Alves, Valdecir A. Janasi, and Giovanna Pereira

Departamento de Mineralogia e Petrologia, Instituto de Geociências , Universidade de São Paulo, São Paulo, Brazil (adrianaalves@usp.br)

Recent studies of granite petrogenesis are strongly influenced by the finding that mafic microgranular enclaves (mme) witness frequent and volumetrically significant contribution of mantle-derived magmas to the origin and evolution of granitic melts, be it as a heat source and/or as a source compositional diversity.
On the other hand, the origin of felsic microgranular enclaves (fme) is still a matter of debate; current hypotheses consider them as fragments of chilled margins, products of protracted hybridization between invading basic magmas and resident granite mushes or products of interaction between fairly similar melts.
Felsic microgranular enclaves are widespread in various granite plutons from SE Brazil, in many cases surpassing mme in size and volume. Two groups of occurrences are studied in more detail illustrate different scenarios, with and without clear connections with mafic magmas.
In the Mauá and Mogi das Cruzes plutons, made up of (muscovite)-biotite monzogranite, only fme occur, and the participation of more mafic melts is not evident from field structures or from whole rock and mineral chemical/isotope data. Our preferred model relate the fme to self-mixing events, suggesting mingling/mixing between highly viscous and chemically similar felsic endmembers.
In the Itu Batholith, mme enclaves occur, albeit in very different volumes, in three chemically distinct plutons, all with A-type chemical affinities, In the rapakivi Salto Pluton, fme are large (dm to meter-sized) and widespread, except in a central body of porphyry granite. Scattered cm-sized mme of variable composition, some clearly brought as inclusions in the fme, are thought to represent different stages of hybridization, as indicated by disequilibrum features common also in the host syenogranites (rapakivi texture; mafic-rimmed quartz). The enclave assemblage of the Cabreúva Pluton is similarly dominated by fme, but larger mme and small diorite occurrences are evidence that basic magmas reached the granite chamber and may have triggered remelting and hybridized with the resident mush. In contrast, the presence of basic magmas invading the magma chamber is typical in the Itupeva Pluton, where fme are virtually absent, and hybrid rocks of granodiorite composition and synplutonic mafic dikes are common.
The different occurrences of fme highlight the various mechanisms of self-mixing in granitic magma chambers, involving replenishment by less evolved granitic magma or invasion of basic magmas provoking reheating of a granitic mush with remobilization of less dense, but hotter, interstitial melt.