

Potassium-rich Brasiliano calc-alkaline granitic rocks, southern region of the State of Rio de Janeiro, Brazil

¹GUIMARÃES, M.T. and ²PENA, H.M. ¹Geological Survey of Brazil - CPRM, Rio de Janeiro, Brazil; ²UFF - Department of Geochemistry, Institute of Chemistry, Niterói, Brazil.

Studies on the Mangaratiba-Conceição Granitic Complex showed three main rock types: the Mangaratiba Granite, the Conceição de Jacaré Porphyrific Granite, and the Serra Grande Granodiorite. Thin section work revealed disequilibrium between the mineral phases as suggested by zoning in plagioclase crystals, simple intergrowths between mafic minerals, skeletal crystals of mafic minerals, K-feldspar mantling (antirapakivi texture), that, taken together with field observation, suggest the presence of cooling magmas, in the formation of these rocks. Such observations include the presence of phenocrysts of K-feldspar in MME (mafic microgranular enclaves), MME in the form of drops, chilled margins between the granodioritic rock and leucogranite. Geochemical data show a close relationship between rocks of the complex, and several diagrams revealed well-defined differentiation trends, suggesting fractional crystallization as the dominant process. Furthermore, the data suggested that we are dealing with hybrid magmatic calc-alkaline rocks, very rich in K. The REE show moderate fractionation. The degree of fractionation of the LREE is greater, and that of the HREE is lesser. The Eu/Eu^* (Eu anomaly) decreases in the intermediate rocks towards the rocks of granitic composition. In the trace element diagrams the enrichment of Sm and Ce is more expressive, whereas the values for Ti, Nb, P and Zr shown negative anomalies. The diagrams also show significant fractionation of apatite, plagioclase, oxide and zircon, and to a lesser extent hornblende or clinopyroxene or even biotite in the genesis of these rocks. The petrographic and geochemical characteristics suggest that these rocks formed in a subduction zone with element enrichment. The data suggest that the magmatism occurred at the end of the Brasiliano Cycle and that it probably reflects events related to the final phase of uplift and the beginning of the crustal consolidation at the end of this orogenic cycle. At this time, ascending mantle plumes rich in LILE and LREE caused local crustal melting, mixing and differentiation that gave origin to the rocks in this area.