

GEOCHEMICAL CONSTRAINTS ON THE MANGERITE "RAPAKIVI" GRANITE CONNECTION IN THE NEOPROTEROZOIC SÃO JOSÉ DO RIO PARDO SUITE, SOUTHWESTERN BRAZIL

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The Neoproterozoic São José do Rio Pardo suite (Campos Neto *et al.*, 1988) is composed of a variety of foliated rock types ranging from mafic mangerite (58 wt % SiO₂) to hololeucocratic granite (up to 78 wt% SiO₂). These rocks occur as folded tabular bodies mostly concentrated in an elongated belt extending NW-SE for ca. 100 km within the Guaxupé Domain, an allochthonous terrane made up of granulites, migmatites and several types of orthogneisses strongly affected by a Neoproterozoic (ca. 650-620 Ma) metamorphic overprint.

The mangerites are usually green-coloured, and exhibit an anhydrous mafic mineralogy with ferrosilite + hedenbergite, charnockites *s.s.* are rare, since at ca. 68 wt% SiO₂ the rocks commonly turn into pinkish granites with hastingsitic hornblende + biotite as mafic minerals; further differentiation produced biotite-bearing hololeucocratic granites with up to 78 wt% SiO₂.

Important geochemical variations are observed even among modally similar rocks from different massifs; some characteristic fingerprints, typical of "intraplate" granitoids (e.g., low **mg#**, Ca and Sr; high Zr), are, however, always recognized.

The mangerites bear an important cumulative component, and their strong chemical variation is caused by differences in the proportion and composition of the accumulated feldspar (from Na-Ca-Sr-rich in more primitive to K-rich in more fractionated magmas) and also in the **mg#** of the parental magmas (**mg#** of the mangerites range from ca. 34 to as low as 7).

The chemical compositions of the granites (ca. 68-78 wt% SiO₂) are similar to those of the "rapakivi" association, and define more linear trends in variation diagrams, reflecting the withdrawal of feldspar (Na, Al, Ba, Sr decreasing

with silica) plus pyroxenes (decreasing Ca, Fe, Mg, Sc), Fe-Ti oxides (decreasing Ti, V) and apatite from primary magmas with a "felsic mangerite" composition. In normative Qz-Ab-Or diagrams, the granite compositions follow a thermal valley at high Or/Ab, reflecting the persistence of low a(H₂O) in the course of differentiation; hololeucocratic hypersolvus granites records a raise in the Na/K ratios at the very last stages of differentiation, and reach high contents of normative Qz, suggestive of shallow crystallization.

Fractionation of accessory minerals exerts a strong influence on the REE patterns of the rocks from the suite. The more primitive magmas were usually zircon-saturated, and many mangerites show signs of zircon accumulation, resulting in Zr contents over 1,000 ppm and slightly fractionated [(La/Yb)_n = 5-15] REE patterns. With falling temperature and Zr contents, (La/Yb)_n reaches values over 50 in some allanite-rich hololeucocratic granites; further fractionation involves allanite extraction, and a rapid decrease in La (and Th) contents,

As indicated by field, petrographic and geochemical data, the suite is broadly cogenetic, and in some occurrences the entire compositional range may have originated by *in situ* differentiation within sill-like bodies with thicknesses around 500 m. The primary magmas seem to have originated by partial melting of lower-crustal granulites under very high temperatures (>950 °C), the inferred differences among them could reflect variations in source-rock composition and in some cases the incorporation of small amounts of basic (mantle-derived?) material, both possibly contributing to variations in fO₂ and thus in the **mg#** of the magmas.

Available U-Pb zircon data indicate that the São José do Rio Pardo mangerite-granite suite is

slightly younger than a nearby voluminous high-K calc-alkaline suite (620-640 Ma vs. 640-660 Ma); if this succession marks a transition from compressive to "intra-plate" tectonic regime in this region, this was extremely rapid.

REFERENCE

CAMPOS NETO *et al.* (1988) *Geoch. Brasiliensis*, 2:185-199