

## **REE constraints on the evolution of the rapakivi granites in the São Francisco complex, São Paulo State, Brazil.**

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The São Francisco rapakivi complex is Brasiliano in age, and intrudes low-grade metamorphic rocks of the São Roque Group of the Ribeira belt. The complex includes mainly syenogranites, minor monzogranites, and rare quartz-monzodiorites as enclaves. Syenogranites and monzogranites contain biotite and rare hornblende as dark constituents, and show geochemical characteristics of A-type and within-plate granites. The  $T_{DM}$  model ages indicate three distinct older crustal sources or phases for these rocks: ca. 2.2 Ga, 1.96-1.93 Ga, and 1.89-1.85 Ga. Here we report the REE studies in the fine-grained equigranular facies (2.20 Ga  $T_{DM}$  age), normal rapakivi facies (1.96 Ga  $T_{DM}$  age), coarse-grained porphyritic facies (1.93 Ga  $T_{DM}$  age), and coarse-grained equigranular facies (1.94  $T_{DM}$  age). In general the high differentiated rapakivi granitic facies show high REE contents (except Eu) and pattern (except fine-grained equigranular facies) similar to that of the upper continental crust. From normal rapakivi facies through coarse-grained porphyritic facies and coarse-grained equigranular facies (1.96-1.93 Ga  $T_{DM}$  ages) the La/Yb ratios decrease (15.09 to 7.12) caused by the depletion of LREE and the negative Eu anomalies increase (0.32 to 0.20), indicating that LREE concentrated minerals (allanite ?) and feldspar are the main phases removed by crystal fractionation. On the other hand, the fine-grained equigranular facies show flattened pattern [(La/Yb)<sub>N</sub>=1.85] and a strong negative Eu anomalies [(Eu/Eu\*)<sub>N</sub>=0.04] suggestive of a high fractionated granitic magma originated from a limited partial fusion process or from a extreme crystal fractionation process. Concluding, at least two distinct phases of high differentiated rapakivi granites occur in the São Francisco complex based on  $T_{DM}$  model ages and REE evidences, both showing crustal source signature.