

Zircon U-Pb, Lu-Hf and REE Composition of Sorocaba and São Francisco Granites, São Paulo State, SE Brazil

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The granitic massifs of Sorocaba (SG, 180 km²) and São Francisco (SFG, 150 km²) are located southeast of São Paulo State, southeastern Brazil. They crop out near the Paraná Basin and intrude low-grade meta-volcano-sedimentary rocks. SHRIMP U-Pb ages, Lu-Hf (LA-MC-ICP-MS) isotopic data and REE (LA-ICP-MS) abundances in zircon were considered together with WR geochemistry (XRF and ICP-MS) to understand petrogenetic processes.

The U-Pb ages for SG granodiorites are 617±4, 610±7 Ma, syeno- and monzogranites are 585±4 and 603±4 Ma. For the SFG ages are 592±3 Ma for the syeno-monzogranites and 599±4 Ma for the minor quartz-monzodiorites.

Lu-Hf isotope system from all the analyzed zircon crystals display strongly negative εHf₀ values, compatible with crustal signatures. The granodiorites εHf₀ values vary between -12.2 and -21.5. These values are slightly less evolved than those observed in the other samples; in the syeno- and monzogranites from SG, εHf₀ are between -12.8 and -33.1. Zircon crystals from quartz-monzodiorites of SFG displays εHf₀ between -30.5 and -33.5 varying in a more limited range, and the syeno-monzogranites εHf₀ varies between -32.5 and -54.4.

REE patterns are characterized by negative Eu anomalies, variable positive Ce anomalies and variable enrichment of HREE regarding to MREE. The REE concentrations were used to calculate partition coefficient data and then compared with the model from Blundy & Wood [1] considering: $r_o = Zr$ site in zircon, 0.84 Å [2]; Young's modulus for Zr was deducted from equation 15 [3]; $D_o = D_{Zr}$ and $T = Zr$ saturation temperature in WR. The best-fit curves were those of the SFG quartz-monzodiorites. Calculated partition coefficients of HREE show good correlation. Meanwhile, the LREE are slightly discrepant for the more felsic-studied rocks. Those discrepancies, joined with the other *in situ* analyses are a robust dataset that allow to analyse petrogenetic processes.

[1] Blundy, J. & Wood, B. (1994). *Letters to Nature* 372, 452–454. [2] Shannon, R. D.(1976). *Acta Crystallographica Section A* 32, 751–767. [3] Wood, B. J. & Blundy, J. D. (2003) *Treatise On Geochemistry*, 2, chap 9, 395–424

Preparation of micrometer sized soil particles for NanoSIMS analysis

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The study of biogeochemical interfaces in soils requires an adequate technique capable of revealing processes occurring at a sub-micron spatial scale.

NanoSIMS analysis provides information about elemental/isotopic distributions at such a scale. Soil architecture is revealed by imaging the spatial distribution of organic matter (e.g.: ¹²C, ¹²C¹⁴N are detected) and mineral constituents (e.g. ²⁸Si, ²⁷Al¹⁶O, ⁵⁶Fe¹⁶O).

Samples relevant in soil science obtained by density and/or particle size fractionation are usually single particles or microaggregates with sizes in the micrometer range. Organic matter potentially distributed as a thin coating (few nm) on mineral particles could be lost during the presputtering/implantation process before NanoSIMS measurement. The challenge is to prepare such primary particles as flat, well-polished samples and to investigate them in cross-section. Embedding in a carbon containing resin results in ambiguities in distinguishing between the resin and the organic matter.

We present a method for preparing polished cross sections of micrometer-sized primary soil particles. The particles were coated with a marker layer, embedded in epoxy resin and polished. In the cross section organic coatings and assemblages on the primary soil particles can be distinguished.

This method can essentially improve the quality of NanoSIMS measurements on grainy mineral samples to better characterize soil biogeochemical interfaces.