

GEOCHRONOLOGY, Sm-Nd AND Pb-Pb ISOTOPE SYSTEMATICS OF EDIACARAN POST-COLLISIONAL HIGH-SILICA VOLCANISM AT THE TUPANCI AREA, NW OF THE SUL-RIO-GRANDENSE SHIELD

Sommer, C.A.¹; Leitzke, F.P.²; Lima E.F.¹; Barreto, C.J.S.⁶; Lafon, J.M.⁵; Matté, V.³; Philipp, R.P.¹; Conceição, R.V.¹; Basei, M.A.S.⁴

¹ Universidade Federal do Rio Grande do Sul; ² Steinmann Institut für Geologie, Mineralogie and Paläontologie, Universität Bonn, Germany; ³ Universidade Federal do Pampa; ⁴ Universidade de São Paulo; ⁵ Universidade Federal do Pará; ⁶ Universidade Federal de Pernambuco

New geochronological (U-Pb zircon LA-ICP-MS) and isotopic (Sm-Nd and Pb-Pb) data are presented for the volcanic and hypabyssal acid rocks from the northernmost exposure of the Acampamento Velho formation in the NW portion of the Sul-Rio-Grandense Shield (SRGS), Brazil. Acid volcanic rocks occur as shallow intrusions (hypabyssal rocks) at the Tupanci Hill and as lava flows (porphyritic rhyolites) and pyroclastic deposits (ignimbrites) at the Picados Hill. The Tupanci hill comprises an N-S elongated subvolcanic body with a dominant NE-SW fault pattern. The main lithology is represented by porphyritic rhyolites with phenocrysts of sanidine and quartz surrounded by an equigranular-fine-grained to aphanitic quartz-feldspar matrix. Volcanic rocks in the Picados Hill have effusive and explosive origin. The rhyolitic rocks are porphyritic and the best outcrops are dominantly in the north-central portion of the Hill, while pyroclastic rocks are characterized by a high degree of welding and predominate in the south portion of the area. In some portions there are mainly lapilli-size fragments, with abundance in lithic fragments and other portions are predominantly reomorphic, with mostly ash-size grains and crystal-rich. The geochemical features of both hills are similar for major elements but show distinct aspects regarding trace elements. Rocks have high contents of SiO₂, alkalis and FeO^t/FeO^t+MgO; with low contents of Al₂O₃, CaO and MgO; and agpaitic index close to the unity (>0.9). Major and trace elements data allowed the identification of two different evolutionary trends: low and high-Ti, related respectively to the effusive/pyroclastic rocks of the Picados Hill and subvolcanic rocks of Tupanci Hill. The same behavior is observed for trace and rare earth elements (REE) in multi-element variation diagrams. U-Pb isotopic analyses were performed using a high-resolution multi-collector inductively coupled plasma-mass spectrometer (ICP-MS) coupled to an excimer laser ablation (LA) system, while Sm-Nd and Pb-Pb were acquired using thermal ionization mass spectrometry. The first volcanic episode, grouped in the high-Ti rhyolites from the Tupanci hill, has about 579 Ma, which is in agreement with reported ages for the time span of the post-collisional Acampamento Velho formation volcanism in the Bom Jardim Group of the Camaquã Basin. A second U-Pb age of 558 Ma was obtained for rhyolites from the low-Ti group at the Picados Hill, although with a high uncertainty associated (+/- 39 Ma). This may indicate a younger acid volcanism, or a greater time span for the AVF volcanism in southernmost Brazil, due to the high degree of geochemical affinity regarding trace elements and isotopes between both groups. Regarding magmatic sources, Sm/Nd isotopic data coupled to Pb isotopes and trace element geochemistry indicates different amounts of paleoproterozoic (Dom Feliciano – Pinheiro Machado Suite) to Neoproterozoic (Rio Vacacaí terrane) lower crust melting. Finally, our data contributes to a better understanding of the stratigraphic evolution for the Neoproterozoic post-collisional volcanic successions of the Camaquã Basin in the SRGS.

KEYWORDS: VOLCANISM, GEOCHRONOLOGY, CAMAQUÃ BASIN