

Sr-Nd-Pb GEOCHEMICAL CONSTRAINTS ON THE RELATIONSHIP BETWEEN APOTERI BASALTS (NORTHERN BRAZIL AND GUYANA) AND THE CENTRAL ATLANTIC MAGMATIC PROVINCE

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In northern Brazil, Roraima state and southwest Guyana, inflated pahoehoe basalt flows occur along the margins of the Tacutu rift and dykes intrude the Paleoproterozoic basement, trending to the NE and concordant and close to the boundary of the rift system. The dykes and flows are representative of Apoteri magmatism. New field, geochemical data (major, trace and rare-earth elements), Sr-Nd-Pb isotopic compositions and the first chemical stratigraphy for the rocks of the Apoteri magmatism indicate that petrographic and chemical compositions are homogeneous and characteristic of continental tholeiitic basalts. Flow samples were collected in Serra Nova Olinda (four analyses), Morro Redondo (seven analyses), Rio Arraia in Roraima, Brazil, and in Lethem River (two samples each) and base of Kanuku Mountains (two samples) in Guyana. Dyke samples are from Brazil, Taiano and Uiramutã localities, with four analyses each. Chemical analyses of bulk rocks were performed by ACME Analytical Laboratories, Vancouver, Canada. Major elements were determined by X-ray fluorescence spectrometry and trace elements, metals and REE by inductively coupled plasma mass spectrometry (ICP-MS). Pb, Sr and Nd isotope compositions were determined in the Laboratório de Geologia Isotópica, Instituto de Geociências, Universidade Federal do Rio Grande do Sul, Brazil. The basalt flow chemostratigraphy of the Morro Redondo and Nova Olinda sites show two distinct groups: a) the lower flows with intermediate TiO₂ content (ITi group) ranging from 1.09 to 1.41 wt.%, narrow range of MgO (5.64 - 6.46 wt.%) and Ni (43-53 ppm) contents; and b) the upper flows with lower TiO₂ content (LTI group) from 0.75 to 0.78 wt.%, higher MgO (7.95-8.85 wt%) and Ni (105-115 ppm) contents. The two magma types share many characteristics in HFSE and REE, but in detail show important differences in REE ratios such as (La/Yb)_N ~ 4.0 for ITi and 3.2 for LTI. The dyke chemical composition completely corresponds to the widespread ITi group flow analyses, suggesting that they have the same origin. All the basalts show enriched Sr-Nd-Pb initial isotopic compositions (²⁰⁶Pb/²⁰⁴Pb = 18.355-18.764, ²⁰⁷Pb/²⁰⁴Pb = 15.55-15.65, ²⁰⁸Pb/²⁰⁴Pb = 38.367-38.623, ¹⁴³Nd/¹⁴⁴Nd_i = 0.5122238-0.512311, ⁸⁷Sr/⁸⁶Sr = 0.70758-0.708948). The observed chondrite-normalized La/Yb vs Eu/Yb ratio suggest variable melting degrees such as 7-8% to LTI and 10-11% to ITi, indicating that the flows and dykes from Apoteri magmatism probably derived from a SCLM source. These data show consistent similar isotopic compositions and chemical characteristics to other tholeiitic flows of the large Central Atlantic Magmatic Province (CAMP), especially in eastern USA.

Keywords: APOTERI MAGMATISM; Sr-Nd-Pb ISOTOPES; CAMP CONTINENTAL THOLEIITES.