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GEOCHEMISTRY CHARACTERIZATION OF PART OF THE EARLY NEOPROTEROZOIC PLUTONISM IN THE CENTRAL STRUCTURAL DOMAIN OF THE BORBOREMA PROVINCE, NE BRAZIL

Authors

GUIMARÃES IGNEZ ¹, BRITO-NEVES BENJAMIM BLEY ²

presenter's e-mail: bbleybn@usp.br

1 - UFPE

2 - Instituto de Geociências - Universidade de São Paulo-Brazil

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Abstract

Orthogneisses associated to bimodal metavolcanic rocks, with crystallization ages ranging from 925Ma to 952Ma (Cariris Velhos event), and Brasiliano metamorphic age (612Ma-640Ma), constitute a belt around 700Km long, from the Atlantic coastline in the east to the Riacho do Pontal Fold Belt in the west, within the Borborema Province, Northeast Brazil. The Cariris Velhos orthogneisses studied in this work are located in the east and central part of this belt comprising biotite (muscovite) monzogranites to sienogranites. Tourmaline, garnet, apatite and zircon are the accessory phases. They are peraluminous to slightly metaluminous, SiO₂ - rich (70.5% - 76.0%), CaO- and MgO-poor, have high FeO/(FeO+ MgO) ratios (> 0.80), high alkalis contents (K₂O + Na₂O = 7.0 to 10.0,) with K₂O/Na₂O ratios ranging from 1.5 to 2.4, low Sr (20 a 150ppm) and Nb (12 to 22 ppm), variable Ba (100 - 1260 ppm), Rb (164 - 400ppm) and Zr (144 - 408ppm) contents and high abundances of Y (41 to 80ppm) and Ga (19 to 30ppm). The Chondrite normalized REE patterns are characterized by (Ce/Yb)_N ratios ranging from 2.5 and 10.0 and moderate to strong negative Eu anomalies (Eu* 0.23 - 0.50). The spidergram patterns are characterized by LILE/HFSE ratios around 10, deep troughs at Sr and Ti and small troughs at Nb. The geochemical characteristics suggest that the studied granitoids are A-type. Based on the discrimination criteria of Eby [Geology 20(1992) 641] they belong to the A2 type, reflecting their derivation from crustal source.

The studied granitoids have relatively high zircon saturation temperatures (782oC to 882oC). The T(DM) model ages range from 1.3Ga to 1.9Ga and epsilon Nd values from -0.12 to -5.0. The geochemical signature of the Cariris Velhos granitoids suggests that they were produced by high temperature partial melting of crustal source with some mantle contribution, leaving plagioclase in the residue. Previous models proposing a collisional setting for the Cariris Velhos in the studied area are not supported by our data. Extension, may corresponding to the initial rifting stage before Rodinia breakup, represents the most likely tectonic setting.

ACCEPTED as Poster Presentation

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