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Ignez de Pinho Guimarães, Adejardo Francisco da Silva Filho, Richard Armstrong

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ORIGIN AND AGE OF COEVAL GABBROS AND LEUCOGRANITES IN THE NORTHERN SUBPROVINCE OF THE BORBOREMA PROVINCE, NE BRAZIL

Ignez de Pinho Guimarães[1]; Adejardo Francisco da Silva Filho[1]; Richard Armstrong[2]

1 – Department of Geology, Pernambuco Federal University ignez@ufpe.br, afsf@ufpe.br; 2 – Australian National University - richard.armstrong@anu.edu.au

Abstract

The Paleoproterozoic Serrinha – Pedro Velho Complex comprises orthogneisses and migmatites, exposed in the south part of the Archean São José do Campestre Massif, Rio Grande do Norte domain of the Borborema Province, NE, Brazil. During the Ediacaran, the Serrinha - Pedro Velho Complex underwent metamorphism at HT/LP conditions in a tectonic setting dominated by dextral transpressive deformation, dated at ~575Ma. Crustal melting generated various plutons and dykes of leucogranites with composition ranging from syeno- to monzogranites. Mafic rocks, including gabbros, norites and diorites also occur as dykes and small plutons intruded into the Serrinha - Pedro Velho Complex. Features of mixing and mingling between mafic and leucogranitic magmas were recorded locally. The granites and mafic rocks show field features and geochemical signatures of extension related magmatism. U-Pb SHRIMP zircon data yielded similar Concordia ages for felsic (582 ± 5 Ma) and mafic (588 ± 6 Ma) rocks. The leucogranites have strongly negative εNd (580 Ma) values (-19.8 to -24.3) and Paleoproterozoic to Archean Nd T_{DM} model ages (2.2 – 2.6 Ga), similar to those recorded in the orthogneisses of the Serrinha - Pedro Velho Complex. The mafic rocks show slightly higher εNd (580 Ma) values (-13.09 to -19.63). The leucogranites were probably generated by partial melting of a source similar to the Serrinha Pedro Velho orthogneisses. The mafic rocks are MgO- rich, and the less evolved ones show picritic basaltic composition, similar to mafic rocks from continental flood basalt provinces. We suggest that melting of