

CRIOGENIAN–EDIACARAN MAGMATISM RECORD OF THE PERNAMBUCO–ALAGOAS DOMAIN, BORBOREMA PROVINCE (NE BRAZIL): IMPLICATIONS FOR THE EARLY ASSEMBLY OF THE WEST GONDWANA

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Abstract: A combined study of new whole-rock major-trace elements, mineral chemistry, Sr–Nd–O isotopes, and zircon U–Pb ages, was carried out for one biotite-hornblende granodiorite to granite orthogneiss (Jacaré dos Homens orthogneiss), emplaced along the Jacaré dos Homens transpressional shear zone, and one pluton (Santo Antonio granite) from the southern Águas Belas–Canindé composite batholith of the Pernambuco–Alagoas Domain, northeastern Brazil. SHRIMP zircon U–Pb dating of the Jacaré dos Homens orthogneiss and the Santo Antonio granite yields ²⁰⁶Pb/²³⁸U weighted apparent mean ages of 642.4 ± 3.4 Ma and 636.1 ± 3.6 Ma, respectively, which suggests that they were emplaced in the Criogenian–Ediacaran transition. These rocks were emplaced in a regional strain field combining transpressive deformation. The occurrence of a low-angle foliation, controlled by a transpressive deformation, suggests that thrusting has operated in the area. Concordant zircon U–Pb data from this study and from the literature date the beginning of the Brasiliano orogeny in the interval between 642 and 600 Ma. The studied granitic rocks show high-K calc-alkaline to shoshonitic composition, magnesian nature and metaluminous to slightly–moderately peraluminous signature, typical of I-type granitoids. They are enriched in the alkalis (7.69 to 11.79 wt.%), Rb, Ba, Th, K and light rare earth elements, depleted in Nb, Ta, Sr and Ti, consistent with a convergent tectonic setting. Nd isotopic data for the Jacaré dos Homens orthogneiss reveal t_{DM} age of 1.21 Ga with slightly negative εNd (642 Ma) of - 1.56, show initial ⁸⁷Sr/⁸⁶Sr ratios of 0.7067 with δ¹⁸O (zircon= + 7.0‰) value more high than mantle values. While the Santo Antonio pluton shows Nd- model age varying from 1.04 to 1.05 Ga, with εNd (636 Ma) positive to slightly negative of +0.09 to - 0.63 and back-calculated (636 Ma) initial ⁸⁷Sr/⁸⁶Sr ratios from 0.7048 to 0.7049. The geochemistry indicates that the studied granitoids and the plutons from the literature that intruded the Águas Belas–Canindé composite batholith were either derived by partial melting of the Tonian mantle-derived magmas or by Tonian lower continental crust (evidenced from inherited zircon cores) triggered by uplift asthenosphere and underplating of lithospheric mantle.

Keywords: SYN-OROGENIC EMPLACEMENT; SR–ND–O–PB ISOTOPES; TECTONIC EVOLUTION