TWO STAGE MANTLE-DERIVED MAGMA IN A SYN-TECTONIC EDIACARAN BATHOLITH AND THE ONSET OF THE BRASILIANO OROGENY: EVIDENCE FROM SR, ND AND O ISOTOPES

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Abstract: The elongate Monteirópolis batholith (270 km^2) is composed of alkali feldspar granite to granodiorite, it is part of the Águas Belas–Canindé composite batholith and intruded rocks of the Pernambuco–Alagoas Domain, northeastern Brazil. This batholith is limited by the NNE-SSW-trending Jacaré dos Homens transpressional shear zone in its southwestern portion, and displays low-angle foliation, coeval to the development of a regional flat-lying foliation. Microgranular dioritic enclaves and amphibole-rich clots are abundant. Syn-plutonic dikes of diorite composition are also present. The mineralogy of this pluton comprises quartz, alkali feldspar and plagioclase as essential phases, biotite and amphibole as major accessory phases, besides titanite magmatic epidote. Major and trace element chemistry shows high SiO_2, total alkalis, Ba and Sr, low Fe# [(FeOt / (FeOt + MgO)] and Nb contents, attesting to high-K calc-alkaline and metaluminous to slightly peraluminous character, typical of I-type granites. The rocks are enriched in LREE and LILE and depleted in HFSE, and show fractionated chondrite-normalized REE patterns (La_N/Lu_N = 27.6 to 125) with Eu/Eu*= 0.67 to 1.25. Chondrite-normalized spidergrams show marked negative Nb, Ta, Sr and Ti anomalies, typical of subduction-related magmas. The Al_2O_3/TiO_2 ratios and P_2O_5 *vs.* SiO_2 contents suggest near-liquidus temperatures of 950 – 800 °C. U–Pb SHRIMP zircon data yielded a crystallization age of 626 ± 4 Ma. Regional structures and U–Pb geochronological data for the Jacaré dos Homens transpressional shear zone suggest that shearing was installed at ca. 640 Ma. Movements along this shear zone may have contributed to provide space for magma emplacement. The rocks in this batholith are characterized by slightly negative to slightly positive εNd values (- 0.78 to + 1.06), average Nd- model age of 1.0 Ga, low initial $^{87}Sr/^{86}Sr_{(626\ Ma)}$ values of 0.7050 to 0.7052, and low $\delta^{18}O$ values (zircon) of + 5.00 to 5.94‰ V-SMOW. The magma was likely formed by partial melting of Tonian mantle-derived rocks in the lower continental crust, probably triggered by underplating of mantle-derived mafic magma during collision of the São Francisco Craton and the Pernambuco–Alagoas Domain during onset of the Brasiliano orogeny close to the Cryogenian–Ediacaran transition.

Keywords: ONSET OF THE BRASILIANO OROGENY; SR–ND–O ISOTOPES; U–PB SHRIMP ZIRCON DATING