

TWO-STAGE MANTLE-DERIVED SANTANA DO MUNDAÚ HIGH-K CAL-ALKALIC COMPOSITE GRANITIC BATHOLITH, PERNAMBUCO-ALAGOAS DOMAIN

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ABSTRACT: The Santana do Mundaú composite batholith intruded the southwestern portion of the Ipojuca-Atalaia batholith, in the eastern Pernambuco-Alagoas Domain of the Borborema Province, northeastern Brazil. It consists of two major NE–SW elongate plutons (Santana do Mundaú and Chã Preta), the first one dated at 636 ± 10 Ma (U–Pb zircon TIMS). The Santana do Mundaú pluton (SMP) consists of leucocratic to mesocratic syenite, quartz syenite to syenogranite that have equigranular to slightly inequigranular medium- to coarse-grained texture, and contains Fe-hornblende, biotite, sphene and primary epidote as major accessory phases. The Chã Preta pluton (CPP) is equigranular medium- to fine-grained biotite syenogranite to monzogranite; a minor facies consists of equigranular amphibole granite. In spite of some differences in their texture and accessory minerals, these two plutons have similar whole-rock chemical compositions; rocks are highly fractionated (SiO_2 from ~ 67 to $\sim 74\%$), calc-alkalic to high-K calc-alkalic, metaluminous to slightly peraluminous, enriched in LILE. Nb contents are low (up to 25 ppm) as well as Rb/Sr ratios (up to 0.6). Chondrite-normalized REE patterns are fractionated (La/Yb from ~ 6 to ~ 64) with discrete negative Eu anomaly. Although the normalized REE patterns are overlapping for the two plutons, the total REE is higher for the SMP than that for the CPP. MORB-normalized spidergrams indicate Ta-Nb, P and Ti depletions for the two plutons. The analyzed samples have low initial $^{87}\text{Sr}/^{86}\text{Sr}$ ratios (back-calculated ratios vary from 0.705110 to 0.706190 for the SMP that is higher than that for the CPP, 0.703792 to 0.704809). Epsilon Nd (0.6 Ga) are slightly negative for the two plutons (-2.51 to -0.44 for the SMP and -0.88 to 0.00 for the CPP). Nd model ages are similar for the two plutons, from 1.0 to 1.3 Ga. The amphibole granitic facies of the CPP also have low initial back calculated $^{87}\text{Sr}/^{86}\text{Sr}$ ratios (from 0.705389-0.705558), but more negative ϵNd (0.6 Ga) (-9.53 to -9.37), and older tDM of 1.9 and 2.0 Ga. Overall, the chemical and isotopic data are suggestive of a two-stage derivation mantle-derived source for these Neoproterozoic granites, with little crustal contamination. The source material for the corresponding granitic magmas was a rock derived from a mantle-derived magma emplaced during the Cariris Velhos cycle that remained in the lower crust until the Neoproterozoic partial melting event, related to the initial stages of the Brasiliano orogeny. This finding is similar to that observed in other granitic batholiths in the Pernambuco-Alagoas Domain (e.g. Águas Belas-Canindé).

KEYWORDS: granites, Neoproterozoic cycle, mantle-derived magmas, Cariris Velhos event