ORIGIN OF THE HIGH-K CALC-ALKALINE GRANITE SERIES: CONSTRAINTS FROM A GEOCHEMICAL AND SR-ND ISOTOPE STUDY OF THE PINHAL-IPUIÚNA BATHOLITH, SE BRAZIL

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Resumo: The Pinhal-Ipuiúna Batholith (~1,000 km^2), intrusive in the southernmost portion of the Guaxupé Domain, Socorro-Guaxupé Nappe, SE Brazil, is made up of a wide variety of granitic rocks, defining a continuous suite from subordinate ~50 wt% SiO_2 gabbro to ~75 wt% SiO_2 leucogranite, with predominant porphyritic hornblende-biotite quartz monzonite and monzogranite of intermediate composition. TIMS U-Pb zircon dating shows that the major units of the batholith were emplaced in a short time interval (619-622 Ma), coincident with the regional metamorphic peak, when abundant anatectic granite (Pinhal-type biotite granite) was generated.Linear geochemical trends for most elements, and a relatively small Sr-Nd isotope variation ($^{87}Sr/^{86}Sr(t)$= 0.709-0.710 and eNd (t=620 Ma)= -6 to -8) irrespective of silica content seem at first inspection to be consistent with a comagmatic origin for the whole compositional spectrum. However, close scrutiny of data, and comparison with coeval regional magmas derived from different mantle and crust reservoirs reveal a more complex petrogenesis. The felsic rocks, in particular, show significant variability, mostly expressed in terms of the trace-elements behavior, and are interpreted as products of partial melting of a heterogeneous lower and middle crust, which were mixed to varied degrees with basic magmas to generate the predominant quartz monzonites with high-K calc-alkaline signature. No samples of mafic rocks clearly free from contamination with crust-derived material are found, but the isotope overlapping with the felsic rocks appears to steem both from their derivation from magmas generated in the enriched subcontinental mantle and from the relatively young age of the melted crust (Sm-Nd t(DM) ~1.5 Ga, as compared to 1.8-2.2 Ga in other high-K calc-alkaline batholiths in the region).

Palavras-chave: Sr-Nd isotopy; geochemistry; high-K calc-alkaline.