

Basic-Ultrapotassic Post-Collisional Magmatism with Arc Signature in the Sergipano Orogenic System, Brazil

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The Sergipano Orogenic System (SOS) is interpreted as formed from the closure of continental magmatic arches of complex history, during the Neoproterozoic collision between the São Francisco Craton and the Pernambuco-Alagoas land masses. The magmatism in SOS is abundant and essentially consists of high-K calc-alkaline granitogenesis besides peraluminous granites, with intrusive shoshonitic terms in the post-collision period (588 Ma).

Minettes occur as ellipsoid-shaped microgranular mafic enclaves up to 1 meter long associated to the post-orogenic shoshonite granitogenesis. The fine-grained texture and the presence of skeletal crystals (mainly apatite, biotite, diopside and opaque minerals) in the minettes indicate the rapid crystallization rate of lamprophyres, avoiding important interaction between the lamprophyric magma and the nesting monzonites. Compositional zoning identified in crystals of plagioclase, clinopyroxene and alkali feldspar also reflect the effects of thermal instability during crystallization of these rocks. The presence of biotite and amphibole rims in the contact in the enclaves of biotite diopside cumulate at the contact with monzonite indicates geochemical instability between the original magmas. The absence of similar borders between these cumulates and the minettes is considered to reflect geochemical equilibrium between these rocks.

Geochemical data show that the minettes correspond to ultrapotassic rocks ($K_2O/Na_2O > 3$, $6 > \% MgO > 8$, $K_2O > 3\%$). They may be classified as Group III, which are orogenic magmas characterized by depletion in Nb, Ta and Ti. Trace element ratios (e.g. Th/Yb, Ta/Yb) are consistent with an arc environment signature. Magmas capable of crystallizing rocks as the studied minettes are attributed by the literature as formed in a period after collisional events, being formed from partial melting of previously metasomatized mantle. The presence of Group III ultrapotassic magmas in SOS has not been reported before and its distribution in several granite bodies with different ages (e.g. 630 Ma and 588 Ma) indicates that at the end of this Neoproterozoic orogenesis basic and intermediate magmas were coeval to the emplacement of felsic magmatism. [Acknowledgments: CNPq, FAPITEC, CAPES].