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The Cana Brava complex: new petrological and geochemical data on a poorly known layered intrusion

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The intrusion of mantle-derived melt which produced huge layered complexes can induce anatexis of the host rocks, which can be responsible of granitic crustal intrusion, and are possibly the reservoir for volcanic systems (e.g. Val Sesia magmatic system). Thus, they represent an important possibility to understand what could happen in a magmatic system which involved almost the entire crustal thickness.

The Cana Brava complex (Goiás, central Brazil) is the northernmost intrusion of a 300 km long, North-trending belt of mafic-ultramafic massifs outcropping in the Brasília Belt. Among the three complexes forming the belt (together with the Barro Alto and Niquelândia ones), the Cana Brava complex is the less known.

The Cana Brava complex is long about 40 km and wide from 12 to 4 km. It has a 10-20 NNE direction concordant with a super-imposed foliation of the rocks. It is in tectonic contact with the rocks of the Serra da Mesa Group to the East and in magmatic contact with the Palmeirópolis meta-vulcano-sedimentary Sequence to the West. The intrusion occurred during a continental rift in the lower crust and the parent melt composition was estimated to be MORB-like.

Literature data suggests that the Cana Brava complex suffered several metamorphic events (in granulite, amphibolite and hydrothermal facies) and provides a large time span for its intrusion (3.9 Ga to 420 Ma). Recent works re-interpreted structural, textural and geochemical features of the Niquelândia complex.

Thus, a new study has been performed on the Cana Brava complex in order to compare the two intrusions. The occurrence of late undeformed layers, and other field evidences, suggest that the Cana Brava intrusion occurred under shear conditions which recrystallized the igneous texture of the rocks and provided for the present foliation. Moreover, petrographic evidences point to that no granulite and amphibolite facies metamorphic events occurred after the crystallization.

Bulk-rock major and trace elements analyses show strong enrichments for the most incompatible elements at the top of the complex which suggest, together with the occurrence of Palmeirópolis Sequence xenoliths, that the parent melt was affected by crustal contamination. Rb-Sr and Sm-Nd isotopic analyses confirm this hypothesis, showing an increasing contamination trend along the stratigraphy ($^{87}\text{Sr}/^{86}\text{Sr}_{(790)}$ between 0.708243-0.736590 and $\epsilon\text{Nd}_{(790)}$ between 1.71 and -8.47 from the bottom to the top).

U-Pb SHRIMP-II analyses on zircons from 4 samples from the complex provided for concordia ages between 798.7 ± 2.2 Ma and 779.3 ± 1.3 Ma. These ages constrain the Cana Brava intrusion at 800-780 Ma, similarly to the intrusion ages estimated in literature for the Barro Alto and Niquelândia complexes.

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