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ILHABELA PRECAMBRIAN GEOLOGY AND CRUSTAL EVOLUTION, SÃO PAULO STATE, SE - BRAZIL

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Ilhabela is located in the SE-Brazil, north coast of São Paulo State, and is included in the Mantiqueira Province, as part of the Central Ribeira Belt (CRB), West Gondwana. Remarkable NE-SW shear zones, subparallel to the Brazilian coast, characterize the CRB. In a local context, Ilhabela and the adjacent continental areas are designated as Costeiro Domain. The island is a detached continental fragment constituted by Precambrian basement rocks that include gneisses, metasedimentary rocks, migmatites and granitic intrusions. Mafic dikes, three major alkaline syenite intrusions, stratified gabros and trachyte dikes intruded the Precambrian rocks during the Mesozoic.

The Precambrian rocks of Ilhabela were subdivided into: coarse-grained granite gneisses; mesocratic biotite gneisses; fine-grained mylonitic biotite gneisses; leucocratic mylonitic granites; banded gneisses; calcsilicate rocks and foliated porphyritic granitoids. These units, excluding the foliated porphyritic granitoids, are metamorphosed in upper amphibolite facies with a weak retrogression at greenschist facies conditions.

The main structural feature is a strong mylonitic foliation (Sn), oriented NE-SW and dipping ~30° towards NW. The stretching lineation associated to Sn is oriented NNE-SSW, gently dipping to both directions. Kinematic indicators suggest sinistral sense of movement with the top to the SSW.

Geochemical studies revealed two groups of granite gneisses, one perquartzous and the other with $60 < SiO_2 < 70$, but both sodi-calcic with $Na_20/K_20 > 1,5$, evidencing properties of TTG metagranitoids, possibly indicative of Archean protoliths. Subordinated felsic mylonites showed distinct geochemical characteristics when compared with each other and with the granite gneisses, pointing to different origins. Pseudoconcordant pegmatitic veins with high Ba and low Pb may have been produced by initial partial melting of the granitic gneisses during late stages of mylonitization. Mylonitic leucocratic granite with low Ba and high Pb, possibly was derived from highly differentiated granitic magma, of unknown origin, that intruded the premylonitic protoliths of the granite gneisses.

The foliated porphyritic granitoids are intrusive in the granite gneisses unit and are characterized by oriented euhedral to subeuhedral phenocrysts of K-feldspar (~5 cm) and antiperthitic plagioclase (~1 cm) and medium to coarse-grained matrix, varying from monzogranite to granodiorite in composition. In these rocks, the major mafic minerals comprise green amphibole, biotite and opaque minerals. Microgranular mafic enclaves, classified as diorite, are common and usually appear stretched concordant with the magmatic foliation. Mingling structures of porphyritic granitoids with mafic magmas were also observed.

First geochemical data of these granitoids were discussed by Meira (2014) in a comparative context of the Ediacaran post-collisional granitic magmatism in the CRB. They are in agreement with generally extensional tectonics, possibly as early magmatic stages of the Ediacaran-Cambrian Rift System of Southeastern South America. Additional geochemical and geochronological studies of the Ilhabela foliated porphyritic granitoids are in progress for further comprehension of this magmatism and the Precambrian geology and crustal evolution of this part of West Gondwana.

Reference:

Meira, V. T., 2014. Evolução tectono-metamórfica neoproterozóica dos Complexos Embu e Costeiro no contexto de formação do Gondwana Ocidental (leste do estado de São Paulo). Tese de Doutoramento, IGc, Universidade de São Paulo. 348 p.

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