Flow-pattern analysis in syntectonic granitoids from the Dom Feliciano Belt, SE-Brazil

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The Dom Feliciano Belt is most promising for studying effects of melt injections into a deforming continental crust. In the Itapema region, ~80 km north of Florianopolis, two syntectonic granitoids subsequently intruded a low-strain region – Neoproterozoic volcanosedimentary schists and Paleoproterozoic granites and gneisses – bounded by two major, NE-trending, strike-slip zones, both considered as part of the Neoproterozoic III Southern Brazilian Shear Belt. The younger Rio Pequeno granite is porphyritic and, therefore, suitable for the analysis of synmagmatic structures. The general absence of significant solid-state deformation enables magmatic flow structures to be preserved, such as: (i) a weak, S-C type flow foliation, (ii) synmagmatic shear zones, both structures marked by the distribution and alignment of K-feldspars, (iii) elongated mafic microgranular enclaves. In addition the lack of corresponding solid-state deformation structures in the wall rocks argue for a low differential regional stress during melt intrusion. Mafic microgranular enclaves in the cm-to-m-scale, with long axes up to 5 m are interpreted as mingling features. A system of two synmagmatic conjugate shear zones is observed. The more strongly developed set occurs as up to 5 m long and 10 cm wide, subvertical and E-W to ENE-WSW trending zones with dextral shear sense. The zones of the second set are shorter, NE-SW to NNE-SSW oriented, with a sinistral shear sense. In addition to magmatic microfractures in feldspars, chessboard subgrain patterns in quartz and plagioclase recrystallized grains with 0.5–1 mm diameters indicate high-T deformation. These features, together with the lack of lower-temperature deformation, argue for melt crystallization in a regional low differential stress field. Flow patterns and crystal distributions have been analyzed on the basis of modern methods of fractal geometry, specifically designed for unraveling local pattern inhomogeneity and anisotropy. Future work is intended to increase the structural data basis and reveal more details of the relationship between the melt injections, the regional stress field and the large-scale shear zone pattern of the Dom Feliciano Fold Belt and, consequently, provide a better understanding of its late-Proterozoic development.