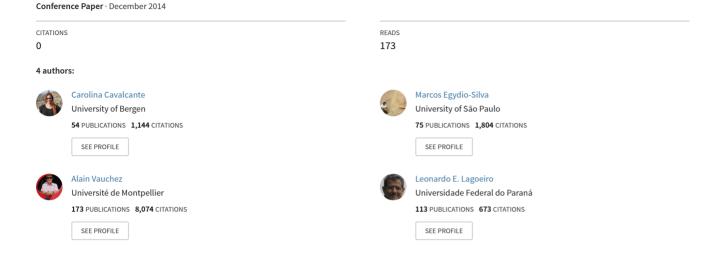
RHEOLOGY AND DEFORMATION MECHANISMS IN A HIGH TEMPERATURE SHEAR ZONE FROM A MICROSTRUCTURAL AND CRYSTALOGRAPHIC PREFERRED ORIENTATION APPROACH: AN EXAMPLE FR....





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RHEOLOGY AND DEFORMATION MECHANISMS IN A HIGH TEMPERATURE SHEAR ZONE FROM A MICROSTRUCTURAL AND CRYSTALOGRAPHIC PREFERRED ORIENTATION APPROACH: AN EXAMPLE FROM SE BRAZIL

Geane Carolina Cavalcante¹, Marcos Egydio-Silva¹, Alain Raymond Vauchez² and Leonardo E. Lagoeiro³, (1)USP University of Sao Paulo, São Paulo, Brazil, (2)University of Montpellier II, Montpellier Cedex 05, France, (3)UFOP-Federal University of Ouro Preto, Department of Geology, Ouro Preto, Brazil

Abstract:

The Ribeira belt, located in southeastern Brazil, was formed during the Brasiliano (Pan- African) orogeny by the collision between the proto South American and African continents resulting in the amalgamation of Western Gondwana at around 670–480 Ma. Its northern termination displays a transcurrent shear zone network, the ~250 km long Além Paraíba-Pádua shear zone, which involves granulites, migmatites and granites facies mylonites deformed in transpression. A detailed microstructural and crystallographic preferred orientation (CPO) study of the rock-forming minerals is being undertaken to infer constraints on the rheology of continental crust during the nucleation and development of this shear zone. A variety of mylonites (from protomylonites to ultramylonites) have been analyzed by Electron Backscattering Diffraction (EBSD) in order to determine the CPO of minerals, especially quartz, feldspars, amphibole, pyroxene and biotite. High-grade mylonites often exhibit ribbon-shaped quartz, probably due to high temperature grain boundary migration. They frequently wrap around K-feldspar porphyroclast exhibiting undulose extinction and core-mantle structures that may be related to bulging and/or subgrain rotation recrystallisation. In these HT mylonites, plagioclase is dynamically recrystallized and form fine-grained layers alternating with quartz-ribbons. Hornblende porphyroclasts present strain shadows of opaque mineral. Medium to high-grade mylonites derived from each felsic and mafic granulite and migmatitic gneisses show plagioclase with undulose extinction and deformation twins, quartz grains with both ribbon and porphyroclast shapes (> 3mm in size), orthopyroxene and garnet as porhyroclast and porphyroblast, respectively, and strongly oriented biotite. CPO of quartz indicates that it was deformed through plastic deformation with the activation of prism {a}. Feldspar CPOs show concentrations of [001] close to the lineation, of [010] close to the pole of the foliation and of [100] close to the Y strain axis, sug

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