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High temperature deformation in the Neoproterozoic transpressional Ribeira belt, southeast Brazil

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The Neoproterozoic Ribeira belt is subdivided in two domains displaying contrasting tectonic characteristics. The northern domain is dominated by low-angle foliation and orogen-normal thrust tectonics. The southern domain displays a 1000 km long network of anastomosed transcurrent shear zones parallel to the belt. This contrast is interpreted as reflecting a continent-continent convergence almost normal to the margins in the northern domain and significantly oblique in the southern domain. The central, transitional, domain of the Ribeira belt displays the northern termination of the transcurrent shear zone network. In the 250 km long Além Paraíba-Pádua shear system, granulite facies mylonites deformed through transpression, crop out.

A detailed study has been made of the microstructure and Lattice Preferred Orientation (LPO) of the rock-forming minerals in order to better understand the deformation mechanisms active in the crust at high temperature. Plagioclase crystals are plastically deformed, displaying curved twins and cleavages, mechanical twins, and evidence of dynamic recrystallization. The LPO of plagioclase is consistent with activation of the (010) [100] and (010) [001] slip systems. The LPO of ortho-pyroxene and amphibole also suggest that these minerals have been deformed through dislocation creep with the activation of the (100) [001] slip system. Quartz in the granulite mylonites displays evidence of extensive growth through grain boundary migration. The LPO of quartz is therefore the result of a static transformation of an initial, synkinematic LPO, and cannot be interpreted in terms of deformation mechanisms active during mylonitization.