

COHERENT CRUST AND UPPER MANTLE DEFORMATION AROUND A CRATONIC CORE: EVIDENCE FROM SURFACE GEOLOGY, NUMERICAL MODELING AND SHEAR WAVE SPLITTING.

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The Ribeira and Brasilia Neoproterozoic belts in Brazil formed along the eastern and western edges of the São Francisco craton respectively. At the southern tip of the craton, the NW-trending Brasilia belt is intersected by the slightly younger, NE-trending wrench-faulting dominated Ribeira belt. Northward, the Ribeira belt curves to almost N-S and is characterized by a low-angle foliation associated to thrusting toward the craton. Both wrench-faulting and thrusting are broadly coeval with a granulitic metamorphism. Numerical modeling of the deformation of a lithospheric plate involving a stiff block has shown that the transition from wrench-faulting to thrusting within the Ribeira belt, as well as the cross-cutting relationships between the Brasilia and Ribeira belts, may be due to the termination of the São Francisco craton. It also suggests that the deformation of the lithospheric mantle is coherent with the crustal deformation. This implies that the upper mantle fabric and resultant seismic anisotropy should correlate positively with the surface geology. Shear wave splitting measurements around the southern termination of the São Francisco craton suggest a good correlation between the orientation of the fast split shear wave polarization plane (f) and the orogenic grain. In the southern Brasilia belt f trends NW. In the southern Ribeira belt, wrench-faulting dominated, f trends ENE. Northward, where occurs the transition from orogen-parallel wrench-faulting to orogen-transverse thrusting, f shifts from NNE to WNW, i.e., from parallel to perpendicular to the structural trend of the belt.. This hints to a costructuration of the mantle and the crust.