

32nd IGC - Florence, 2004**Abstract title**

THE ROLE OF FRONTAL AND OBLIQUE TECTONICS IN THE AMALGAMATION OF THE WESTERN GONDWANA

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Keywords

Pan African

Brasiliano

Neoproterozoic

Abstract

The Brazilian shield is made of some Archean and Paleoproterozoic cratonic nuclei surrounded by Pan-African Brasiliano mobile belts of Neoproterozoic ages. These mobile belts have a typical curvilinear geometry surrounding the cratons, from which it was difficult figure out a simple kinematic picture. Some of these mobile belts display a typical frontal collision tectonic style. Examples are the Araçuaí and Brasília belts, striking NNE on both sides of the São Francisco Craton. Others, such as the Ribeira and Borborema belts, are dominated by transcurrents regimes, with NE or ENE directions, suggesting oblique collision systems. Here an attempt is made to determinate the mean orientation of the principal horizontal compressive stresses for each belt, considering either the frontal or oblique convergence character. In the Ribeira and Borborema belts the tectonic fabrics are characterized by dextral ductile to ductile/brittle transcurrent shear zones, with the development of mega S/C structures and subsidiary conjugate sinistral NS shear zones. The stretching lineations are mainly ENE with subhorizontal dip, although early oblique NW lineations associated with thrusts are also observed. On the other hand in the Araçuaí and Brasília belts the tectonic pattern shows frontal thrusts with vergence to the Sao Francisco Craton, with stretching lineations normal to the belts. The Paraguai Araguaia belt is coherent with this same pattern, representing frontal collisions against the Amazon Craton, as in Africa the Congo Belt in Africa represents a frontal collision to the Congo Craton. The Kaoko belt in Africa with sinistral transcurrent regimes fit into this general scheme as it is parallel with some sinistral NS shear zones in the Ribeira Belt, considering the usual Gondwana reconstructions. From these general observations, it is possible to propose a picture with WNW - ESE to NW - SE directions of principal compressive stress, and we suggest this represents the mean displacements vectors, according with a coherent kinematic picture for the amalgamation of this Gondwana sector, with WNW - ESE to NW - SE main directions of closure.

ACCEPTED as Poster Presentation**in session: "T31.01 - Tectonics of Precambrian mobile belts"**