

TOPOGRAPHIC AND STRUCTURAL EXPRESSIONS OF ONGOING COMPRESSION ACROSS INTRAPLATE SOUTH AMERICA : OBSERVATIONS AND NUMERICAL MODELING

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The South American plate (SAP) is now in horizontal compression and shortening. This is shown by stress data compilations, intraplate stress field numerical models and space-based geodetic results. The compression/shortening is probably due to the interactions amongst the SAP and the neighboring plates and with the asthenosphere as well. The integrated visualization of plate-scale tectonics, topography /bathymetry, gravity, continental geology, seismicity, stresses, active deformation, seismically derived Moho depths and P and S wave velocity anomalies has shown a number of observations related to the ongoing compression.

The Euler equator of the Neogene convergence between the SAP and the Nazca plates bisects the Andean topography and the underlying slab. This equator is roughly coincident with a chain of positive isostatic anomalies crossing the plate, from the Central Andes to NE-Brazil. This chain concentrates seismicity, is the major plate divide, delimiting two different geotectonic, gravity and topographic domains. Implication is that strong mechanical links exist between the convergence, the Andean tectonics and the intraplate deformation.

Large wavelength lithospheric folding is observed along a profile between the Central Andes and SE-Brazilian Coastal ranges: an antiform (the flooded Pantanal) is found to the west whereas a synform (the highlands of the Paleozoic Parana basin) is found to the east. Seismicity concentrates between the two structures. 2-D numerical modeling was successful in qualitatively replicating the observed deformation.