

INTRAPLATE STRESSES IN SOUTH AMERICA: DATA AND MODELS

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Intraplate stresses are important constraints on the models of plate driving forces and lithosphere/asthenosphere interaction. Focal mechanisms, recent geological faultings, and breakout orientations are beginning to reveal the main features of the intraplate stresses in continental South America. Compressional and strike-slip regimes predominate, except for the Andean plateau where normal stresses prevail. A regional, more uniform component of the stress field can be observed in most of the continent. However, local stresses due to crustal heterogeneities can have the same order of magnitude as the regional component, causing significant deviations in the direction of the observed stress field. In the sub-Andean region, E-W oriented compressional stresses are perturbed by spreading effects of the Andean plateau. In the mid-plate region of Brazil, despite the few available data, the following pattern seems to emerge: E-W compression in eastern Brazil, and SE-NW compression in western Brazil, tending to N-S compression in the Amazon. This first order pattern could be due mainly to plate-boundary forces. Large deviations are observed along the Atlantic coast where local flexural stresses in the continental shelf can overcome the regional stress. Stress data from inversion of fault slip of recent (mainly Holocene) geological faulting in Brazil is generally consistent with the geophysical data, except for the Parana basin. The geological data, on the other hand, reveals quick temporal changes of stress regime during the Quaternary. The implications of these results for the plate driving mechanisms will be discussed.