



Evidence for post-rift reactivation in SE Brazil

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There is mounting evidence that the Atlantic margin of SE Brazil has been tectonically active since continental break-up. The evidence comes from stratigraphic analysis, structural studies, and thermochronological dating. Cobbold et al. (2001) reviewed evidence for tectonic activity since the Late Cretaceous and Riccomini et al. (2004) described structures in the Tertiary basins onshore. Furthermore, Eocene alkaline plutons are currently at exposure in SE Brazil, implying at least of 1 to 3 km of later exhumation.

To investigate post-rift reactivation, we have combined a thermochronological study, by fission tracks and (U-Th)/He on apatite, with a structural study of the Taubaté and Resende basins. The first thermochronological results indicate a major phase of cooling during the Late Cretaceous to Early Tertiary, implying an exhumation of 2 to 4 km throughout the region (Cogné et al., submitted). This phase is synchronous with independent onshore and offshore evidence for tectonic movement in SE Brazil.

We have recently revisited the main roadside outcrops and quarries in the onshore Taubaté and Resende basins, which follow the valley of the Paraíba do sul river, between two mountain ranges on the uplifted continental margin of SE Brazil. One of our objectives was to discriminate between (1) thin-skinned faulting and syn-sedimentary deformation of gravitational origin, and (2) thick-skinned deformation involving crystalline basement. For most outcrops of Eocene to Oligocene sedimentary rocks, syn-sedimentary faults are mainly normal (extensional). In contrast, for outcrops involving syn-sedimentary normal faults between basement and Eocene to Oligocene strata, three show significant strike-slip components. We also notice that for five outcrops, basement has overthrust Tertiary strata. We infer possible transpressive reactivation during the Neogene, comparable with a period of cooling inferred in the temperature history for some of the analysed samples.

At the scale of South America, there is a striking synchronicity between deformation phases in SE Brazil and those in the Andes, which has led us to consider a probable tectonic relationship between reactivation of the "passive margin" of SE Brazil and development of the Andes.

References

- Cobbold, P., Meisling, K., and Mount, V. 2001. Reactivation of an obliquely rifted margin, Campos and Santos basins, southeastern Brazil. *American Association of Petroleum Geologists Bulletin*, 85, 1925-1944.
- Riccomini, C. Sant'Anna, L. Ferrari, A., 2004. Evolução geológica do Rift Continental do Sudeste do Brasil, in: Mantesso, Neto, V., Bartorelli, A. Carneiro, C.D.R., Neves, B., (eds) *Geologia do Continente Sul-Americano*, Sao Paulo, 383-405.