

REACTIVATION OF AN OBLIQUELY-RIFTED MARGIN, CAMPOS AND SANTOS BASINS, SE BRAZIL

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We interpret and document Late Cretaceous and Cenozoic reactivation of older structures on the obliquely-rifted margin of SE Brazil, attributing them to the combined effects of far-field stresses and hot-spot activity. Our conclusions are based on current seismicity, digital topography, fission-track ages, gravity data, regional reflection seismic profiles, and well data. Our results have important implications for risk factors associated with deep-water exploration plays, especially the prolific Early Cretaceous lacustrine petroleum system of the Campos and Santos basins.

Onshore, widespread crustal seismicity indicates a current transpressional stress regime. The Moho is 37 to 42km deep, and neotectonic fault-block tilting has resulted in mountain ranges up to 2700m high and extensive river capture. Based on fission-track data, uplift and denudation are Cretaceous and Eocene in age. A series of Tertiary continental pull-apart basins, developed during Paleogene right-lateral transtension, have become inverted during Neogene right-lateral transpression. Alkaline mafic intrusions of Late Cretaceous to Paleogene age, caused by the Trindade hotspot, were emplaced along reactivated Neocomian strike-slip faults and transfer zones.

Offshore, current seismicity is concentrated along Neocomian transfer zones trending NW-SE. The locus of clastic fan deposition shifted during Late Cretaceous and Tertiary times, because of onshore uplift and drainage reorganization. Cretaceous sediments were folded, tilted, eroded and unconformably overlapped above a reactivated Neocomian Moho uplift, to produce an accentuated nearshore hinge-line. Neocomian transfer zones were reactivated during ongoing sedimentation, accompanied by abundant volcanism and deep-seated folds attributed to lithospheric buckling. Regional tilting resulted in thin-skinned deformation above Aptian salt.