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Structural Configuration, Rifting tectonics and Preexisting Basement Framework at the Southeastern Brazilian Margin

Natasha Stanton (1) and Renata Schmitt (2)

(1) Observatorio Nacional, Geophysics Department, Rio de Janeiro, Brazil (naty_stanton@hotmail.com), (2) Rio de Janeiro Federal University (renatagondwana@uol.com)

The southeastern Brazilian margin exhibits a structural configuration that reflects its tectonic evolution during the Mesozoic break up of Gondwana supercontinent. The offshore structures are mainly NE-SW oriented, i.e. subparallel to the adjacent basement (The Ribeira Belt) framework orientation. Nevertheless, between Campos and Santos Basins, the coastline, hingeline and rifting structures differ from the previous statement, following an E-W direction. This break on the structural pattern implies an oblique rifting, probably accompanied by transtensional tectonics, arising different hypotheses concerning its origins. Based upon magnetic, gravity and onshore structural data we investigated the continental and proximal marginal structures, in an attempt to understand the role played by preexisting basement structures versus Mesozoic tectonic deformation on the rifting process and margin formation.

Widespread magmatism accompanied the rifting process giving origin to dykes swarm (130 my), which helped to constrain the age of the continental by cross cutting-relationships in the field. These Mesozoic magmatic features intruded the continental basement displaying mainly an NE-SW direction, and indiscriminately affected tectonic units with distinct internal grain, composition and previous structural orientation. The magnetic analysis showed that, despite the fact that these magmatic conduits, represented by positive lineaments, accomodated a considerable ammount of extension during rifting, they only affected the crust superficially (less than 5 km depth). The residual gravity map suggests a crustal thining towards the coast, as proposed before by Assunção et al. (2002), with the a pattern coherent with the magnetic and structural change in the structural configuration. These results may imply that even if the rifting structures developed subparallel to ancient onshore structures, the continental basement, at specific regions, was deformed regardless preexisting weakness zones and discontinuities. The breakup line did not follow everywhere the Precambrian sutures zones, but probably was a response to the tensors geometry active during the rift phase. This mechanism resulted in an oblique rifting, giving origin to the E-W structures. We propose an association between preexistent continental architecture and the pattern of deformation active during the Early Cretaceous, as responsible for the break up geometry and the oblique marginal structures formed in consequence. These results may provide important constraints on continental breakup process of the margin and the relative important of factors on sedimentary basin formation.