



Crustal Study on the southeastern Brazilian Margin using magnetic data

N. Stanton (1,2), R. Schmitt (1), A. Galdeano (3), M. Maia (2), and M. Angelo Mane (1)

(1) Rio de Janeiro State University (Brazil) (naty_stanton@hotmail.com), (2) Institute Universitaire Europeen de La Mer (France), (3) Institute de Physique du Globe de Paris (France)

The magnetic character of the Southeastern Brazilian Margin was investigated based on aeromagnetic and World Digital Magnetic Anomaly Map (WDMAM) datasets. The observed anomalies were correlated with the Precambrian-Eo Paleozoic continental basement and the marginal structures, aiming to provide an overall view of possible onshore-offshore structural relationships and the regional crustal architecture. We used transformed maps to enhance the magnetic response of deeper structures, in order to better characterize the crustal structure, constraining the presence of discontinuities, intrusions and magmatism at different levels. In large scale, the magnetic anomalies revealed offshore positive lineaments, well correlated with the main rifting structures orientation. These magnetic highs follow a NE-SW trend at Santos and Campos Basins, but assume an E-W direction between 23° and 24°S, showing the same pattern displayed by the coastline, hinge line and main basin faults orientations. A possible presence of magmatic rocks, associated with the rifting related grabens is proposed to explain the positive anomalies, which is supported by the high residual gravity anomalies observed on this portion of the margin. In a more detailed analysis revealed by the aeromagnetic anomaly map, the continental basement is characterized by N45E and N30E magnetic trends, related to both preexisting structures of Ribeira Orogenic Belt and the newly formed Mesozoic features. The latter are mainly represented by tholeiitic dyke swarms, 120-130 Ma old.

We conclude that the magnetic anomalies are well correlated with the continental and oceanic basement structures, revealing the presence of onshore deep suture zones, anomaly areas which are probably related to intrusions, and main structural trends. The magnetic-structural pattern observed points out similarities and discrepancies between onshore and offshore provinces which may add new constraints on the relative importance of basement architecture on margin formation. Such results suggest that rifting probably reactivated preexisting continental discontinuities, represented by NE-SW fault systems, used as magmatic conduits for the dykes. Nevertheless, the extensional deformation process was not controlled by it; rather it seems to have been conditioned by the geometry of tectonic plates in relation to the stress tensors during the margin formation.