# Low T thermal history and evolution of the Rio de Janeiro region of the Brazilian southeastern continental margin

J. N. GEZATT[1],R. STEPHENSON[1], A. CARTER[2], D. I. M. MACDONALD[1]

[1] Department of Geology and Petroleum Geology, University of Aberdeen, King's College, Aberdeen, AB24 3UE, UK.

[2] Department of Earth and Planetary Sciences, Birkbeck College, Malet Street, London, WC1E 7HX, UK.

The apatite fission track (AFT) ages for twenty-one samples collected from the transect between the cities of Rio de Janeiro and Três Rios (22°54'S, 43°12'W and 22º 07'S, 43º 12' 33"W, respectively) range between 98.5±11.9 and 54.1±4.2 Ma. Ages are younger towards the coast and increase progressively towards inland. Highest samples (around 1500 m above sea level) have older AFT ages. However, a wide amplitude of age distribution has not been found on the area. This contrasts with the large AFT age range found by other studies in adjacent portions of the Brazilian continental margin, where age ranges up to about two hundred million years from the coast to the innermost sample in the continent have been reported. Corrected apatite He ages for two of the samples along the section help further constrain the low temperature thermal history of the area. Sample JG-01, on the coast, shows an AHe age of 72.9±5 Ma (AFT age 70.1±2.5 Ma), while the the furthest sample inland (200 km from JG-01), RJ-37, has AHe age of 81.6±4 Ma (AFT age 95.0±3.6 Ma).

Samples with more than 50 confined track lengths were modelled using software QTQt and HeFTy, to find a simple thermal history for the area. Most of the cooling trajectories show a rapid uplift starting between 100 and 76 Ma and a significant reduction of the cooling rate between 60 and 40 Ma. The Late Cretaceous cooling event is attributed to a rapid uplift linked to rifting and break up of the Atlantic Ocean. The Paleogene inflections in the cooling trajectories may be related to the tectonic reactivation and formation of the Cenozoic Rift System of Sourtheastern Brazil. Models made using combined AFT and AHe data support such an interpretation.

The low temperature record of the Rio de Janeiro - Três Rios section of the Brazilian southeastern continental margin implies a straight-forward thermal history of the area's rift and post-rift evolution. This contrast with those found for surrounding areas. The observed variability of thermal histories and low T age distributions throughout the continental margin of SE Brazil are accordingly attributed to the strong N-NE/S-SW structural compartimentalization of Neoproterozoic basement rocks and extensional rift related transfer zones.