POST-RIFT EVOLUTION OF THE ONSHORE MARGIN IN THE SERRA DO MAR (SE-BRAZIL) USING APATITE FISSION TRACK AND (U-TH)/HE AGES

Marli C. Siqueira Ribeiro[1], Peter Hackspacher[1], Finlay M. Stuart[2]

[1]Instituto de Geociências e Ciências Exatas da Universidade Estadual Paulista- IGCE/UNESP, Rio Claro, Brasil.
[2] Isotope Geosciences Unit, Scottish Universities Environmental Research Centre, East Kilbride G75 0QF, UK

RESUMO: Onshore evolution in this Serra do Mar (SM) is related to the complex tectono-magmatic evolution since the break-up of Western Gondwana and opening of the South Atlantic Ocean in Early Cretaceous. Evidences post-rift reactivation in the onshore Precambrian basement presents a series of Late Cretaceous of the uplifting of a proto-(SM) supplying a siliciclastic inflow into the Santos basin and the intrusion of the several alkaline complexes and dyke swarms. In the Paleogene the reactivation of the main Precambrian shear zones caused of evolution of the southeastern Brazilian continental rift (SBCR) and a new pulse of magmatism, with ankaramitic flows in the Volta Redonda and Itaboraí basins, dated 48 and 44 Ma in south of Rio de Janeiro state. Offshore margin in the Santos basin, seismic and stratigraphic studies indicated the tectonic reactivation during the Late Cretaceous and Paleogene, as well as the Neogene. Onshore margin studies described by succession of weathering types identified in mantle profiles during the Neogene suggesting a correlation between of weathering and uplift phases in the plateaus adjacent to SBCR.

In order to clarify the intensity and duration of the post-break up tectonic processes that shaped the SM we have undertaken a low temperature thermochronology study of crystalline basement, from the plateaus and escarpments situated between south of Rio de Janeiro and São Paulo state. Apatite fission track (AFT) and a suite of new (U-Th/He) and (AHe) dating have been combined with geologic information to generate precise thermal histories and make initial attempts to quantify the amount of exhumation.

AFT ages range from 145 to 53 Ma whereas preliminary AHe ages range from 75 to 37 Ma. Forward modeling confirms the Late Cretaceous-Paleogene cooling and another distinct cooling phase in Neogene between 30 and 10 Ma. The Late Cretaceous-Paleocene cooling episode cross the entire plateaus in two major trends: (1) initial onset of erosion ~80 Ma of the throughout SM, followed by (2) exhumation process in the Late Paleocene to Early Eocene. The Neogene cooling phase is not homogeneous over the whole area in the first modeling combining AFT and AHe data. The Early Miocene cooling phase affected the SM southern rim and surrounding of the Volta Redonda basin in Rio de Janeiro state mainly. In this case, we assume this cooling phase was promoted of the normal faulting re-activation following the significant uplift of its flanks and consequent incision and the widening valleys in this section of the SM.

KEY-WORDS: APATITE FISSION TRACKS, (U-TH-SM)/HE, SERRA DO MAR