



The alkaline complex of Jacupiranga, Brazil: A key location for the South Atlantic “Passive” Continental Margin

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Being situated on the edge of the South Atlantic “Passive” Continental Margin, the alkaline intrusion of Jacupiranga, SE Brazil is a key location to understand the post-rift evolution of this continental margin. Thermochronological methods lead to the quantification of the post-intrusive thermal and exhumation history of the alkaline complex which intruded the Neoproterozoic metamorphic basement at 134.9 ± 1.3 Ma (Shrimp U-Pb zircon, Chmyz et al., 2017) at a depth of 2 - 3 km. Apatite and zircon fission-track data (AFT, ZFT) were revealed by analyzing 22 and 4 rock samples, respectively. In addition, 4 samples gained apatite and zircon (U-Th-Sm)/He data (AHe, ZHe). Published geological data were used to generate a temperature evolutionary model. This T-t-model was tested against the thermochronological data set by using the software code HeFTy (Ketcham, 2007). AFT ages of the intrusive rocks range from 98.4 ± 6.3 Ma to 76.4 ± 7.4 Ma. Apatites of two alkaline dykes revealed ages of 58.4 ± 5.1 Ma and 52.3 ± 4.3 Ma, respectively. One Neoproterozoic gneiss sample taken close to the intrusion exhibits an AFT age of 69.1 ± 4.9 Ma. Only one zircon sample from an alkaline dyke revealed reliable data to calculate a ZFT age of 56.8 ± 4.9 Ma, which is similar to the AFT age of the same sample, indicating a fast cooling of the dyke at about 56 My. ZHe ages range from 95.7 ± 7.7 Ma to 58.2 ± 4.7 Ma, whereas AHe ages range from 66.9 ± 5.3 to 30.4 ± 2.4 Ma. The numerical modeling using HeFTy indicates a fast cooling from intrusion age to 90 Ma which is interpreted as the cooling of the intrusion to the crustal temperature at the intrusion level. Thereafter, a slow and constant cooling reached 25 -30 °C at about 55 Ma. A minor reheating up to 40 °C followed. Surface temperature was reached 1-2 Ma ago. Summarizing the results lead to an erosion of about 2 km from Lower Cretaceous to Miocene. The final erosion of the alkaline complex took place since the Miocene. Furthermore, Eocene to Oligocene reheating up to 40 °C that has been discussed in several papers (Zalan & Oliveira, 2005) for the area east of São Paulo seems to be possible also for the intrusion.