Geophysical Research Abstracts
Vol. 14, EGU2012-867, 2012
EGU General Assembly 2012

Denudation history of Cretaceous intrusions on both sides of the South Atlantic, Brazil – Namibia.

J. de Souza Silva (1,2), U. Glasmacher (1), and P. Hackspacher (2)

(1) Institute of Earth Sciences, Research Group Thermochronology and Archaeometry, Heidelberg University, INF 234, 69120 Heidelberg, Germany, (2) Institute of Geosciences and Exact Sciences, University of the State of São Paulo, UNESP, Rio Claro/SP 13506-900, Brazil

On both sides of the South Atlantic Cretaceous intrusions are a distinct geomorphologic feature. The Late Cretaceous Poços de Caldas (PCAM, ∼83 Ma intrusion age) is a nearly circular alkaline massive west of the Serra do Mar in Brazil. In the interior, the topography of the PCAM is characterized by a plateau-like surface at about 1300 m.a.s.l. Towards the surrounding Proterozoic metamorphic rocks the elevation decrease by 600 m rapidly (steep flanks) towards ∼700 m a.s.l. The Early Cretaceous Brandenberg metaluminous to peralkaline igneous complex (BIC, ∼132 Ma, Schmitt at al., 2000) is located in north-western part of Namibia. The plateau-like interior reaches an elevation of more than 2570 m a.s.l., which is about 1800 m above the surrounding Proterozoic metamorphic rocks.

Five apatite fission-track (AFT) samples of the PCAM range in age from 69.0 (4.4) Ma to 42.7 (3.4) Ma. Eleven AFT samples of the BIC range from 98 (9) Ma to 69 (4) Ma (Raab et al., 2005). Whereas, the BIC AFT-ages indicate decreasing ages with decreasing elevation all samples from PCAM have within error the same ages at different elevations. The youngest age is an exception and related to different processes. The age-elevation relationship of the PCAM indicates a fast denudation of ∼0.35 km/Ma at around 60 Ma. Between ∼ 60 Ma and ∼ 40 Ma this denudation rate changed into a very slow denudation of 0.005 km/1 Ma. In contrast, the BIC AFT-ages indicate a moderate cooling history leading to a denudation rate of about 0.12 km/Ma during the time interval 80 Ma – 60 Ma in the Late Cretaceous, these FT data are consistent with the offshore seismic data interpretation (Clemson et al., 1997). The initial denudation of this area (BIC) commences approximately 10 Ma earlier in the Late Cretaceous than the reactivation of Omaruru-Lineament/Waterberg-Thrust at approximately 70 Ma (Raab et al. 2002)

Furthermore, data are presented that indicate a very complex denudation history since the solidification of the alkaline magma of PCAM. The timing of the very slow denudation of PCAM equals the suggested formation time (Upper Cretaceous to Early Palaeogene transition) of the South American Planation Surface and might stimulate discussions related the age of the South African and South American Surfaces (King 1956, 1967).