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Long-term evolution of the western South Atlantic passive continental margin in a key area of SE Brazil revealed by thermokinematic numerical modeling using the software code Pecube

Christian Stippich (1), Florian Krob (1), Ulrich A. Glasmacher (1), and Peter C. Hackspacher (2)

(1) Heidelberg University, Institute of Earth Sciences, Thermochronology and Archaeometry, Heidelberg, Germany (christian.stippich@geow.uni-heidelberg.de), (2) Instituto de Geociências e Ciências Exatas da Universidade Estadual Paulista - IGCE/UNESP, Rio Claro, Brasil

The aim of the research is to quantify the long-term evolution of the western South Atlantic passive continental margin (SAPCM) in SE-Brazil. Excellent onshore outcrop conditions and extensive pre-rift to post-rift archives between São Paulo and Laguna allow a high precision quantification of exhumation, and rock uplift rates, influencing physical parameters, long-term acting forces, and process-response systems. Research will integrate published1 and partly published thermochronological data from Brazil, and test lately published new concepts on causes of long-term landscape and lithospheric evolution in southern Brazil. Six distinct lithospheric blocks (Laguna, Florianópolis, Curitiba, Ilha Comprida, Peruibe and Santos), which are separated by fracture zones1 are characterized by individual thermochronological age spectra. Furthermore, the thermal evolution derived by numerical modeling indicates variable post-rift exhumation histories of these blocks. In this context, we will provide information on the causes for the complex exhumation history of the Florianópolis, and adjacent blocks.
The climate-continental margin-mantle coupled process-response system is caused by the interaction between endogenous and exogenous forces, which are related to the mantle-process driven rift – drift – passive continental margin evolution of the South Atlantic, and the climate change since the Early/Late Cretaceous climate maximum. Special emphasis will be given to the influence of long-living transform faults such as the Florianopolis Fracture Zone (FFZ) on the long-term topography evolution of the SAPCM's. A long-term landscape evolution model with process rates will be achieved by thermo-kinematic 3-D modeling (software code PECUBE2,3 and FastScape4). Testing model solutions obtained for a multidimensional parameter space against the real thermochronological and geomorphological data set, the most likely combinations of parameter rates, and values can be constrained. The data and models will allow separating the exogenous and endogenous forces and their process rates.

References

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