

Pan-African shear zones in the Kaoko Belt (Namibia) and links across Southwestern Gondwana: Neoproterozoic evolution and Phanerozoic reactivation

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RESUMO

This research aims to contribute to the understanding of the tectonic and geodynamic evolution of southwestern Gondwana, from its amalgamation in the Neoproterozoic to its break-up in the Cretaceous. It is focused on the long-term tectonic activity of the network of shear zones of the Kaoko Belt in northwestern Namibia. The deformation history of these structures during the Pan-African orogenic cycle will be reconstructed using a multi-method geochronological investigation including U-Th-Pb and K-Ar and Ar/Ar geochronology in multiple minerals. The geochronological research is grounded on detailed structural observations in the field and in microscale, aiming to compare the evolution history of these Shear Zones with the main regional events of the orogeny. The resulting evolution in southwest Africa will then be compared with that of equivalent tectonic features in southern South America, leading to the construction of a tectonic model of the amalgamation of southwestern Gondwana. In addition, this project aims to evaluate the impact of the reactivation of these structures on the regional exhumation during the Phanerozoic, particularly during the period of ca. 400 Myr between the Neoproterozoic orogeny and the Cretaceous continental break-up. In order to do so, different thermochronological methods in the temperature range of 300-100 °C will be combined, focusing in the reconstruction of regional thermal histories through a combination of (U-Th)/He and K-Ar geochronology in multiple mineral phases. By combining both approaches, the impact of structural reactivation during exhumation and surface processes will be evaluated. The resulting long-term tectonothermal history of the shear zones and their influence in the regional exhumation will be contextualized and compared with adjacent units in Africa and its South American counterparts, enabling the establishment of correlations across southwestern Gondwana. Preliminary results include field observations, petrological reconnaissance and the collection and preparation of a complex set of samples containing varied mineralogy for geochronological analyses from different structural domains of the Kaoko Belt, as well as a detailed dataset of (U-Th)/He analyses in zircon and apatite that is complemented by single-crystal mapping of zircon using Raman spectroscopy.

Palavras-chave: shear zones; Brasiliano/Pan-African Orogenic Cycle; structural reactivation.