



Meso-/Cenozoic thermal and inversion history of the Tarfaya Basin and provenance analysis of the basin fill (Morocco)

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The Tarfaya Basin is the northern part of the Tarfaya-Laâyoune-Dakhla Basin that extends over 1000 km along the western Saharan margin from the Mauritanian border to the Canary Islands in the north. The basin is bounded by the Mauritanide thrust belt and Precambrian Reguibat Arch in the SE–E and the Palaeozoic fold belt of the Anti-Atlas in the NE. A large amount of Mesozoic terrigenous sedimentary rocks are deposited in most of the basins along the continental margin of Morocco indicating a major episode of erosion occurred during the rift and early post-rift period in the Central Atlantic. In the Tarfaya-Laâyoune-Dakhla Basin, the Mesozoic to Cenozoic sedimentary cover reaches a thickness of up to 12 km. The presence of high surface elevations in the Anti-Atlas mountain belt (2700 m) indicates a potential source area for the surrounding basins, i.e. the Tarfaya Basin.

The present study was focused on the thermal and inversion history of the Tarfaya Basin, the provenance of the Meso–Cenozoic sedimentary rocks of the basin and additionally on the thermal and exhumation history of the Western Anti-Atlas. In order to characterize the t–T history, apatite and zircon fission-track dating, apatite and zircon (U–Th–Sm)/He dating and furthermore 2-D modelling with ‘HeFTy’ software has been carried out at Precambrian rocks of the Western Anti-Atlas and Cretaceous to Neogene sedimentary rocks from the Tarfaya Basin.

Thermochronological data and t–T path modelling indicate an inversion of the onshore Tarfaya Basin in the Palaeogene. The provenance analysis suggests an almost continuous sediment transport from the Anti-Atlas to the Tarfaya Basin and a simultaneous sediment input from the Reguibat Shield.