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# GEODYNAMIC EVOLUTION OF THE EASTERN ALPS: EVIDENCES FROM FISSION-TRACK GEOCHRONOLOGY IN THE RHENODANUBIAN FLYSCH ZONE

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The geodynamic evolution of the Eastern Alps is reconstructed by studying the provenance and thermotectonic history of the Rhenodanubian flysch and Ybbsitz klippen zone. The fission-track geochronology on zircon and apatite gives the opportunity to decipher these processes.

The study shows that from Cenomanian till Eocene times, two different depositional realms existed, the Main Flysch basin and the Laab basin. The origin of the sediments was deciphered with zircon fission-track geochronology and by classifying the zircons after their external morphology (Pupin method). The Laab basin received sediments from the European continental margin. A northern position relative to the Main Flysch basin is therefore attributed to the Laab basin. The source area delivering the Main Flysch basin were the evolving Alps with detritus from Austroalpine units. The zircon fission-track ages point to thermotectonic events affecting the hinterland of the basins. The Cretaceous ages reflect the cooling after Eoalpine metamorphism in the Austroalpine realm. The Permian to Jurassic ages are the result of thermotectonic processes due to the disintegration of Pangea. Paleogeographically spoken, three different situations are possible: (1) the Main Flysch basin belongs to the South Penninic realm and the Laab basin to the North Penninic realm, (2) both basins belong to the North Penninic realm, or (3) North and South Penninicum were no separated depositional areas in the Eastern Alps.

The Rhenodanubian flysch zone (RDFZ) represents an accretionary wedge with a rather complex thermal history due to successive and differential accretion and exhumation. The sedimentary sequence was deposited along a convergent margin. According to the apatite fission-track data accretion started before the Maastrichtian and lasted until the Miocene. The accretion prograded from a central area (Salzburg-Ybbsitz) to the west and east. In the west, the accretion continued in Middle Eocene to Early Oligocene times reflecting the underplating of the RDFZ by the European continental margin sediments. In the east, where three nappes (Greifenstein, Kahlenberg and Laab nappes) can be distinguished, the exhumation started in Late Oligocene to Early Miocene time. The Kahlenberg and Laab nappes suffered total resetting, and the Greifenstein nappe partial resetting. According to the new paleogeographic reconstructions, the Kahlenberg and Laab nappes were placed on top of the Greifenstein nappe by an out-of-sequence thrust.

The apatite fission-track data give evidence for a burial depth of at least 6 km for the samples, which experienced total resetting, but not deeper than 11 km, since the zircon fission-track data do not show resetting.

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