

## **The young exhumation and thermal history of the Kreuzeck basement complex (Eastern Alps) as inferred from apatite fission track and apatite (U-Th)/He thermochronometry**

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### Geological Setting

The Kreuzeck Massif is a part of the Austroalpine basement units south of the Tauern Window. The boundary between Kreuzeck Massif and the Penninic units is marked by the NW-SE striking Mölltal Fault Zone, which shows an apparent dextral offset in the order of 40 km [1]. Another prominent boundary is the Polinik Fault - a ductile-brittle shear zone parallel to the Mölltal Fault Zone. It separates two blocks with different exhumation history. We call them Polinik Block to the NE of the Polinik Fault and Kreuzeck Block to the SW of it. The aim of our study is to investigate the thermotectonic evolution of the southeastern part of the Tauern Window and the neighboring Austroalpine Units of the Kreuzeck Massif.

### Results

The Polinik Block and the neighboring Penninic units yield Miocene apatite fission track (AFT) ages (18 - 7 Ma), whereas the Kreuzeck Block shows Oligocene to the Early Miocene AFT ages (35 - 20 Ma). Thermal history modeling reveal fast cooling for both areas. In the Polinik Block a positive correlation between AFT age and elevation can be observed. Calculated exhumation rates of ~0.18 mm/year are in good agreement with previous results from the study area [2].

So far, four samples from Polinik Block and six samples from the Tauern Window have been dated by the (U-Th)/He dating method. The apatite (U-Th)/He ages range from 4.9 to 13.4 and 4.4 to 15 Ma respectively (uncorrected for alpha ejection), and they are younger than the according AFT ages. These data indicate that the Austroalpine Polinik Block experienced final cooling earlier (~10 Ma) than the Penninic unit north of the Möll Fault Zone (~ 4 Ma). This indicates an activity of the Mölltal Fault Zone with different exhumation to both sides in the Late Miocene. Our preliminary results show that the thermal history of the southeastern Tauern Window and different Austroalpine blocks experienced different late Alpine cooling histories during and after lateral extrusion ( [1] [3]).

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- [3] Ratschbacher, L., Frisch, W., Linzer, H.G., Merle, O., (1991) Lateral extrusion in the Eastern Alps. Part2. Structural analysis. *Tectonics* 10, 257–271.