

On the age of sinistral shearing along the southern border of the Tauern Window (Eastern Alps)

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The first-order structure of the western part of the Tauern Window consists of three upright, ENE-striking antiforms of large amplitude, whose flanks are overprinted by sinistral shear zones that strike parallel to the axial planes of the antiforms. We used the Rb/Sr method to determine the age of shearing along the sinistral Ahrntal shear zone at the southern border of the Tauern Window.

We dated four samples of tonalitic Zentral Gneiss: one from the inferred undeformed tonalite protolith, two from deformed tonalitic Zentral Gneiss and one from an outcrop-scale sinistral shear zone within the foliated tonalitic gneiss. Generally biotite and feldspar define isochrons for the four samples. The undeformed tonalite yields an age of 26.4 ± 0.1 Ma, the weakly deformed tonalite an age of 11.1 ± 0.1 Ma.

The strongly foliated tonalitic gneiss yields 19.8 ± 0.1 Ma, which is close to the age of the outcrop-scale shear zone of 18.0 ± 0.1 Ma. The 11 Ma age of the weakly deformed sample is difficult to interpret because it is significantly younger than the zircon fission-track ages from neighbouring areas. The older 26 Ma age for the undeformed tonalite sample is interpreted as a cooling age for temperatures below the closure temperature of biotite.

This age of deformation is consistent with the age determination of Glodny et al. (2008) from deformed marbles of the Schieferhülle, and with previous dating of sinistral shearing along the northern border of the western Tauern Window (Schneider et al. 2007), which yielded an average (n=5) age of 21.9 ± 1.6 Ma. Therefore, sinistral deformation appears to have affected both the northern and the southern margins of the Zentral Gneiss in the western Tauern Window at the same time.

References:

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