

Exhumation-related structures at the eastern margin of the Tauern Window (Eastern Alps)

Andreas Scharf¹, Silvia Favaro¹, Mark R. Handy¹, Stefan M. Schmid²

¹Freie Universität Berlin, Germany, ²ETH-Zürich, Switzerland: scharfa@zedat.fu-berlin.de

The Katschberg Shear Zone (KSZ) comprises a 3-5 km thick mylonite belt whose penetrative foliation (Sm) swings around a series of coeval antiforms (Hochalm, Sonnblick Domes) and a synform (Mallnitz). The eastern segment of the KSZ is a low-angle, SE-dipping, top-E to –SE ductile normal fault capped by a 10-100 m wide zone of cataclasites known as the Katschberg Normal Fault (KNF). At the N and S terminations of the KNF, the ductile KSZ acquires an orogen-parallel orientation within calc-schist (Bündnerschiefer of the Glockner Nappe). There, it lacks a cataclastic overprint and is characterized by a moderately to steeply dipping Sm with subhorizontal stretching lineations. The northern, E-W-trending branch exhibits dextral sense of shear, whereas the southern branch is sinistral and strikes NW-SE, i.e. subparallel to the brittle Mölltal Fault with predominantly dextral shear-sense indicators that overprint the Sm. The kinematic continuity of top-E to SE normal faulting along the KNF with ductile dextral and sinistral strike-slip motions at its ends, combined with the coincidence of the KNF with the greatest amount of tectonic omission around the Hochalm Dome indicate that N-S-shortening, strike-slip shearing and orogen-parallel normal faulting were broadly coeval.

The kinematics of the KSZ indicates that units in the Tauern Window underwent exhumation by both extensional unroofing and erosional denudation. Cooling ages constrain the KSZ to have formed between 25 and 17 Ma. Exhumation began with orogen-parallel extension, with initially flat-lying branches at the N and S ends of the KNF. As N-S shortening increased, these branches steepened and accommodated predominantly strike-slip motion. The steep parts of the KSZ represent stretching faults, with offset along them decreasing from E to W. This coincides with a decrease of N-S shortening and E-W extension towards the center of the Tauern Window. Dextral motion along the brittle Mölltal Fault post-dated the KSZ which ceased at about 17 Ma. The KSZ may pre-date a substantial part of the N-S to NE-SW directed indentation of the Adriatic micro-plate that was accommodated by continued and more intense upright folding in the W part of the Tauern Window, as well as by strike-slip motions along the Periadriatic Line and the SEMP line.