# Kinematics of the SEMP-fault in the western Tauern Window (Stillupp Valley)

***Poster***

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## Introduction

The working area is located in the Stillupp Valley (Tirol, Austria), where the western termination of the SEMP-fault (Salzach, Ennstal, Mariazell, Puchberg), overprints the northernmost margin of the Zentralgneiss. This sinistral shearzone, which has a length of about 300 km, and causes a lateral displacement of 60 km (Linzer et al. 2002), marks part of the northern border of the Tauern Window.

## Macroscopic Structures

The northern part of the study area shows a penetrative, mylonitic foliation, which strikes ENE–WSW, dips subvertically, and contain flat-lying, but generally WSW-dipping stretching lineations. This mylonitic zone, which has a width of approximately 2 km is systematically associated with shear bands and $\sigma$-clasts, indicating a sinistral sense of shear. Occasionally, shear bands are also contained in the YZ plane of deformation, where they indicate a S-side-up sense of shear. Besides mostly in this part the deformation of the rocks is overprinted by brittle tectonics. South of the mylonitic zone, the foliation is folded by isoclinal folds with axial planes subparallel to the foliation described above. These folds can be correlated to the upright, large-amplitude folds, which form the three gneiss cores of the western Tauern Window. Further south, folds become more open, with axial planes dipping gently southward. We attribute these folds to the early Alpine phase of shortening, which affected the Zentral Gneiss (e.g. Lammerer 1988), before doming of the Tauern Window. This area is also affected by ductile shear zones of several meters width and a periodic distance of about 100 m. These shear zones strike WSW–ENE, dip steeply southwards and show a S-side-up sense of shear, indicated by the foliation drag and shear bands.

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## Microscopic Structures

On the basis of the quartz microstructures a gradient in the deformation temperature across the sinistral shear zone can be inferred. Quartz grains in the northernmost samples were deformed by dislocation glide associated with incipient bulging recrystallization. Towards the South, the deformation and recrystallization mechanisms of quartz show a transition to dislocation creep and subgrain rotation recrystallization, followed by dislocation creep and grain boundary migration at the southernmost end of the sinistral shear zone. This change in the deformation and recrystallization mechanisms goes together with a grain size increase of the new grains from ca. 0.04 mm in the North to ca. 0.12 mm in the South. The folded foliation south of the sinistral shear zone shows a high-temperature fabric, characterized by dynamic recrystallization of quartz. Hence, there is no evidence for a static overprint separating the first and the second phase of folding.

## Interpretation

In summary, the structures and microstructures described above suggest that the upright folds of the western Tauern Window formed during shearing along the SEMP Fault, which becomes ductile as it enters the northern margin of the Tauern Window. In addition, a pronounced, southward increase in structural level, as exposed across the strike of the shear zone, points to a transpressive type of deformation. Therefore, in addition to a left-lateral displacement, the SEMP Fault accommodates a vertical S-side-up component of displacement, which contributes to the exhumation of the Tauern Window.

## References

Lammerer B (1988) Thrust-regime and transpression-regime tectonics in the Tauern Window (Eastern Alps). Geologische Rundschau 77, 143–156.

Linzer H-G, Decker K, Peresson H, Dell'Mour R, & Frisch W (2002) Balancing orogenic float of the Eastern Alps. Tectonophysics 354, 211–237.