Geophysical Research Abstracts
Vol. 12, EGU2010-13561, 2010
EGU General Assembly 2010

The Jaufen Fault: a kinematic link between the Tauern Window and south-Alpine Indentation

Susanne Schneider, Audrey Bertrand, and Claudio Luca Rosenberg
Freie Universität Berlin, Geology/Geochemistry, Berlin, Germany (sanne5@web.de)

The Southern Alps are separated from the Eastern Alps by the Periadriatic seam. Where two segments of it, the sinistral Meran-Mauls Fault and the dextral Pustertal Fault with an angle of approximately 135° join, three other major faults nucleate; the Brenner Normal Fault, the sinistral Ahrntal Fault system and the sinistral Jaufen Fault (JF). At this spot, the corner of the Dolomite Indenter, the five fault systems transfer the strain produced at the tip of the Dolomite Indenter into localized ductile and brittle deformation zones resulting in NNW – SSW crustal shortening, lateral extrusion and vertical motion. The JF strikes parallel to the margin of the Dolomite Indenter (Meran-Mauls Fault), separating an area with Early Alpine biotite cooling ages in the northwest, from an area with Variscan and partially reset cooling ages in the southeast. In contrast, ZFT ages are younger to the southeast of the JF than to the northwest. On the base of the ZFT ages and the occurrence of normal shear senses, the JF, was interpreted as a normal fault accommodating NW – SE extension during Miocene.

Here we present a 13 km long structural section, striking NW through the Upper Austroalpine, Upper Penninic nappes and Periadriatic Intrusive. This section comprehends spatial distribution of ductile kinematic indicators, divided into two ductile Alpine deformational stages (D1, D2) and brittle kinematic indicators related to Late Alpine deformation. We interpret structures formed during D2 as related to south-Alpine indentation, because they are parallel to the margin of the Dolomite Indenter.

The JF consists of a 500m thick mylonitic zone, striking from Sterzing to St. Leonard. In contrast to previous studies, we only observed sinistral but no normal sense of shear within the fault. Southeast of the JF upright, tight F2 chevron folds refold an S1 axial plane foliation. The axial planes of the D2 folds strike NE, predominantly. In contrast, northwest of the JF folds (F1) are recumbent. Two major and one minor sinistral mylonitic zones, showing a newly formed mylonitic foliation S2, were found along the section. The first major zone is the JF in the south of Sterzing, the second major zone is located in the Egger valley according to the Meran-Mauls Fault and the minor zone is located in a small creek southwest of Stilves according to the Faltleis Fault. They strike parallel to the axial planes of the F2 folds and dip as steep to the north as those; parallel to the internal structures of the western Tauern Window, where a similar kinematic relationship of folds and sinistral shear zones was observed. Sporadic disperse dextral shear indicators striking WNW parallel to the Pustertal Fault and normal shear indicators, giving a Top to the N – NW shear sense parallel to the Brenner Fault, were found along the section.

Based on the observations above, we interpret the JF as a major structural boundary between a zone in the SE of the fault of steeply dipping F2 folds, parallel to the indenter margin and one zone in the NW of the fault with recumbent D1 structures, not significantly affected by indentation. Therefore Miocene ZFT cooling ages southeast of the JF are probably due to folding and erosion during indentation, rather than to extensional denundation along the fault. F2 folds and sinistral shear zones southeast of the JF are transpressional features in continuity with the internal structural grain of the western Tauern Window. In particular, the Ahrntal Fault may be the eastern continuation of the JF. As observed along the Brenner Fault, the JF separates an area shortened by indentation and preferentially exhumed from an area largely unaffected by shortening and exhumation.