



Structural observations from the Canavese Fault west of Valle d'Ossola (Piemonte) and some time constraints

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The Canavese Fault (CF) is the SW part of the most important fault system in the Alps, the Periadriatic Fault. The CF has a complex kinematic history involving an older stage of NW-side-up faulting and a younger stage of SE-side-up plus dextral faulting in the area of Valle d'Ossola (Schmid et al. 1987). There, shearing occurred under greenschist-facies conditions and the fault is a c. 1 km thick mylonite zone. Toward SW, faulting took place under progressively lower temperatures and the volume of rocks affected by S-side-up plus dextral shearing becomes larger at the expense of the N-side-up mylonites. S of Valle Sesia, brittle fault rocks dominate over mylonites. Still further SW, close to the Serra d'Ivrea, the CF splits into two branches, the Internal Canavese Fault (ICF) and the External Canavese Fault (ECF). S-side-up plus dextral faulting is localised along the ICF while the observed displacement senses at the ECF are mostly, though not always, N-side-up and sinistral.

Age constraints for faulting along the CF are mostly derived from absolute ages of magmatic rocks exposed alongside or within the fault. In the section around Biella, NW-side-up faulting cannot have lasted longer than until 31 ± 2 Ma (Scheuring et al. 1974) because this is the age of andesites overlying the basement of the Penninic Sesia Zone. However, some additional uplift of the Sesia Zone with respect to the South Alpine Ivrea Zone was accommodated by down-to-the-SE tilting of the Sesia zone around a roughly NNE-SSW-trending subhorizontal axis which is evidenced by palaeomagnetic data (Lanza 1977). As a result of that, the Early Oligocene Biella Pluton (c. 31 Ma, Romer et al. 1996) today occupies a similar altitude level as the andesites of the same age. Post-31-Ma uplift of the Ivrea Zone with respect to the andesites is evidenced by the Early Oligocene (29-33 Ma, Carraro & Ferrara 1968) Miagliano Pluton which is hosted by the Ivrea Zone rocks and exposed at the present topographic surface. This SW-side-up faulting was accommodated by the CF. For the NE segment of the CF, K-Ar data of 19-26 Ma (Zingg & Hunziker 1990) indicate that the fault was active at that time but these data cannot be linked to a specific displacement sense. Dextral faulting was active at c. 20 Ma as constrained by K-Ar ages of fault gouge from Riedel structures of the Insubric Fault (Zwingmann & Mancktelow 2004). One of the aims of our ongoing work in the TopoAlps project "4D kinematics of the Neogene western Alps" is to provide further absolute age constraints for the different kinematic stages of faulting along the CF by radiometric age dating.

Concerning the displacement amount, our results suggest that the CF is a stretching fault accumulating dextral displacement toward the E. This interpretation is supported by the observation that while dextral displacement senses at the ICF are more or less balanced by sinistral ones at the ECF, dextral shear senses become more and more dominant toward Val d'Ossola in the NE.

Referneces:

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