Feldspar deformation in greenschist facies shear zones (Aar-Massif, Switzerland) ***Poster***

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Granitic gneisses of the Central Aar Granite host a shear zone network that formed at greenschist facies conditions. The work area is located in the Bächlital (Grimsel area, Central Switzerland) and was chosen for the analysis of shear zones because of the weakly anisotropic fabric of the host gneisses. Contrary to previous publications (e.g. Choukroune & Gapais, 1983), none of these host rocks are undeformed. They contain a penetrative foliation (S_1) that strikes consistently ENE-WSW with a steep dip of around 70° to the south. This foliation is overprinted by the aforementioned shear zone network, which was the main focus of this study. The granitic gneisses are predominantly equigranular, but locally contain feldspar augen. Albite, quartz, magmatic K-feldspar, biotite, chlorite and epidote make up the rock. Albite is the dominant plagioclase mineral, reflecting the greenschist facies metamorphic overprint. Partial chloritization of biotite is associated with the segregation of a Ti-phase. Calcium from the K-feldspar was used for the formation of epidote. The shear zone network comprises major, dm to km long shear zones which are interconnected by minor, cm to dm long shear zones. The major shear zones are oriented predominantly NE–SW and have a cm-wide mylonitic to ultramylonitic centre which is bounded on either side by cm to m long fractures that run parallel to the shear zone centre in intervals of meters to decimeters. The minor shear zones are not preferentially oriented and reach lengths of several centimeters to decimeters. They do not always show a distinct shear component and sometimes end as cracks before reaching the next major shear zone.

Four stages of feldspar deformation during the shear zone development could be observed in thin section:

1. Discrete, intracrystalline microfaults form conjugate sets. Although some of these microfractures run parallel to the cleavage planes, the majority runs oblique to them. Bent twin lamellae represent the beginning stages of microfracturing. Rotated microphacoids (fragments bordered by the microfractures) are the end result;

2. Dynamic recrystallisation characterized by serrate grain boundaries and core-mantle structure of feldspar grains. What processes leading to this recrystallisation are unclear and and are still under investigation. Cracks filled with small feldspar grains and pressure shadows of K-feldspar clasts point to pressure solution as a relevant process in this stage. Electron microprobe analysis revealed that some fractures are filled with K-feldspar which is chemically distinct from the host K-feldspar (e.g. higher Ba content). Progressive subgrain rotation is also commonly observed in feldspar grains. Some subgrain aggregates show a crystallographic preferred orientation;

3. Recrystallised aggregates become

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more prevalent and grains start to creep, leading to a mylonitic fabric;

4. The transition to the fourth, ultramylonitic stage is not well defined.

The aim of my work is to understand the mechanisms of the feldspar deformation in the four stages that lead to the ultramylonitic final stage. The results I have presented in this abstract are preliminary.