DEFORMATION BEHAVIOUR OF FELDSPAR IN GREENSCHIST FACIES GRANITOID MYLONITES FROM THE AUSTROALPINE BASEMENT TO THE SOUTH OF THE WESTERN TAUERN WINDOW, EASTERN ALPS

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The aim of this study is the investigation of the deformation behaviour of feldspars at mid-crustal conditions. Due to the abundance of K-feldspar and plagioclase their deformation behaviour is crucial for the long-term rheology of the continental crust. It is strongly controlled by the interaction of brittle, dissolution-precipitation and crystal-plastic mechanisms. Here we present the record of mylonitic pegmatites from the Austroalpine basement to the south of the western Tauern Window. These pegmatites are of Permian age and thus record the Alpine deformation history. The chemical and structural characteristics of the feldspar microfabrics are analysed via polarisation microscopy, scanning electron microscopy (SEM) and electron backscatter diffraction (EBSD). The pegmatites are relatively Ca-poor and thus consist mainly of albitic plagioclase, K-feldspar, quartz and white mica. In addition tourmaline, garnet and accessories like monazite can occur. The matrix of these pegmatites is often composed of fine-grained quartz and albite, which may either be intimately mixed or clearly separated. In the latter case alternating ribbons of these minerals define a foliation. Quartz in these ribbons shows a strong crystallographic preferred orientation (CPO), which corresponds to deformation by dislocation creep under greenschist facies conditions. Albite ribbons in contrast only exhibit a shape preferred orientation and show no CPO. In a few samples low-strain patches of albite show a CPO that is probably inherited from the original host grain. Fragments of K-feldspar and/or tourmaline are aligned in this foliation and frequently show strain shadows of albite, K-feldspar and quartz. K-feldspar porphyroclasts often have serrated grain boundaries to matrix albite grains. New grains of K-feldspar and albite occur in intragranular zones within K-feldspar clasts. Some of the “new” K-feldspar grains show only small misorientations to their host. No crystallographic relationship of albite grains within or bordering to K-feldspar porphyroclasts is observed.

These microfabrics show that deformation of feldspars in these rocks is mainly controlled by brittle behaviour and dissolution-precipitation creep. Crystal-plastic deformation in feldspars occurs only localised, as seen for example by bent porphyroclasts.