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The Tschigot granodiorite (Eastern Alps, Southern Tyrol): a structural and AMS study

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The Ordovician Tschigot granodiorite, hosted by the Texel complex, underwent polyphase tectonometamorphic overprint during the Variscan and Alpine orogenies. The main magmatic body forms a large sigma-like clast. While the contact with the host rock is characterized by a strong and coherent mylonitic foliation the internal part of the body is almost isotropic. The mylonitic foliation (S1.2) dips 40-60° toward N to NW. The related stretching lineation (L1.2) plunges 5-35° toward W or E, but also with some 10-15° deviations to NW or SW. Shear sense criteria related to L1.2 indicate top-to-the W sense of shear. Towards the inner parts of the body the intensity of deformation decreases rapidly within first 200-300 meters. From the mylonites at the contact (i.e. LS tectonites) the fabric first changes to form L>S and L-tectonites with their lineation (30-40° to NW) in perfect agreement with the orientation of the crenulation lineation (L2) from the surrounding host rocks. Unfortunately the continuous transition from LS to L-tectonites is hardly outcropping. Rarely two foliations (S1.1 and S1.2) can be observed in the granodiorite with the intersection lineation shallowly dipping towards NW (i.e. parallel to the lineation from the L-tectonite). While dynamic recrystallization of quartz in the L-tectonite is dominated by grain boundary migration with subordinate subgrain rotation (SGR), SGR characterizesthe mylonite from the contact area.

With respect to their orientation the analysed magnetic lineations (Lmag) and foliations (Smag) are perfectly in agreement with the structural field data. The parallelism between magnetic (Smag, Lmag) and field structures (S1.2, L1.2) in the mylonite domain shows that in the temperature range between 400-500°C and under conditions of intensive shearing preexisting structural and magnetic features are fully overprinted and reoriented. In conclusion our data demonstrate perfect overlap between magnetic and structural fabrics in sheared rocks under upper greenschist facies conditions. Thus AMS information can be used for deciphering macroscopically undedected features, as might be the case in coarse grained and statically recrystallized rocks.