

THE GLARUS OVERTHRUST (SWITZERLAND): EVIDENCE FOR SIGNIFICANT SYN-OVERTHRUSTING DUCTILE SHEAR WITHIN THE HANGING WALL COMPLEX

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It is widely believed that the Glarus nappe complex in the Helvetic Alps in Switzerland is thrust as an essentially rigid block over the - also essentially rigid - infra-Helvetic footwall block. At the thrust contact, more than 40 km displacement is thought to be localised in a 25-200 cm thin limestone layer (the famous Lochseiten limestone). Martin Burkhard (Neuchâtel University, Switzerland) recently proposed, however, that the Glarus nappe complex might have behaved much less rigid than commonly thought, and has taken up substantial amounts of syn-overthrusting simple shear. We present microscopical and field evidence in support of this idea. The hanging wall rocks (mostly Permian Verrucano) show a well developed linear fabric (mineral lineation and elongated clasts) in a roughly 700 to 1000 m wide zone above the thrust contact. The lineation is parallel to the northwards directed thrust direction. Pre-thrusting (Calanda phase) fold axes are progressively sheared into parallelism with this lineation in an approximately 200 m wide zone above the contact. This rotation is consistent with a northwards directed shear strain of more than 50 to 70. Bedding and foliation are entirely parallel in the lowermost 50 m. Shear-bands indicate northwards thrusting. The foot wall rocks show almost no evidence of syn-overthrusting ductile shear. Only in the uppermost meter (or even less) the pre-thrusting (Calanda phase) foliation is bended northwards and locally, secondary foliations are developed. The strain distribution (i.e., significant amounts of syn-thrusting strain in the hanging wall versus almost no strain in the foot wall) is remarkably similar to the strain distribution predicted by gravitational - ductile glide mode - nappe emplacement.