

The pre-Mesozoic tectonic contact of the Schneeberg Complex and the pre-Permian sediments in the southeastern Ötztal Nappe (Austroalpine, Italy)

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In its southeastern part the Ötztal Nappe comprises the Ötztal Basement s. str., the Schneeberg Complex, the Laas Series and the Texel Complex. The latter is known as the western end of the Eoalpine High-Pressure Belt, for which several subduction and exhumation models exist. For assessing these models, it is essential to clarify the relationships inside the Ötztal Nappe.

Systematic electron-microprobe garnet mapping allows discrimination between different metamorphic histories in the southeastern Ötztal Nappe by zonation patterns. Alpine garnet growth is reported in all units. Variscan high-grade metamorphism is documented by inherited cores of two-phase garnets. While the internal parts of the Schneeberg Complex show only single-phase garnets, the Ötztal Basement s. str., the Laas Series and the Texel Complex show two-phase garnets. The Schneeberg Complex can be divided into the single-phase Schneeberg synforms and the two-phase Schneeberg frame zone (Rahmenzone). The tectonic contact between the Schneeberg synclines and the other units is therefore of pre-Alpine origin (Fig. 1). Garnet zonation does not indicate an Alpine contact between the Texel Complex and the Ötztal Basement s. str. This challenges models where the Texel Complex and the Ötztal s. str. represent the footwall and hanging wall of an exhumation-related normal fault (Sölva et al. 2005) or two different nappe systems (Schmid et al. 2004).

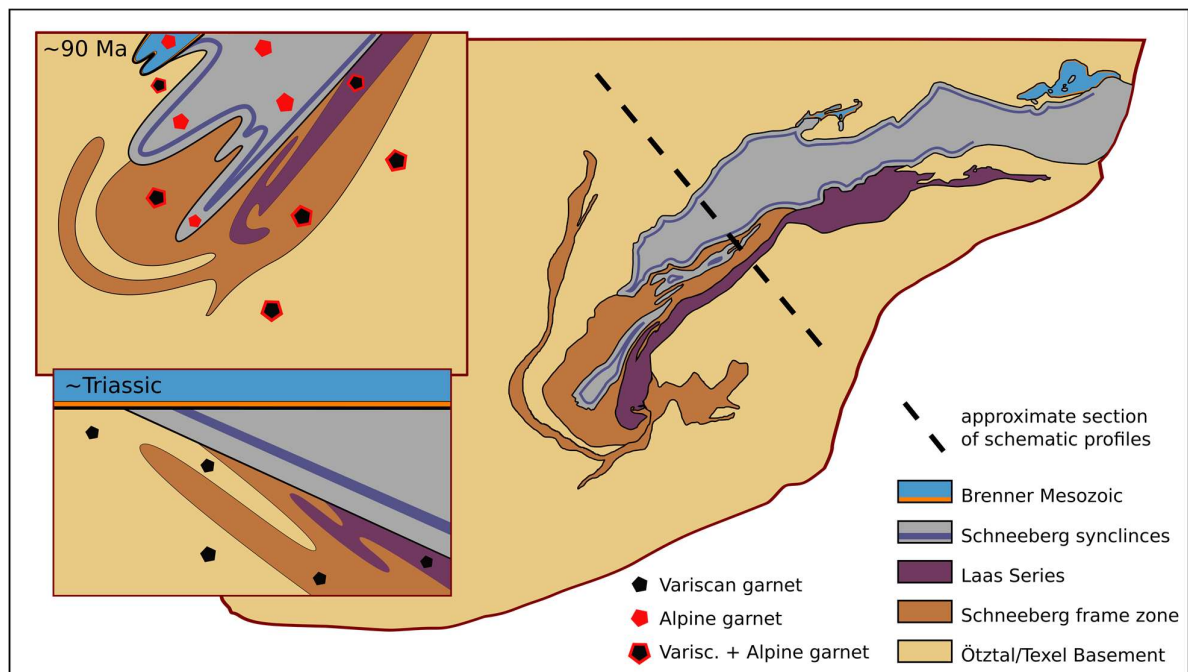


Fig. 1: Map of the southeastern Ötztal Nappe (after Mauracher 1980) with schematic profiles.

To test if the remaining contacts are of sedimentary nature, we used detrital zircon U-Pb dating by laser ablation ICPMS. Previous U-Pb dating of magmatic zircons of granitic intrusions in the southeastern Ötztal Nappe yielded Ordovician (450–470 Ma) formation ages. Our set of detrital zircon ages indicates that the Austroalpine basement containing Ordovician magmatites is the source area of the metasediments of the Schneeberg Complex and the Laas Series. We suggest that the Schneeberg and Laas series represent the post-Ordovician, pre-Permian sedimentary cover of the Ötztal/Texel basement. In contrast to the Laas Series and the other units, the rocks presently found in the Schneeberg synclines belonged to a higher structural level of the Variscan orogeny, unaffected by Variscan garnet-grade metamorphism. Therefore, the basal contact of these Schneeberg rocks probably represents a Permian extensional fault or shear zone.

References

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