

The structure and evolution of the Pohorje Massif near Slovenska Bistrica, Slovenia - HP-metamorphism and exhumation of Lower Central Austroalpine rocks

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The Pohorje Massif in NE-Slovenia is located at the southeastern margin of the Eastern Alps in the vicinity of the Periadriatic Line. It belongs to the Lower Central Austroalpine and consists of highgrade-metamorphic lithologies which have undergone a polyphase tectonometamorphic history: 1.) A HT-LP event during Permian rifting associated with opening of the Meliata oceanic basin further to the SE. 2.) A HP-metamorphism during Upper Cretaceous related to eo-alpine subduction and collision. 3.) Miocene core complex formation with emplacement of a granodiorite to tonalite batholith as a result of extension in the Pannonian Basin and lateral extrusion of the Eastern Alps.

The Cretaceous nappe stack of the Pohorje Massif consists largely of metasedimentary sequences such as gneisses and micaschists but also contains lenses of eclogites and amphibolites and a body of serpentinites and garnet-peridotites (“*Slovenska Bistrica Ultramafic Complex*” (SBUC) after Janak et al. (2006)). This nappe stack was folded into a WNW-ESE trending antiform with the Miocene intrusion in its central part during core complex formation. Eclogites record HP-conditions of ~ 28 kbar/725°C as indicated by microstructural observations, geothermobarometric calculations and thermodynamic modelling. The HP-assembly consists of Grt + Omp \pm Zo \pm Ky \pm Qtz \pm Phg. The occurrence of symplektites of Spr + Plag + Spl + Amp around kyanite suggests near isothermal decompression after the peak of HP-metamorphism at ca. 90 Ma (Miller et al., 2005). Protoliths are probably gabbroic to basaltic bodies which were emplaced during Permian rifting into thinned continental lithosphere. Garnet-peridotites occur as small lenses within strongly serpentinitized depleted mantle rocks. They have aberrant Al-rich bulk compositions and are interpreted as depleted mantle rocks which were refertilized before eo-alpine orogeny. Mapping of the area NW of *Slovenska Bistrica* clarified that locations with garnet-peridotites are restricted to the SBUC. Recent studies have suggested that the Pohorje ultramafics were incorporated from the overlying mantle wedge into crustal rocks of the subducting plate and dragged down to UHP-conditions (Janak et al., 2006). However, since the SBUC is the structurally deepest unit overlain by the eo-alpine nappe stack it might have been part of the footwall plate ab initio. In this scenario the ultramafics would represent subcontinental lithosphere which was depleted by partial melting and partially refertilized by fluids or melts in the course of Permian rifting processes.

References:

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