

**MULTISTAGE P–T EVOLUTION RECORDED IN GARNET-BEARING
MIGMATITES FROM THE BAVARIAN UNIT, BOHEMIAN MASSIF, UPPER
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The Bavarian Unit in Upper Austria, as part of the Moldanubian superunit of the Variscan Orogen, was formed during a late Variscan (post 330 Ma) LP–HT overprint, probably related to a partial delamination of mantle lithosphere and subsequent asthenospheric upwelling (FINGER et al., 2007). We investigated unusual grt-crd-sil-migmatites with large garnet porphyroblasts, that occur along the Danube valley near Ottensheim. The large garnet porphyroblasts of these rocks preserve chemical zoning which constrains a multistage metamorphic evolution. Elevated homogeneous grossular content in the core (5–6 mol% grs) is followed discontinuously by low grossular content in the garnet mantle (1–1.5 mol% grs) and then again by a discontinuous increase at the rim (3–3.5 mol% grs) defining three distinct stages of garnet growth. The three garnet zones also display different mineral inclusions, i.e., sillimanite, plagioclase and spinel in the core, staurolite, biotite, plagioclase, sillimanite and muscovite in the mantle, and cordierite, sillimanite, K-feldspar and spinel equilibrated with the garnet rim.

Metamorphic conditions were obtained from a microprobe study of the garnet and the enclosed minerals using standard geothermobarometric calculations as well as thermodynamic modelling. A first prograde MP–MT metamorphic event (0.9–1.1 GPa and 740–780°C) is represented by the garnet core. This first metamorphic event was followed by a stage of decompression and cooling. A renewed heating event starting at LP–MT conditions (0.44–0.54 GPa and 580–610°C) led to a regrowth of garnet. The rims of the garnets formed during LP–HT metamorphism (0.60–0.66 GPa and 830–910°C). U–Th–total Pb dating of monazite inclusions in the garnet cores indicates an age of 340 ± 7 Ma for the first MP–MT metamorphic event, relating it to the Variscan collision stage. Dating of matrix monazite yields an Upper Carboniferous age (315 ± 4 Ma) for the LP–HT overprint, consistent with existing geochronological dates from the Bavarian Unit (GRAUERT et al., 1974; KALT et al., 2000; FINGER et al., 2007).

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