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Syn-deformational melt percolation through a high-pressure orthogneiss and the exhumation of a subducted continental wedge (Orlica-Śnieżnik Dome, NE Bohemian Massif)

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High-pressure granitic orthogneiss of the south-eastern Orlica–Śnieżnik Dome (NE Bohemian Massif) shows relics of a shallow-dipping S1 foliation, reworked by upright F2 folds and a mostly pervasive N-S trending subvertical axial planar S2 foliation. Based on macroscopic observations, a gradual transition perpendicular to the subvertical S2 foliation from banded to schlieren and nebulitic orthogneiss was distinguished. All rock types comprise plagioclase, K-feldspar, quartz, white mica, biotite and garnet. The transition is characterized by increasing presence of interstitial phases along like-like grain boundaries and by progressive replacement of recrystallized K-feldspar grains by fine-grained myrmekite. These textural changes are characteristic for syn-deformational grain-scale melt percolation, which is in line with the observed enrichment of the rocks in incompatible elements such as REEs, Ba, Sr, and K, suggesting open-system behaviour with melt passing through the rocks. The P–T path deduced from the thermodynamic modelling indicates decompression from ~15–16 kbar and ~650–740 °C to ~6 kbar and ~640 °C. Melt was already present at the P–T peak conditions as indicated by the albitic composition of plagioclase in films, interstitial grains and in myrmekite. The variably re-equilibrated garnet suggests that melt content may have varied along the decompression path, involving successively both melt gain and loss. The 6–8

km wide zone of vertical foliation and migmatite textural gradients is interpreted as vertical crustal-scale channel where the grain-scale melt percolation was associated with horizontal shortening and vertical flow of partially molten crustal wedge en masse.