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Dear colleagues,

in the following you will find my report of the doctoral thesis of **Vít Peřestý** "*The role of deformation partitioning on the tectonic evolution of the superstructure-infrastructure transition in the Teplá -Barrandian domain*".

This thesis is a compilation of two published papers (*Journal of Metamorphic Geology, Lithos*) and one submitted manuscript (*International Journal of Earth Sciences*), all of which are based on a multidisciplinary approach combining methods of metamorphic petrology, geochronology and structural analysis in order to investigate the complex transition zone between the unmetamorphosed early-Variscan superstructure (Teplá-Barrandian Domain) and the late-Variscan high-grade infrastructure (Saxothuringian Domain). The publications in the thesis focus on the controversial superstructure/infrastructure transition zone at the western margin of the Teplá-Barrandian domain, which is represented by the contact of the Teplá Crystalline Complex (TCC) and Mariánské Lázně Complex (MLC). Although this zone has been studied by numerous authors the age and nature of the pre-Variscan event, the age of the eclogite facies metamorphism in the MLC, the complex structural record and the link of macroscopic fabric with mineral assemblages and their P–T conditions are either controversial or unknown.

In the following, I would like to shortly discuss each individual publication of the thesis emphasizing the important points and the general conclusions:

The first article, "*Metamorphic inheritance of Rheic passive margin evolution and its early-Variscan overprint in the Teplá-Barrandian Unit, Bohemian Massif*" (published in the *Journal of Metamorphic Geology*), constrains three different deformation and metamorphic events in the Teplá Crystalline Complex focusing on the correlation of the macroscopic fabrics with microtectonics and P–T conditions constrained by mineral assemblages. The individual tectono-metamorphic events were linked to in-situ U-Pb dating of monazite. The oldest event is a Cambro-Ordovician (c. 485 Ma) LP–HT regional metamorphism with peak temperatures up to 650°C. This event is followed by a Devonian (c. 375 Ma) Barrovian-type metamorphism associated with a vertical fabric. This fabric is finally overprinted by a late Devonian event, which formed a gently dipping fabric. The tectono-metamorphic history is translated into a model for the evolution of the southern margin of the Rheic Ocean from the passive margin formation to the early phases of Variscan orogeny. The paper represents an excellent multi-disciplinary approach and the presented model is well constrained by the linkage of the microstructural record with the P-T-t-d evolution (nicely outlined in figure 16).

In the second article, "*Combined Lu-Hf and Sm-Nd geochronology of the Mariánské Lázně Complex: New constraints on the timing of eclogite- and granulite-facies metamorphism*" (published in *Lithos*), the structural record and the metamorphic events in the MLC and the overlying TCC are compared and correlated. This study is based on pseudosection modelling of the metamorphic events in the MLC and construction of the P–T path of the rocks together with the dating of the major events. It is shown that younger HT overprint led to a partial resetting of the Sm-Nd and Lu-Hf isotope system in the garnet, but the Lu-Hf system can still preserve older age, which probably dates eclogite-facies

metamorphism. I especially like the synthesis (compiled in an excellent diagram in figure 32) derived from the contrasting eclogite/amphibolite-facies migmatite fabrics, the mineral microstructures, the calculated P–T conditions and the Lu-Hf and Sm-Nd ages resulting in a complete P–T–t–d path recording a rapid transition from HP subduction, crustal thickening to extensional HT shearing. The paper concludes with an orogen-wide comparison showing that the unconventional exhumation path does not fit to models of monocyclic exhumation in a subduction channel proposed but records more similarities with geodynamic models typical for the Iberian subduction system.

The third paper, "*Restoration of early-Variscan structures exposed along the Teplá shear zone in the Bohemian Massif - constraints from kinematic modelling*" (submitted to the *International Journal of Earth Sciences*) represents a structural study of the superstructure-infrastructure transition zone. This study describes the polyphase early-Variscan structural record associated with a complex and highly heterogeneous detachment system. Over a large area a continuous reorientation of the NNE-SSW trending lineation in the superstructure to a ESE-WNW trending lineation in the infrastructure has been observed. A simple kinematic model, which is controlled by the velocity gradient tensor in three dimensions, was applied in order model the deformation history of the transition zone. The reorientations of the lineation are interpreted as the result of superposition of an originally subvertical foliation by a shallow SE-dipping foliation. The authors conclude that the well preserved vertical foliation in the superstructure is associated with crustal thickening and is overprinted by the foliation developed during exhumation of deeper parts of the infrastructure. The paper is an excellent example how solid structural field work is complemented by quantitative modelling. I have only two minor comments, which can be easily included after the review process: (i) in figures 37-40 all the beautiful field examples are labeled with numbers (VPxxx) but

it would be good to know to which locations these numbers refer. Maybe there is a table with GPS coordinates submitted with the manuscript, which I could not find in the thesis. (ii) I would change the contouring interval in figures 36/36. Looks awkward if isolated data points are contoured.

**All three papers represent important new data and interpretations not only in the research on the understanding of the Variscan orogeny but also in the general understanding of processes in the lower crust, which are probably active in modern collision orogens like the Himalayas. Therefore I conclude that I can strongly recommend the acceptance of the PhD thesis of Mr. Vít Peřestý and that the candidate should be admitted to the oral presentation and the defense of his thesis.**

Yours faithfully,

A handwritten signature in black ink, appearing to read 'B. Grasemann', written in a cursive style.

Bernhard Grasemann