

Abstract

Upper part of the orogenic crust (superstructure) significantly differs from the lower part of the crust (infrastructure) by structural and metamorphic record. This fundamental observation is explained by interruption of the mutual evolution due to mechanical decoupling of the hot and ductile infrastructure from the cold and brittle superstructure at certain stages of the orogenic evolution. The superstructure-infrastructure transition zone is a rheologically predisposed domain of sharp deformation and metamorphic gradients with polyphase structural record. Understanding of the deformation partitioning in such a rheologically complex setting is a key aspect in linking of the individual deformation stages between upper and lower crust. The transition zone between unmetamorphosed early-Variscan superstructure (Teplá-Barrandian Domain) and late Variscan high-grade infrastructure (Saxothuringian Domain) crops out at the western margin of the Teplá-Barrandian Domain in the Bohemian Massif. This area is a continuous mid- to lower-crustal section with early-Variscan structural and metamorphic record, which is superposed onto pre-Variscan episode. This thesis aims to decipher individual deformation events, to evaluate their manifestations at different crustal levels and to bring new and unifying tectonic model. This work is based on detailed multidisciplinary approach, which combines methods of metamorphic petrology, geochronology and structural analysis. The most important results can be summarized as follows:

- Pre-Variscan evolution (D1-M1) has been newly interpreted as early-Ordovician (c. 485 Ma) high-temperature low-pressure metamorphic event, which led to the exhumation of the middle crust as a consequence of crustal extension during formation of a passive margin of the Rheic ocean.
- Metabasites of the Mariánské Lázně Complex record early eclogite-facies metamorphism at c. 25 kbar, 650–750°C (Decl-Mecl), which has newly been dated to c. 390 Ma. This event suggest early stages of subduction in the Bohemian Massif.
- Superposed polyphase early-Variscan event was dated to c. 375 Ma. It reflects older stage of thickening of the crustal column at colder Barrovian geotherm around 20–25°/km (D2-M2), followed by vertical shortening and exhumation of the deep seated rocks towards surface along a crustal-scale detachment shear zone(D3-M3).
- Kinematic model of fabric evolution revealed, that complex structural record in rheologically heterogeneous setting can be explained by strain partitioning of single deformation event D3.
- Inversion of the finite D3 strain suggests that present day contact of Teplá Crystalline Complex and Mariánské Lázně Complex has been situated c. 17 km to the east at depth 50 - 60 km.