

Passive seismic experiments, MOSAIC, BOHEMA I-III, EgerRift, or PASSEQ, carried out in the region of the Bohemian Massif (BM), allowed a detailed study of velocity structure of the upper mantle. We present results of tomography studies of the upper mantle beneath the north-eastern and southern parts of the BM based on the data from the BOHEMA II and BOHEMA III experiments (2004-2006). Despite the fact that regions with the highest resolution of velocity perturbations differ in the models, tomography images are similar in overlapping parts. Models of the upper mantle show mostly low-velocity perturbations relatively to radially symmetric velocity model of the Earth beneath the BM. Limited high-velocity heterogeneity beneath the Moldanubian unit, extended in the NE-SW direction, reflects thickening of the lithosphere due to a collision of the BM with the Brunovistulian micro-plate during the Variscan orogeny. The tomography based on the data from the BOHEMA III experiment revealed significant high-velocity heterogeneity in the southern margin of the model with a subduction of the lithosphere beneath the Eastern Alps.

Tomographic tests showed that effects of uncorrected velocity heterogeneities within the crust can appear as deep as 100 km and, therefore, they could lead to erroneous interpretation of velocity perturbations in the upper mantle. A three-dimensional velocity model of the BM crust was created in order to take into account effects of the crust when calculating teleseismic travel-time residuals. The model is based on crustal velocity models derived from refraction and reflection measurements collected during deep seismic soundings and from a local seismic tomography.