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3-D Velocity Models of the Crust of the Bohemian Massif

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The Bohemian Massif (BM) is one of the largest exposures of the Variscian orogen in Europe. According geological observations the BM can be divided into four terranes, which represent the Saxothuringian, Moldanubian and Teplá-Barrandian micro-plates of Armorica and the Brunovistulikum micro-plate of enigmatic Proterozoic provenance. The complex structure of the geological assemblage is a subject of interest of many geoscientists. Several passive seismic experiments focused on modelling of the upper mantle structure, particularly of the mantle lithosphere have been carried out in the BM (MOSAIC, BOHEMA I-III, PASSEQ). The research also includes teleseismic velocity tomography of the upper mantle, which requires a detailed knowledge of velocity distribution in the crust to correct its effects. Thus a developing 3-D crustal model becomes an important part of each study of deep structure of the Earth. The information on velocity structure can be extracted from deep seismic sounding along the profiles (DSS), performed in the BM since the sixties of last century. Independent complementary data are provided by a recently widely used method of receiver functions (RF), based on waves converted at different discontinuities, particularly at the Moho. We compile models of the crust from interpretations of both active (DSS) and passive (RF and dispersion of surface waves) experiments from previous studies. We have initially constructed four 3-D velocity models of the crust from four different types of data. The analysis of these datasets revealed distinct disagreements (up to 6 km) of Moho depths among interpretations of different datasets or data processing, especially in the Saxothuringian. An inconsistence of the individual crustal models reflects complexity of the local structure of the crust. Because of the need of a single representative 3-D model of the crust for resolving the upper mantle structure beneath the region, we have compiled one plausible model of the crust using data weighted according to its conformity and avoiding local extremes. The upper crust up to the depth of 10 km is characterised by P wave velocities from about 3.5 to 6 km/s, the middle crust has a velocity around 6 km/s and the lower crust has a velocity in a range from 6.5 to 7.5 km/s. The Moho depth of the representative model varies between 29 and 40 km and tends to increase to the south.