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# Lateral displacement of crustal units relative to underlying mantle lithosphere: example from the Bohemian Massif

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**Abstract** We propose a mechanical model of deformation of the entire lithosphere of the Bohemian Massif (BM), whose core is formed by an asymmetric block of the Teplá-Barrandian (TB) unit in between the Saxothuringian (ST) and Moldanubian (MD) units. For the modelling, we have re-processed P-wave travel times recorded during the last two decades at dense networks of seismic stations installed in the BM during several passive seismic experiments. We also use previous results of anisotropic studies based on splitting of teleseismic shear waves. This allows us to refine estimates of the lithosphere thickness and delimit deep margins of the individual mantle lithosphere domains. The domains are rigid enough to preserve pre-orogenic olivine fabrics differently oriented in each of the units. Shapes and dips of the mantle boundaries, representing major zones of weakness inherited from the Variscan amalgamation of independent microplates, indicate that north-westward subductions beneath the TB unit dominated tectonic development of the core of the BM. Two mantle lithosphere domains with different fabric orientations, separated by a WSW-ENE striking shear zone, underlie the TB crust. The NW domain is the TB mantle lithosphere, while the SE domain is the MD mantle lithosphere thrust under the TB crust. Lithosphere of