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Two divergently dipping roots of mantle lithosphere beneath the Alps

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The Alps developed at a collision zone of the Eurasian and African plates. Seismic tomography studies indicate leading role of the rigid mantle lithosphere that functioned as a major stress guide during the plate collisions. Interactions of the European lithosphere with several micro-plates in the south resulted in complicated geometry of the Alpine subductions that led to forming two separated lithosphere roots beneath the Western and Eastern Alps (Babuska et al., Tectonophysics 1990; Lippitsch et al., JGR 2003). Standard isotropic velocity tomography, based on pre-AlpArray data (the AlpArray is the currently active passive seismic experiment in the Alps and surroundings) images the south-eastward dipping curved slab of the Eurasian lithosphere in the W. Alps. But beneath the E. Alps, tomography studies indicate a very steep northward dipping root that resulted from the collision of the European plate with the Adriatic microplate (Karousova et al., GJI 2013). Besides the tomography studies we map structure of the lithosphere-asthenosphere system and model fabrics of mantle lithosphere domains by evaluating large-scale seismic anisotropy of the upper mantle (Plomerova and Babuska, Lithos 2010). We expect that future 3D studies of the mantle fabrics with the use of body-wave anisotropic parameters from AlpArray data will shed a new light on tectonic development of the complex Alpine region and its surroundings.