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Coherent features of the Alpine mantle slabs imaged by recent seismic tomography studies

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The bifurcation of the East Alpine mountain range into branches extending northeastward to the Carpathians and southeastward to the Dinarides represents a triple junction between the European platform (EU), the Adriatic micro-plate (AD), and the Pannonian fragment (PA). During the last decade, controlled source and passive source seismic data have provided a variety of detailed images of the lithosphere and upper mantle in this area. However, the geodynamic interpretation of lithospheric slabs under the Alpine - Adriatic collision zone is still under debate. So far, arguments have been based mainly on images provided by individual seismic tomography studies. In order to enhance robust features of the upper mantle structure, we have averaged four tomographic models, weighted according to their coverage by seismic stations and boundaries of high resolution. We achieved an image of the Alpine slab of unprecedented clarity. It extends coherently from the border between the Western Alps and the Apennines to the EU-AD-PA triple junction, dipping southeastward in the west and nearly vertically in the east. The whole slab can be connected to European mantle lithosphere and a flip of subduction polarity must not be induced. The geometry of the slab infers also additional constraints on the development of the triple junction during the post-collision phase of the Eastern Alps.