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Lithosphere thickness variation along the Eastern Alps

Irene Bianchi (1), Meghan S. Miller (2), and Götz Bokelmann (1)
(1) University of Vienna, Wien, Austria (irene.bianchi@univie.ac.at), (2) University of Southern California, USA

Analysis of Ps and Sp receiver functions from datasets collected by permanent and temporary seismic stations, image lithospheric discontinuities across the entire Eastern Alps with tens of kilometers lateral resolution. The receiver functions show the presence of a discontinuity within the upper mantle that is due to a negative velocity contrast. The comparison with other geophysical observations renders it likely that the observed discontinuity represents the lithosphere-asthenosphere boundary. This sheds light on the formation and evolution of the Eastern Alps, being a result of long-term convergence between the European and Adriatic plates and of the lateral (east directed) tectonic extrusion associated with the retreating subduction of the nearby Carpathian slab. The lateral variations in lithosphere thickness mirror these two processes and both mechanisms are reflected in the structure we image with the lithospheric discontinuities. For the first time in the area the Lithosphere-Asthenosphere Boundary is imaged with such a clear depth variation, reflecting the depth extent of the dextral extrusion of the EA towards the Pannonian Basin.