

The lithosphere-asthenosphere boundary below the Eastern Alps and the effect of eastward extrusion.

Bianchi, I.¹, Miller M.², Bokelmann, G.¹

¹Universität Wien, Institut für Meteorologie und Geophysik, 1090 Wien, Austria

²University of Southern California, USA

(bianchi.ire@univie.ac.at)

The Eastern Alps (EA) are the result of the European and Adriatic plates convergence. The architecture of this portion of the Alpine collision has been furthermore affected by a lateral (east directed) tectonic extrusion caused by the retreating subduction of the nearby Carpathians. Analysis of Ps and Sp receiver functions from datasets collected by permanent and temporary seismic stations, located in the EA, show the presence of a low velocity layer (LVL) at depth. This LVL might indicate the velocity drop that the seismic waves undergo passing through the asthenosphere, and it testifies a sudden lateral thickness change of the lithosphere. The detected thinner lithosphere is bounded by the Bohemian Massif to the north, and by the Lavanttal fault to the South-west. The detected asthenosphere is deeper (100-130 km) below the North Calcareous Alps, and shallower (70-80 km) below the Vienna Basin and Styria Basin. Unraveling the depth extent of the coherent rigid lithosphere moving over a weak asthenosphere helps deciphering the decoupling determining plate motions and tectonics of the EA. 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.