



The thickness of the European Lithosphere as seen by S receiver functions

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The thickness of mobile lithospheric plates is still a important question in debate. Unfortunately high-resolution observations of the mantle lithosphere are rarely available. In this work, S receiver functions obtained from seismograms of teleseismic events recorded at 80 permanent broadband stations lying within central and eastern Europe are used to estimate the thickness of the mantle lithosphere. Our results provide new, independent information about the lithospheric thickness down to 200 km depth beneath the Precambrian platform of the Eastern Europe as well as that beneath the Paleozoic platform of the Central Europe. Detailed high-resolution images of the Lithosphere-Asthenosphere Boundary (LAB) reveal indications for a typical continental lithosphere of about 95 km thick beneath a number of stations within Central Europe, whereas in the vicinity of the Trans-European Suture Zone (TESZ), the lithosphere thickens to about 125 km. A relatively thin lithosphere of 75 km was found beneath the subsidence region of Pannonian Basin. This value is also consistent with the thin crust and high heat flow reported in this area. Another lithospheric thinning was observed beneath the northern part of the Rhine Graben. This area is characterized with a 70 km deep LAB suggesting that the Cenozoic extension may influence the whole lithosphere. No clear signal from the LAB was detected Beneath Alps and Carpatinans. The LAB phase may probably disturbed by complicated structure due to the subduction occurred in these regions. A relatively thicker lithosphere was found beneath the old Bohemian Massif that was emplaced during the Variscan orogeny. The LAB was estimated at about 110-115 km depth beneath this area. We found also

a LAB depth of about 180 km beneath a single station located in the Eastern Carpathians. This value is also confirmed by deep earthquakes occurring underneath this area. Beneath the stations located in the Precambrian platform of the Eastern Europe, the LAB significantly deepens and lies at a depth of approximately 200 km, even though the converted phase from the LAB is not as sharp as found beneath other stations located in the Central Europe.