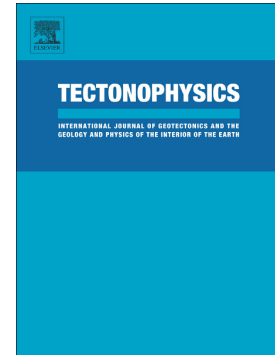


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Detection of a new Sub-Lithospheric Discontinuity in Central Europe with S-Receiver Functions

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Keywords: Lithosphere-Asthenosphere Boundary (LAB), Mid-Lithospheric Discontinuity (MLD), Sub-Lithospheric Discontinuity (SLD), S-Receiver Functions, East European Craton, Bohemian Massif, Pannonian Basin.

Abstract

We used S-receiver functions (i.e. S-to-P converted signals) to study seismic discontinuities in the upper mantle between the Moho and the 410 km discontinuity beneath central Europe. This was done by using c. 49,000 S-receiver functions from c. 700 permanent and temporary broadband stations made available by the open EIDA Archives. Below Phanerozoic Europe we observed expected discontinuities like the Moho, the lithosphere-asthenosphere boundary (LAB), the Lehmann discontinuity and the 410 km discontinuity with an additional overlying low velocity zone. Below the East European Craton (EEC), we observed the Mid-Lithospheric Discontinuity (MLD) at c. 100 km depth as well as the controversial cratonic LAB at c. 200 km depth. At the boundary of the EEC but still below the Phanerozoic surface, we observed downward velocity reductions below the LAB in the following regions: the North German-Polish Plain at about 200 km depth; the Bohemian Massive, north-west dipping from 200 to 300 km depth; the Pannonian Basin, north-east dipping from 150 to 200 km depth underneath the western Carpathians and the EEC. We named this newly observed structure Sub-Lithospheric Discontinuity (SLD). At the northern edge of the Bohemian Massive, we see a sharp vertical step of about 100 km between the

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