Geophysical Research Abstracts
Vol. 13, EGU2011-2410, 2011
EGU General Assembly 2011


# European LAB constrained from seismic anisotropy

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Modelling seismic anisotropy of the mantle lithosphere in 3D represents a powerful tool to study both its thickness and fabric. We present a uniform updated model of the European lithosphere-asthenosphere boundary (LAB; Plomerova and Babuska, 2010), recalculated from data collected during several regional studies of seismic anisotropy and other tomographic experiments. Exploiting the long memory of the fabric of the deep continental lithosphere, we define the LAB as a boundary between a fossil anisotropy in the lithospheric mantle and an underlying seismic anisotropy related to present-day flow in the asthenosphere. Analysis of static terms of teleseismic P-wave travel-time deviations shows that the LAB topography is more distinct beneath the Phanerozoic part of Europe than beneath its Precambrian part and deepens down to ∼220 km beneath the two Alpine roots, the South Carpathians and eastward of the Trans-European Suture Zone. We compare our model of LAB with those derived from converted phases (Sp receiver functions) and from magnetotelluric data. In general, there are similarities between the LAB models derived from various geophysical parameters and techniques, as well as diversities, which might reflect differences in resolution and accuracy of individual methods (Jones et al., 2010). On the other hand, different physical parameters can 'see' different LABs and diverse lithosphere structures. Therefore, we advocate the necessity of combining different methods and datasets, and especially 3D approaches that allow us to consider seismic anisotropy with general orientation (plunging symmetry axes). We propose processes which could create the observed fossil fabric of the continental lithosphere as a consequence of successive subduction and accretion of micro-continent fragments outboard of continental cratons and a gradual stabilization of the LAB by a mantle flow after a detachment of lower parts of subducting slabs.