



Deep Europe today: Geophysical synthesis of the upper mantle structure and lithospheric processes over 3.5 Ga

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We present a summary of geophysical models of the subcrustal lithosphere for the entire Europe. This includes the results from seismic (reflection and refraction profiles, P- and S-wave tomography, mantle anisotropy), gravity, thermal, electromagnetic, elastic, and petrologic studies of the lithospheric mantle. Three profiles (two N-S and one E-W), constrained by all available geophysical data, illustrate major tectonic processes as reflected in the lithospheric structure of Europe ranging from Precambrian terrane accretion and subduction to Phanerozoic rifting, subduction and continent-continent collision. We propose an integrated model of physical properties of the European subcrustal lithosphere, with emphasis on the depth intervals around 150 and 250 km. At these depths, seismic velocity models, constrained by body- and surface-wave continent-scale tomography, are compared with mantle temperatures and mantle gravity anomalies. The differences in the lithospheric structure of Precambrian and Phanerozoic Europe, as illustrated by a comparative analysis of different geophysical data, are shown to have both a compositional and a thermal origin. (Artemieva, Thybo, Kaban, *Geol. Soc. London Sp. Publ.*, 2006).