



Regional mantle structure below the European continent resulting from complex lithospheric geodynamic processes

Blanka Nita (1), Magdala Tesauero (2), Sierd Cloetingh (3), Mikhail Kaban (2), and Edward Perchuc (1)

(1) Institute of Geophysics PAS, Seismology, Warsaw, Poland (blankan@igf.edu.pl), (2) GFZ German Research Centre for Geosciences, Potsdam (magdala.tesauero@gfz-potsdam.de), (3) The VU University, Faculty of Earth&Life Sciences, Amsterdam

The increasing number of seismological stations covering the Eurasian plate gives a possibility to image the mantle structures from different directions of wave propagation. For this purpose, we analyze P and S body waves generated by natural seismic events with epicenters located at distances and azimuths enabling registering seismic rays having propagated at mantle depths. The seismic wave field analyzed is registered at the VEBSN broadband network covering the European continent.

In order to reinforce the physical meaning of the structures imaged, we correlate our results with recent mantle thermal, rheological and gravity models (Tesauero et al., 2009; Kaban et al., 2010). The latter have been obtained using EuCRUST-07, a high resolution regional crustal model (Tesauero et al., 2008).

The seismic structures of the geological units imaged refer to different tectonic episodes, mainly concerning the ancient (Variscan orogeny) and present day subduction processes (Alpine orogeny). Tectonic processes in the shallow lithosphere and those acting in the deep mantle appear correlated, mostly due to the important role of subduction.

Huge difference between the structures imaged are observed in terms of thickness of the lithosphere and asthenosphere, presence of the regional-scale seismic discontinuities (such as that observed beneath the Alpine orogen at 300 km depth), as well as local variations of the location of 410-km discontinuity.