



## Upper Mantle Structure Around the Trans-European Suture Zone

Ilma Janutyte (1,2), Mariusz Majdanski (3), Peter H. Voss (4), Elena Kozlovskaya (5), and the PASSEQ Working Group Team

(1) Vilnius University, Vilnius, Lithuania, (2) NORSAR, Kjeller, Norway, (3) Institute of Geosciences Polish Academy of Sciences, Warsaw, Poland, (4) Geological Survey of Denmark and Greenland – GEUS, Copenhagen, Denmark, (5) Sodankylä Geophysical Observatory / Oulu Unit, University of Oulu, Oulu, Finland

The Trans-European Suture Zone (TESZ) is the transition between old Proterozoic lithosphere in Northern and Eastern Europe and the younger Phanerozoic lithosphere in Central and Western Europe. The presented study is a part of the PASSEQ 2006-2008 project which is linked to the TOR project realized during 1996–1997. The PASSEQ and the TOR projects aimed to study the lithosphere and asthenosphere structure around the TESZ, but the latter was focused on the northwestern part of the TESZ between Sweden and Denmark – Germany, while the PASSEQ project was focused on the TESZ mainly beneath Poland. During the PASSEQ project 139 short-period and 49 broadband temporary seismic stations were deployed along the transect stretching from Germany throughout Czech Republic and Poland to Lithuania. The array recorded continuous seismic data from May, 2006 to June, 2008. In our study we used data of all available PASSEQ seismic stations and seismic stations of the national seismological networks of the participating countries and compiled a data set of teleseismic P-wave arrivals. The full data set consists of 8308 manually picked arrivals. Due to limited computational power we used the data of the highest quality only, i.e. 6008 picks. The non-linear teleseismic tomography algorithm TELINV was used to obtain the model of P-wave velocity perturbations in the upper mantle around the TESZ. We recovered the upper mantle structure from 70 km down to 350 km in the study area. The results show  $\pm 6.5\%$  P-wave velocity variations compared to the IASP91 velocity model. We found higher velocities beneath the old East European Craton (EEC) east of the TESZ and lower ones beneath the younger Western Europe west of the TESZ. The thickest lithosphere was found beneath the EEC (Lithuania) where the higher velocities continue to about 300 km or even more. To the west of the TESZ under the Variscides the average depth of the lithosphere-asthenosphere boundary (LAB) is about 100 km. The TESZ appears as an intermediate tectonic structure between the EEC and Western Europe, with the asthenosphere at a depth of 150-180 km. The LAB in the northern part of the TESZ has a shape of the ramp dipping NE direction at an angle of about 30 degrees. In the southern part of the TESZ the LAB is shallower, most probably due to younger tectonic settings.