



## **A Moho depth map across the Trans-European Suture Zone from receiver functions**

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We present a Moho depth map of central-to-eastern Europe based on P-receiver functions from 484 stations. Specifically, the data set includes the roughly 200 stations of the international PASSEQ experiment that were deployed across the Trans-European Suture Zone (TESZ) from eastern Germany to Lithuania from 2006 to 2008. Thus, the data offer the densest coverage for a passive experiment in this area yet. By using additional stations from permanent networks and other temporary deployments, we extend the coverage into Luxembourg, the eastern parts of the Netherlands, Belgium and France to the west, northern Switzerland, Austria and Slovakia to the south, the western parts of Belarus, Ukraine and Russia, and Estonia to the east and Denmark and southern Sweden to the north. In some areas, e.g. across the Polish Basin, strong sediment reverberations complicate the unambiguous identification of the Moho converted Ps-phase and in some cases may completely mask it. The additional use of S-receiver functions, in which direct conversions and multiples are clearly separated, can greatly aid in measuring the Moho Ps-travel time in these cases.

Ps-travel times of the Moho conversion vary between 2.5 s and 7.5 s within the region, pointing to strong variations in Moho depth. Depth values were determined by stacking direct conversions and their multiples from P-receiver functions (Zhu & Kanamori, 2000). Special care was taken to use the latest and most detailed information on average crustal P-velocities for the stacking, i.e. values from Majdanski et al. (2012) for Poland, Karousova et al. (2012) for the Czech Republic and from EPcrust (Molinari & Morelli, 2011) for the rest of Europe.

The TESZ is imaged as a strong contrast in crustal thickness, from less than 35 km to the west to more than 40 km to the east. This transition seems to be distributed over no more than 30 km laterally. Besides, the character of the Ps-phases converted at the Moho also changes across the TESZ: conversion amplitudes are smaller and the phases less well defined to the east, which could be explained by a more gradual Moho transition. The average Moho depth west of the TESZ is 31 km.

Within the covered region, the largest Moho depths of more than 50 km are found beneath eastern Lithuania and southern Sweden. Furthermore, the Moho depth increases to more than 40 km towards the Alps. The thinnest crust, locally with a thickness of around 25 km, is found beneath the southern Rhine Graben. Other regional variations are also imaged, for example an increased Moho depth around 35 km beneath the Bohemian Massif and slightly decreased crustal thickness of less than 30 km in eastern Slovakia. Our results correlate well with the Moho depth map by Grad et al. (2009), which is mainly based on seismic profiles for the eastern European countries.