



## **Long wavelength mantle transition zone structure beneath Europe as seen by Pds receiver functions**

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The mantle is delineated by seismic discontinuities between 300 and 800 km depth. Variations in topography, width and occurrence of the discontinuities indicate lateral variations in temperature, composition and water content, as these variations influence the mantle phase transitions. Seismic studies of the conversions of pressure to shear waves (Pds phases) are an important tool to observe lateral variations in these discontinuities.

Here we collect a Pds data set across all European seismic stations since 2000 that are available through ORFEUS or IRIS; resulting in ~500,000 event-station pairs. We deconvolve the radial component by the vertical component – assumed to represent the source component- using the iterative deconvolution method to obtain receiver functions. We assess the quality of a receiver function by the signal-to-noise ratio and by evaluating how well the radial component is reproduced when reconvolving the receiver function with the vertical component. This results in ~45,000 high quality receiver functions across Europe.

Here we present the large scale variations in the discontinuities around 410 and 660 km across Europe. The seismic discontinuities beneath the Eastern European craton show little topography and the mantle transition zone thickness is thinner compared to the thickness beneath the rest of Europe. Observing discontinuities within the mantle transition zone is complicated by arriving reverberations from strong shallow structure of the craton. The mantle transition zone around the Mediterranean is thicker and a lot more complexities are observed. The main discontinuities are generally weaker, and other discontinuities around 300 km and a negative jump around 600 km are observed.