Geophysical Research Abstracts
Vol. 14, EGU2012-10191, 2012
EGU General Assembly 2012

The lithosphere-asthenosphere and crust-mantle boundaries in the region of the Upper Rhine Graben as seen by S-wave receiver functions

J.R.R. Ritter, C. Seiberlich, and B. Wawerzinek

Karlsruhe Institute of Technology (KIT), Geophysical Institute, Karlsruhe, Germany (joachim.ritter@kit.edu, +49 0721 71173)

The Upper Rhine Graben is a branch of the European Cenozoic Rift System and is characterised by a clear rift structure which stretches more than 300 km from Basel to Frankfurt. Since 2004 we study the deep structure of the Upper Rhine Graben within the TIMO project, using the mobile seismic broadband stations of the KArlsruhe BroadBand Array (KABBA). The data are complemented with recordings from permanent stations (BFO, ECH, STU, TNS and WLF). Here we present the results from shear wave receiver function (S-RF) modelling. S-RF are waveforms which should contain only S-to-P converted phases which were generated at seismic discontinuities inside the Earth.

The stacked S-RF contain clear signals from the crust-mantle boundary (Moho) under the study region. After a depth migration the Moho topography varies between 25 km and 28 km underneath the Upper Rhine Graben region; within the error limits of 5 km there is no difference between the graben itself and its shoulders. In the southern part of the graben there is an indication for a thinning of the crust to about 23 km. After the Moho signals there is a second phase with opposite polarity in the S-RF. We interpret this signal as conversion from the lithosphere-asthenosphere boundary (LAB). A depth migration results in LAB depths of 70-80 km under the Upper Rhine Graben; the graben itself does not show a specific anomaly. The most shallow LAB depths are found in the region of the Eifel (about 60 km), where a small mantle plume is active.