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THE UPPER MANTLE IN THE EIFEL PLUME REGION

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The Eifel is the youngest volcanic area of Central Europe. The last eruption occurred approximately 11000 years ago. Little is known about the deep origin and the mechanism responsible for the Eifel volcanic activity. Earthquake activity indicates that the Eifel is one of the most geodynamically active areas of Central Europe. We use the receiver function method (RF) to investigate lithospheric-asthenospheric structure beneath the Eifel. We analyzed data from 125 teleseismic events (mb $>$ 5.5) that were recorded both by permanent stations and by temporary network of 33 broad-band and 129 short-period stations. The temporary network was operating from November 1997 till June 1998 and covered an area of approximately 400x250 km centered on the Eifel volcanic fields. RF analysis reveals a clear image of the Moho and the mantle discontinuities at 410 km and 660 km depth. Average Moho depth is approximately 30 km and it shows little variation over the extent of the network. The observed variations of converted waveforms is possibly caused by lateral variations in crustal structure. Inversions of data and migrated RF from stations of the central Eifel array suggest that a low velocity zone is present at about 60 to 80 km depth in the western Eifel region. We also also find indications for a high velocity zone around 200 km depth, perhaps caused by dehydration of the rising plume material. The results suggest that P-to-S conversions from the 410-km discontinuity arrive later than in the IASP91 reference model. This could indicate higher than normal temperatures in the transition zone from upper to lower mantle. It also seems that the 410-km discontinuity is not as continuous as the 660-km discontinuity in the Eifel region.