Geophysical Research Abstracts
Vol. 14, EGU2012-1429, 2012
EGU General Assembly 2012

P and S receiver functions observed at stations in Europe

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We study the teleseismic P and S receiver functions at European seismic stations. From the IRIS and ORFEUS databases, we visually select 3002 teleseismic, moderate-to-large magnitude (i.e.$M_w \geq 5.7$) events recorded by 255 broadband European stations with high signal-to-noise ratio within the years 1990-2011. Corrected for the instrument response, the observed seismograms are cut to a length of 100 s (30 s pre-event, 70 s post-event) in the case of P receiver functions (PRF) and to a length of 100 s (70 s pre-event, 30 s post-event) in the case of S receiver functions (SRF). We rotate the station/event reference frame (Z/R/T) into the ray coordinate reference frame (L/Q/T or P/SV/SH) where the rotation angle is estimated from a covariance analysis. We use a conventional technique to obtain the receiver functions (Langston 1979; Vinnik 1977). All the components (L, Q and T) are deconvolved by the L component (Q component) where the deconvolved Q component (L component) produces PRF (SRF). The receiver function amplitudes are normalized by the zero-lag time amplitude of the deconvolved Q component (L component) of PRF (SRF) (Ammon 1991). We use a time domain deconvolution approach (Menke 1984; Sheehan et al. 1995) to isolate the receiver function. In order to secure the quality of measurements we suppress multiples from deep interfaces, remove outliers and average over many measurements. The outlined analysis procedure yields 1701 L-component SRF and 2103 Q-component PRF. The azimuthal coverage of both PRF and SRF waveforms binned at 20^o backazimuth intervals is appropriate to analyze the observed receiver functions in terms of both azimuthal and radial anisotropy beneath most of the seismic stations. This work is supported by Turkish Scientific and Technical Research Council (TUBITAK) (project number 109Y345).