



Background noise properties at the IBERARRAY broadband seismic network

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The characteristics of the background seismic noise recorded at the IberArray broadband seismic network have been analyzed using power spectral density (PSD) estimates and their corresponding probability density functions (PDFs) for the whole data set (up to 55 stations continuously recording since summer 2007). These PDFs provide a useful tool for managing the network as they allow identifying stations with anomalous high noise levels, but also allow investigating the major sources of noise at different frequency bands and the seismic background noise variations related to time of day, season, weather, location and type of installation.

At high frequencies (> 1 Hz), the main contribution seems to arise from the cultural noise, and therefore significant variations are observed between noise levels at different stations. At microseismic frequencies (0.05 – 0.3 Hz), the noise level is more uniform among stations, even if the sites along the Gulf of Cadiz show a slightly increased level. At long periods, the vertical components usually lay 15db above the NLNM and the horizontal components are much noisier, often exceeding the NHNM for the longest periods. Infragravity waves can be identified along the network for periods close to 100s, even for stations located inland.

The map of the median noise levels across the Iberarray network shows a clear correlation with major geological features, as the Guadalquivir and Gharb sedimentary basins and the Central Iberian Massif. Among the main temporal variations observed we can highlight the day/night differences in the mean noise level, particularly significant for high frequencies, and the noise level variations correlated to the significant wave heights in the surrounding waters. Those latter variations are clearly observed in the microseismic band, but also at periods close to 100s, dominated by the infragravity waves.