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Station Site Effect Evaluation in Austria

Strong site effect can cause anomalous site amplification and result in massive deviations from general earthquake ground motion prediction. Site amplification was firstly observed at the Austrian Seismic Network (network code OE) during our work on peak ground acceleration attenuation (Jia and Lenhardt, 2011) and this initiated investigations in this paper.

We firstly applied a spectral ratio technique to noise and shear-wave spectra from the ten most stable stations in our network. Then we extended our study to all strong motion stations with discontinuous data by using the spectral ratio technique only for shear-waves. To better understand the correlation between site responses and station magnitude residuals, we expanded our study to remaining stations, which have accelerometers within the site and also contributed to the calculation of our network magnitude, including three stations in the Czech Republic and six stations in Northern Italy.

Further investigations were made for data from three co-located stations with different conditions at the Conrad-Observatory: CONA (in the tunnel), CSNA (free field) and a station located in the borehole, for understanding how seismic signals depend on site effects. In addition, dependence of station detection performance on the site effects was evaluated.

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