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# Applying Spectral Ratio Techniques to Estimate Station Site Responses

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Site amplification effects can cause massive deviations from general earthquake ground motion prediction. The site effect was firstly observed at the Austrian Seismic Network (network code OE) during our work on peak ground acceleration attenuation (Jia and Lenhardt, 2011). The experienced station difference initiated site response investigations for our stations. Due to the sparse station distribution and data discontinuousness at most of our accelerometer stations, many published methods are not applicable to our stations. The best suitable method seems to be the spectral ratio technique for shear-waves.

As the first step of this investigation, it was attempted to validate correctness and suitability of this method. For this validation we selected ten strong motion stations with continuous data recorded at our network to enable applying the spectral ratio technique to noise spectra, which requires continuous data in a long time window. These ten stations are located in free field and belong to the group of the most stable stations in our network. We applied the spectral ratio technique to both noise and shear-wave spectra from these selected stations. Results from the two approaches were compared. Similar results were obtained for the same station from these two different approaches. Certain correlation between site responses and station magnitude residuals was notable for these stations as well.

Then we extended site effect study to all strong motion stations with discontinuous data at our network by using the spectral ratio technique only for shear-waves. Most of these stations are located within buildings in towns. This could result in relatively high site response because of the building resonance. Estimated site responses are firstly compared to the ones obtained from the stations in free field. Further comparison was made between the site responses and the PGA residuals obtained from the work in 2011.

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. These stations include three stations in the Czech Republic and six stations in Northern Italy. Comparisons and discussions will be given.