

# Microtremor Measurement Used to Map Thickness of Soft Sediments

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## **Abstract**

The site effect is being special interest in engineering seismology, as it may cause amplification of the seismic waves during earthquakes. Site to References (S/R) and Horizontal to Vertical (H/V) spectral ratios are the common method used to obtain soil amplification information based on the spectral analysis. The two spectral ratios method are calculated for microtremor data measured in the Aachen area and are plotted together with the theoretical transfer function of the sites where drilling information exist. Clear similarities exist between different types of spectra, except two sites due to high noise amplitude and the lack frequency coverage of instruments. Seht and Wohlenberg (1999) obtain a correlation relationship between thickness and main peak frequency of the spectral ratios in the Aachen area. Using the same method, Parolai et al. (2002) obtain different correlation equation which is derived from spectral ratios calculated using microtremor data in the Cologne area. The sediment thicknesses in Aachen and Cologne area are calculated using the correlation equation derived in both area, respectively. The thickness values are plotted in cross sections which show that the method provides reliable thickness information. Another calculation is done for the Cologne area using the equation derived by Seht and Wohlenberg (1999). The latter calculation does not give good estimation on thickness. Therefore, we conclude that the correlation equation between thickness and main peak frequency is only reliable for a specific area where the data is used in deriving the formula and is not applicable for a wider area.

## **References**

- Seht, M. Ibs-von, J. Wohlenberg. 1999. "Microtremor Measurement Used to Map Thickness of Soft Sediments." *Bull. Seism. Soc. Am.* 89, 250-259
- Parolai, S., P. Bormann, C. Milkereit. 2002. "New Relationship between  $V_s$ , Thickness of Sediments, and Resonance Frequency Calculated by the H/V Ratio of seismic Noise for the Cologne Area (Germany)." *Bull. Seism. Soc. Am.* 92, 2521-2527