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Determination of site amplifications and moment magnitudes of East-Alpine earthquakes

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The Seismological Service of earthquakes Austria located at the Zentralanstalt für Meteorologie und Geodynamik (ZAMG; <http://www.zamg.ac.at>) is the federal agency for monitoring and seismic hazard assessments in Austria. The ZAMG seismological network currently consists of approximately 60 Stations (28 broadband and ~30 strong motion). The increasing number of earthquake records during the past 20 years - from the local seismic network with addition of surrounded stations from the EIDA archive - are used to determinate the local attenuation of seismic shear wave energies and the site amplifications.

The propagation path of the released seismic energy through the uppermost crust has a considerable influence on the ground movement recorded at the surface. This contribution follows the known method of combining a physical modeling and a statistical approach by separating the source, path and site effects by means of inversion. A geometrical spreading model defines the frequency-independent decay of energy while the frequency dependent decay is parameterized by the parameters Q and $Kappa$. The moment magnitudes and stress drops of small earthquakes were determined, and a scaling-relationship of local to moment magnitudes could be established.

Taking these site-effects into consideration reduces the uncertainties in the determination of empirical ground motion prediction equations (GMPE) and increases the accuracy of seismic hazard assessments, ShakeMaps and On-Site systems.