Source parameters and scaling relations for local earthquakes in the Pannonian basin

Bálint Süle and Zoltán Wéber

Kövesligethy Radó Seismological Observatory, MTA CSFK GGI, Budapest, Hungary (suba@seismology.hu)

Source parameters have been estimated for 74 local earthquakes ($0.8 < M_L < 4.5$) occurred in Hungary (central part of Pannonian basin) in the period of 1995-2011. Fourier displacement spectra of P- and SH- waves were analysed with respect to the ω^2 model of Brune. Observed spectra were corrected for path-dependent attenuation effects using an independent regional estimate of the quality factor Q_S. To correct spectra for near-surface attenuation, the κ parameter was calculated, obtaining it from waveforms recorded at short epicentral distances. The values of the κ parameter vary between 0.01 to 0.06 s with a mean of 0.03 s for P-waves and between 0.01 to 0.09 s with a mean of 0.04 s for SH-waves. After correction for attenuation effects, spectral parameters (corner frequency and low-frequency spectral level) were estimated by a grid search algorithm. The obtained seismic moments range from 1.34×10^{11} to 3.68×10^{15} Nm ($1.5 \leq M_w \leq 4.3$). The source radii are between 115 and 1343 and stress drop spans from 0.14 to 32.4 bars. From the results, a linear relationship between local and moment magnitudes has been established. The obtained scaling relations show slight evidence of self-similarity violation. However, due to the high scatter of our data, the existence of self-similarity cannot be excluded.