Coda-derived moment magnitudes in central Anatolia

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A reliable representation of the energy at the earthquake source is vitally important to make reliable seismic hazard assessments in tectonically active areas. The use of coda waves, for this aim, can provide source spectra for robust moment magnitude estimates mainly due to its volume-averaging property sampling the entire focal sphere as this makes these waves insensitive to any source radiation pattern effect. In the present study, we examined local earthquakes beneath central Anatolia earthquakes with magnitudes 2.0≤ML≤5.2 recorded at 69 seismic stations that were operated between 2013 and 2015 within the framework of the Continental Dynamics–Central Anatolian Tectonics (CD–CAT) passive seismic experiment. The inversion scheme used here involved simultaneous modeling of source properties as well as seismic attenuation parameters in five different frequency bands between 0.75 and 12 Hz. Forward modeling of coda waves was achieved through an isotropic acoustic Radiative Transfer Theory approach. A comparison between coda derived ($M_w$ coda) and routinely reported local ($M_L$) magnitudes shows an overall consistency. However, apparent move-out observed around small earthquakes ($M_L < 3.5$) can be attributed to wrong assumptions for anelastic attenuation as well as to the use of seismic recordings with a finite sampling interval.