S-wave energy estimation of small earthquakes in the Western Nagano region, Japan and the scaling relation

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Seismic-wave energy is an important parameter to reveal a physical process of earthquakes, and several studies have estimated it for large and moderate earthquakes (e.g. Kanamori et al., 1993). However, it is difficult to estimate energies of the small earthquakes, because we need dense seismic stations with good site conditions to get accurate. In this study, a seismic network operated in the Western Nagano region enables us estimate accurate S-wave energies (Es) for the small earthquakes (Mw=0.8-2.6), considering radiation pattern, geometrical spreading, anelastic attenuation (Qs), and site amplification near the surface. The ratio of Es/Mo decreases as moment decreases. This agrees well with the result of Abercrombie (1995). In addition, Es/Mo increase as the hypocenter is deeper.