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Magnitude Estimation Using Local Earthquake Waveform Data and the Application to Earthquakes in Indonesia Including the 2010 Mentawai Tsunami Earthquake

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This study aims to estimate earthquake magnitude quickly using vertical component data from Broadband seismographs for the improvement of tsunami warnings. Empirical relationships were obtained for displacement and integrated displacement with moment magnitude. Data selection of seismic records was done before estimating the relationships of amplitudes by observing the number of amount of data to unselect records with gaps and the maximum amplitude to eliminate spike data. We compared the magnitudes of the formulas for displacement (MD) and integrated displacement (MID). We found that MID yielded better estimates than MD. MID also produced appropriate estimates for earthquakes with strike-slip focal mechanisms. On the other hand, for deep earthquakes, MD yielded a better estimate. In the case of the 2010 Mentawai tsunami earthquake, MID produced an underestimated whereas the estimate was obtained no more than three minutes after the earthquake origin time.

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Promotional text

This research tries to improve the first magnitude calculation method used by BMKG to disseminate information on earthquakes or a first tsunami warning.

Oral preference format

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