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Magnitude Estimation and Onsite Earthquake Early Warning using Cumulative Absolute Velocity in Taiwan

Hao-Yun Huang[1] and Yih-Min Wu[1,2,3]
[1]Department of Geosciences, National Taiwan University, Taipei 106319, Taiwan (H-Y.H. : chip50505@yahoo.com.tw; Y-M.W. : drymwu@ntu.edu.tw)
[2]Institute of Earth Sciences, Academia Sinica, Taipei 115201, Taiwan (drymwu@ntu.edu.tw)
[3]Research Center for Future Earth, National Taiwan University, Taipei 106319, Taiwan (drymwu@ntu.edu.tw)

Real-time magnitude determination is one of the critical issues for earthquake early warning (EEW). Magnitude determination may have saturation situation using initial seismic signals after an earthquake occurrence. Previous studies utilized eventual cumulative absolute velocity (eCAV) to determine magnitude up to 9.0 without any saturation. However, to determine eCAV will be too late for EEW application. In order to shorten time to obtain eCAV, 4,754 strong motion records from 64 events with M_L large than 5.5 in Taiwan are used to establish the relationship between eCAV and initial shaking parameters (initial CAV, initial cumulative absolute displacement, initial cumulative absolute integral displacement, P_d and τ_c) from 1 s to 20 s after P arrival. Our preliminary results show that eCAV can be estimated using initial shaking parameters. Logarithm linear correlation coefficients vary from 0.78 to 0.97 with standard deviations from 0.27 to 0.10 for time windows from 1 s to 20 s after P arrival. Eventually, we can timely estimate eCAV for magnitude determination as well as or on-site EEW purpose.