

Focal mechanism dependence of broadband moment magnitude M_{wp}

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The broadband moment magnitude M_{wp} (Tsuboi et al., 1995, 1999) can be determined rapidly after large earthquakes occur, and is used for tsunami early warning at the WC/ATWC and the PTWC. Numerical experimental study has not ever conducted to investigate reliability of this magnitude scale, although it has been studied through comparison between M_{wp} estimates and moment magnitudes determined by other techniques (e.g., Whitmore et al., 2002). In this study, we perform numerical experiments to study reliability of M_{wp} as follows. First, we calculate synthetic seismograms for a point source using the codes of Kikuchi and Kanamori (<http://www.eri.u-tokyo.ac.jp/ETAL/KIKUCHI/>). The epicentral distance range of receivers is 30-90 degrees. In order to simplify interpretation of results, only the first arriving P wave is calculated (i.e., depth phases are not included). Then we apply the M_{wp} calculation procedure to the computed synthetic seismograms. We find the dependence of M_{wp} estimates on focal mechanisms. For vertical dip slip and 45 degree dip slip sources, the M_{wp} estimates scatter around the input magnitude, while those for the vertical strike slip source show systematic decrease by about 0.5 in magnitude unit. We are going to investigate the effects of depth phases and rupture propagation on M_{wp} estimates.