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Multiple centroid moment tensor analyses using Green's functions computed for a 3-D earth model

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We performed multiple centroid moment tensor (CMT) inversion for 25 large earthquakes that occurred since 1995. Following the algorithm of Hara (2002, A42, 2002 Fall Meeting, SSJ), the inversion was carried out by two steps. In the first step, we performed ordinary CMT inversion. In the second step, we divided an event into two subevents and performed simultaneous inversion for CMTs of two subevents. In each step, we used the iterative linearized inversion technique of Hara (1997, GJI, 130, 251-256). In this technique, Green's functions are calculated using the Direct Solution Method (Hara et al., 1991, GJI, 104, 523-540), in which effects of three dimensional earth structure can be accurately considered. For a three dimensional earth model, we construct our model based on SAW24B16 (Megnin and Romanowicz, 2000, GJI, 143,709-728) in this study. The data for inversion were spectra in the frequency band 2 and 4 mHz, which we calculated from VHZ channel waveform data retrieved from the IRIS DMC. As initial guesses for the first step, we used solutions of the Global CMT catalog (http://www.globalcmt.org/).

For 12 events, CMTs of two subevents were determined stably, and the results are consistent with previous studies in terms of direction of rupture propagation and source duration. This result suggests that it is possible to construct a set of multiple CMT solutions by the data analysis procedure of the present study. We plan to investigate whether modification of the way to set initial guesses for the second step may improve results for the other events.

Keywords: multiple CMT, 3-D earth model