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Full moment tensor inversion for the 2013 Sea of Okhotsk deep earthquake

HARA, Tatsuhiko[1*] ; KAWAKATSU, Hitoshi[2]

[1]IISEE, BRI, [2]Earthquake Research Institute, The University of Tokyo

We performed full moment tensor inversion for the May 24, 2013 Sea of Okhotsk deep earthquake, which is the largest deep earthquake (the moment magnitude is 8.3 after the Global CMT solution). Following Kawakatsu (1991), we redefined the diagonal components of the moment tensor, and determined full six component moment tensors. In order to determine the isotropic component independently from the CLVD component, we analyzed long period signals in the period range between 550 and 1000 s following Kawakatsu (1996), and Hara et al. (1995, 1996). We retrieved VHZ channel broadband waveform data from the IRIS DMC. The duration of the time series is five hours. We used the Direct Solution Method (Hara et al., 1991, 1993) to calculate the Green's functions. We considered the 3-D velocity structures of model SAW24B16 (M*é*gnin and Romanowicz, 2000) and crust 2.0 (Bassin et al., 2000; http://igppweb.ucsd.edu/~gabi/rem.html) to calculate synthetic seismograms. We set spatial grids around the PDE hypocenter for possible centroid locations and temporal grids around the centroid time of the Global CMT solution for possible centroid times. We conducted linear moment tensor inversions for pairs of the spatial and temporal grids to investigate the dependence of solutions on centroid location and time. In the preliminary analysis, the isotropic components of the solutions with larger variance reductions and smaller correlation coefficients with the isotropic component and the other moment tensor components are in the range around 2 to 4 per cent (implosive) of the seismic moment of this event. This preliminary result is consistent with Okal (2013), who obtained the implosive isotropic component with about 2 per cent of the seismic moment by the analysis of the normal modes ${}_0S_0$ and ${}_1S_0$, although further evaluation on uncertainty of the estimates obtained in this study is required.

Keywords: deep earthquake, moment tensor, isotropic component