CMT analysis of the great 2004 Sumatra-Andaman earthquake using the DSM

Tatsuhiko Hara[1]

[1] IISEE, BRI

   The centroid of the great 2004 Sumatra-Andaman earthquake determined by the Harvard University group is located at the west of the epicenter determined by USGS, which is inconsistent with the aftershock distribution that extends in the north direction. Also, the difference between the centroid time and the origin time is about 2 minutes, which is significantly shorter than some other preliminary estimates (e.g., Park, 2005, EOS, 86, 57-61). In the present study, we determined CMT for this earthquake using the Direct Solution Method (DSM, Hara et al., 1991).

   First, we set the time-space grids. The assumed duration is 450 sec, and the time interval between the adjacent grids is 30 sec. We placed space grids based on the aftershock distribution (the grid interval is about 100 km). Then, in order to find an optimal CMT solution, we perform moment tensor inversion for each pair of time-space grids using the Green's function computed by the DSM for a 3-D earth model S12WM13 (Su et al., 1994). We analyzed spectra in the frequency band 2-4 mHz computed from VHZ channels data retrieved from IRIS DMC (the duration of time series is 12000 sec).

   The optimal centroid location is about 100 km south of the epicenter, which is inconsistent with the aftershock distribution as well as the Harvard estimate. Also, the difference between the origin time and the centroid time is 2 minute, which is consistent with the Harvard estimate, but shorter than other estimates. We are going to vary the frequency band employed for analyses, and investigate the reliability of our CMT analysis.