Indonesia CMT catalogue using JISNET waveform data: Comparison with the Global CMT catalogue

Tadashi Yamashina[1]; Masaru Nakano[1]; Hiroyuki Kumagai[1]; Hiroshi Inoue[1]

[1] NIED

National Research Institute for Earth Science and Disaster Prevention (NIED) is operating a regional broadband seismic network in Indonesia (JISNET) with the Indonesian Meteorological and Geophysical Agency (BMG). JISNET plays a part of the seismic network for the Indonesian tsunami early warning system. We have created a centroid moment tensor (CMT) catalogue using a waveform inversion analysis of earthquakes that occurred in and around Indonesia. In this paper, we present the NIED CMT catalogue and compare it with the Global CMT Project (GCMT) catalogue.

JISNET consists of 15 stations. Each JISNET station is equipped with a Guralp CMG-3T EBB (360 seconds) three-components broadband seismograph, and waveform data from the seismograph is digitized and recorded by a Hakusan LS-7000 data logger. Recorded waveform data are transmitted to the BMG's headquarters via a satellite telemetry system and to NIED via the Internet in real-time. BMG, the National Research Centre for Geosciences in Germany (GFZ) and China Earthquake Administration (CEA) are maintaining other parts of the broadband seismic network in Indonesia.

We used a waveform inversion method in the frequency domain developed by Nakano *et al.* (2007) to analyze waveform data from the Indonesia broadband seismic network. This inversion method assumes a point seismic source and a pure double-couple focal mechanism. The fault and slip orientations are estimated by a grid search with respect to the strike, dip and rake angles, and the centroid location is determined by a spatial grid search. This method can also estimate the source time function.

We obtained 130 centroid moment tensor solutions and source time functions for events with moment magnitude (M_W) more than 5 that occurred from July 2006 to January 2008. In our analysis, JISNET waveform data are mainly used because of the good quality of the data. 95 events are common in the NIED and the GCMT catalogues during this period. First, we compared the moment magnitudes in the NIED and the GCMT catalogues. The average of M_W differences is 0.0 and the standard deviation is 0.1. Next, we compared the centroid depths. The centroid depths of NIED CMT are shallower than those of the GCMT; the average of differences is -6.4 km and the standard deviation is 10.9 km.

Our comparison indicates that the NIED CMT catalogue is consist with the GCMT catalogue with small differences of moment magnitude and centroid depth. Our analysis also provides the source time functions, which have a great potential to investigate a diversity of rupture processes.

References:

The Global Centroid Moment Tensor Project, http://www.globalcmt.org/

Nakano, M. *et al.*, 2007, Development of a waveform inversion method in the frequency domain to estimate earthquake source mechanism, Abstracts Japan Geoscience Union Meeting 2007 (CD-ROM), S151-P006