[JJ] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS14]Strong Ground Motion and Earthquake Disaster

convener:Masayuki Kuriyama(Central Research Institute of Electric Power Industry)
Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Strong ground motion has social impacts as it induces earthquake disasters. We solicit contribution on any seismological topics related to strong ground motion that includes, but are not limited to, source processes, wave propagation, and site effects. We also welcome contribution on earthquake related disaster mitigation.

[SSS14-P30]Source model of the 2016 central Tottori prefecture earthquake (M_{JMA}6.6) using the empirical Green's function method

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An M_{JMA}6.6 earthquake occurred in central Tottori prefecture, Japan on October 21, 2016 (mainshock). We estimated the source model of this event using broadband strong motion records in a frequency range 0.3-10 Hz to investigate strong motion generation on the source fault. The source model is composed of strong motion generation area (SMGA) (Miyake *et al.*, 2003). We used the empirical Green's function method (Irikura, 1986) to estimate the source model selecting an M_{JMA}4.2 foreshock as an EGF event.

We assumed a left-lateral fault plane model with the strike of 342° and the dip angle of 80° by F-net CMT solution for the mainshock and the aftershock distribution. We used waveforms from 11 stations located less than 40 km from the epicenter including 7 K-NET stations, 3 KiK-net downhole stations by NIED and a JMA seismic intensity meter to calculate source spectral ratios between the mainshock and the foreshock. Applying the source spectral ratio fitting method (Miyake *et al.*, 1999) to the observed source spectral ratio, we obtained the corner frequencies and the source scaling parameters. Then we estimated the source parameters of a SMGA of the mainshock by forward modeling using waveforms from 5 stations. The selected 5 stations include 4 K-NET stations considering the azimuthal coverage and the nearest JMA station to the mainshock source among the 11 stations. The SMGA parameters were the size (the length and the width), the rupture velocity, the rupture starting point, and the rise time. The rupture starting point is fixed at the hypocenter by JMA.

The obtained SMGA size was 3 km×3 km and the rupture propagated from the deep to the shallow. We compared this model with source models of Kubo *et al.* (2017) and JMA (2017). They estimated the slip distribution of the mainshock by the kinematic waveform inversion method using strong motion data (0.1-1.0 Hz and 0.05-0.5Hz) and theoretical Green's functions in lower frequency band. The SMGA by our study corresponds to the large slip area in their models. This indicates that broadband ground motions including not only the frequency band we used but also the lower frequency band they used were generated from the SMGA by our study.

The waveforms by our model reproduced the characteristics of the observed waveforms. There is a room

for improvement in the source model relating to the later part of waveforms at some stations including the nearest station.

Acknowledgements: We used strong motion data from K-NET, KiK-net by NIED, and JMA seismic intensity meter, F-net CMT solution by NIED and the unified hypocenter catalog by JMA and MEXT.