

# Analysis of stress drop ratio of slow tsunami earthquake to usual earthquake

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Characteristics of the slow tsunami earthquake include a long source duration with relative low seismic energy release at high frequencies. It is featured by low corner frequency and small effective stress drop in source spectra analysis on  $\omega^2$ -model (Polet and Kanamori, 2000).

In the empirical Green's function method (EGFM) in strong ground motion analysis, the source spectrum ratio of the target earthquake to the reference one (or the seismic wave spectrum ratio at each same station) is used. Seismic waves from reference earthquakes which are often aftershocks are regarded as Green's function. In EGFM, it is possible to obtain estimation of the average effective stress drop ratio of the target to the reference (Irikura, 1986, Miyake et al., 1999). Specifically, using the scale parameter N (associated with fault scale based on the scaling law), the source spectral ratio asymptotically approaches  $CN^3$  on the long-period side and  $CN$  on the short-period side, and C is the stress drop ratio.

We obtained source spectra of the 1992-Nicaragua-tsunami-earthquake( $M_w$ 7.6) and 1994-Java-tsunami-earthquake( $M_w$ 7.8) from the P-phase and S-phase of the teleseismic waveform at each station. In addition, we also obtained ones of reference earthquakes. They occurred on the plate boundary with low angle thrust type off the coast of Nicaragua ( $M_w$ 6.9) on 10/09/2004 and off Java ( $M_w$ 5.9) on 11/20/2003. In each case, the spectra approximately could be regarded as the  $\omega^2$ -model, so we tried to apply the EGFM method. Specifically, the spectrum ratio of the tsunami earthquake to the reference earthquake was calculated for the data at each station, and they were averaged for the P-phase and S-phase. Spectra ratio at the long-period end was fixed by the ratio of seismic moments from GlobalCMT. To them, the optimal corner-frequency (or period) and N was found by the grid search method.

As a result, for the Nicaragua-tsunami-earthquake, the corner-period was 84 sec and the stress drop ratio for the reference earthquake was 1/2.6, and for the Java-tsunami-earthquake, the corner-period was 84 sec and the stress drop ratio for the reference earthquake was 1/5.0.

Keywords: tsunami earthquake, source spectrum, effective stress drop