**S151-P005** **Room: Poster Session Hall** **Time: May 22**

# Source Process of The July 17, 2006 Off Java Island Earthquake by Using a 2.5D FDM Computations (2)

# Taro Okamoto[1]; Hiroshi Takenaka[2]

[1] Dep. Earth Planet. Sci., Tokyo Institute of Technology; [2] Dept. Earth & Planet. Sci., Kyushu Univ.

The July 17, 2006 off Java Island earthquake occurred close to the Java trench and generated a large tsunami which caused about five hundreds of fatalities and devastating damages. It is important to understand source process of this event in studying the mechanisms of nucleation of such shallow earthquakes and excitation of tsunamis.

We analyse the source process of this event by using the teleseismic body waveform data. We also apply a waveform relocation technique to some of the aftershocks in order to determine the source time function, the moment tensor and the source location. In computing the synthetic teleseismic body waveforms we incorporate the effect of laterally heterogeneous near-source structure of the Java trench. There are two major reasons for adapting such an approach. (1) It has been well known that there are large effect of laterally heterogeneous structure near oceanic trench on the teleseismic body waveforms (e.g., Wiens 1987, 1989; Okamoto 1989, 1993; Yoshida 1992). The non-flat bathymetry and the thick sedimentary layers near the source considerably distort the ray paths of the teleseismic waves, resulting in large later phases. Flat interface model can not reproduce such an effect. (2) Near the oceanic trenches, it is often difficult to precisely determine source depths based on global hypocentral analysis because of scarce station coverage near the source. This difficulty, together with the epicentral errors that are sometimes systematic due to large scale velocity anomalies such as the subducting plate (Engdahl et al. 1982), often prevents us from precisely estimating the depth and extent of the fault. We also note that the hypocenter is the point of rupture initiation and not the spatial centroid of the moment release. Our approach not only solves the problem (1), but also can overcome the problem (2): the source position can be relocated by waveform analysis because the structural effect is non-uniform with respect to the source location (Okamoto, 1994).

We assume a 2.5D model (i.e., uniform in trench-parallel direction but heterogeneous in trench-perpendicular direction and in vertical direction) of fine crustal structure based on a detailed seismic study conducted by Kopp et al. (2002). The assumption of 2.5D model is justified because of the nearly constant bathymetry along trench-parallel direction and the nearly horizontal trench-parallel structure revealed by Kopp et al. (2002). A 2.5D finite-difference method (Takenaka and Okamoto, 1997) is used to compute the effect of the near source structure.

The waveform relocation analysis applied to two aftershocks (2006/07/17 15:45 Mw5.9; 2006/09/19 13:58 Mw5.9) result in good fit between the observed and synthetic waveforms and well constrained source locations that are nearly consistent to those of the Harvard CMT solutions. The moment tensors are also consistent to HCMT solutions. This result also justifies the assumption of 2.5D model in our study.

In the source process analysis, we put point sources on the grid points on the fault plane and simultaneously retrieved the slip and the onset time of the point sources. The inversion procedure is a non-linear, non-negative one with smoothing conditions both for slip distribution and onset times. In order to infer the shallowest extent of the fault, we used a fault model extended beyond the trench axis (the sources are placed inside the oceanic crust). Note that such an fault model can be used because we computed waveforms by incorporating the near source structural effect. We will present the results of the analysis in the meeting.