

The stress field in the aftershock region of the 2005 West Off Fukuoka Prefecture Earthquake

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The 2005 West Off Fukuoka Prefecture Earthquake occurred in Genkai-nada, Fukuoka Prefecture, in the northern part of Kyushu, Japan, at 10:53 on March 20, 2005 (JST) with a Japan Meteorological Agency (JMA) magnitude (M_j) of 7.0. According to JMA, a maximum intensity of 6- on the JMA scale was observed in Fukuoka City, in Maebaru City, and in the Saga Prefecture town of Miyaki. This earthquake killed one person and injured more than 1,000 people. Many aftershocks occurred following the mainshock, the largest was magnitude $M_j=5.8$ at 06:11 on April 20, 2005 (JST).

We used waveform data from 11 pop-up type OBSs, 16 locally recorded temporary stations, eight telemetered temporary stations (Shimizu et al., 2006), and 20 permanent stations installed by the city of Fukuoka, JMA, the National Research Institute for Earth Science and Disaster Prevention (NIED), and the Institute of Seismology and Volcanology, Kyushu University (SEVO). We used the stress tensor inversion method developed by Horiuchi et al. (1995) and applied the bootstrap technique to estimate the confidence limit of the result like Michael (1987). Inputs are only polarity data of first motions of aftershocks that were estimated precisely (Uehira et al., 2006). We set up grid point at intervals of 2.5 km \times 2.5 km of horizontal directions, and 2.5 km of the depth direction in the study area. We selected the earthquakes of the range of ± 2.5 km for the horizontal directions and ± 2.5 km for the depth direction of every grid point. We obtained solutions stably, especially directions of the minimum principal axis. Results are following. The minimum principal axes almost lie in horizontal plane. Directions of principal axes change by seismic groups that were shown in Figure 5 of Uehira et al. (2006). In Group II, which includes the mainshock, the direction of the minimum principal axis is N10W-S10E. In Group III, which includes the largest aftershock and extends to the Kego fault, it is N20E-S20W. So, between Group II and III, there are about 30 degrees differences of the strike of the minimum principal axis. The dip angles of the maximum principle axes are about 30 degrees to 60 degrees in the depth of 10km to 15km just under the Genkai Island. This area correlates with the large slip area obtained by Asano and Iwata (2006).