Focal mechanisms and stress field in and around the source region of the 2005 western Fukuoka earthquake

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A MJMA 7.0 earthquake occurred at the western offshore of Fukuoka prefecture on March 20, 2005. Kego fault exists at the southern part of this earthquake and is running through the center of Fukuoka city. Moreover, seismic activity around the Hakata bay has been activated since March 22. This activity seems to correspond to that of Ishido-Uhimonakamichi fault. This fault is a geological structural boundary, which was not recognized as the active fault. There is a possibility that the fault was reactivated due to the 2005 western Fukuoka earthquake. In order to improve our ability to forecast earthquake hazards, it is necessary to investigate stress field in this area.

Focal mechanism solutions of aftershocks were determined by JMA and NIED from P-wave polarity data and moment tensor inversion, respectively. Most of events are strike-slip faulting whose strikes are similar to the fault plane of the mainshock. On the other hand, focal mechanisms around the Hakata bay area have not been obtained, because the magnitude of those events are less than 3 and it is difficult to determine unique solution of small earthquakes by P-wave polarity data and moment tensor inversion. In this study, we determined focal mechanisms from absolute P and SH amplitudes as well as P-wave polarity data. Seismograph stations used in this study include permanent stations operated by JMA, NIED and Kyushu University. Most of earthquakes are strike-slip faulting, although several events contain some dip slip components. There is a difference in fault strikes between the mainshock fault plane and the activity around the Hakata bay. The difference is supported from the focal mechanism solutions, suggesting that our focal mechanism solutions are reliable. We are planning to determine many focal mechanisms and obtain the seismogenic stress tensor by applying the stress tensor inversion method.