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Imaging S-wave scatterer in the focal area of the 2005 West Off Fukuoka Prefecture Earthquake

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On March 20, 2005 the West Off Fukuoka Prefecture Earthquake (M_j=7.0) occurred in the northern Kyushu. The maximum of seismic intensity was 6 (JMA scale). After the main shock, temporal seismic stations were installed by the joint observation in universities in Japan. By using the data, they revealed characteristic of aftershock activity and found inhomogeneous structure around the fault. In order to understand a mechanism of inland earthquakes, it is necessary to investigate inhomogeneous structure around a focal region. The purpose of this study is to estimate the distribution of scatterer around the focal region by both observations of seismic array and receiver array.

We use an earthquake cluster have similar waveforms to each other as a buried seismometer array (source array). This cluster consisted of 21 natural earthquakes was southeast of the focal area. On the other hand, 15 seismic stations were installed in Genkai Island as a receiver array. This was composed of 2-Hz three-component seismometers with a site spacing of about 30m. Array analysis techniques were applied to the waveforms in S-coda part. After waveforms were passed through a band pass filter from 4 to 16 Hz and were normalized for amplitude. They were stacked in terms of several locations of scatterers for the source array or the receiver array. Then, we fitted an exponential function to them and corrected geometrical factor defined in the single scattering model. Moreover, we analyzed both of arrays at the same time (double beam method). We estimated spatial distribution of S-wave scatterers by the source array and the receiver array. The scatterers were found around the source array and Genkai Island. They are also located SE-extension of the main shock fault. These distribution is similar to that by the previous study (Matsumoto et al., 2006) even the array location in this study is different from their one. This implies reliability of our result. In addition, the inhomogeneity at the edge of the fault is possible to scatter waves with wide range in incident angle. It seems that the scatterers around Genkai Island are located at edge of the asperity of the main shock. However, we cannot resolve the image in detail because they are far from the source array. We will reveal the relation of the structures to the asperity in detail by the receiver array.