Estimation of S-wave scatterer in the focal area of the 2005 West Off Fukuoka Prefecture Earthquake by an earthquake cluster

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On March 20, 2005 the West off Fukuoka Prefecture earthquake (MJMA 7.0) occurred in the northern Kyushu, western Japan. The maximum of seismic intensity is 6 (JMA scale) which was recorded in the Fukuoka and the Saga prefectures.

After the mainshock, several numbers of temporary seismic stations and positioned Ocean Bottom Seismometers (OBSs) was installed by joint cooperation from different teams of universities in Japan. The aim of installed the temporary seismic stations and OBSs, above the focal area is to get detailed structure from aftershock data. By using the data inhomogeneous structures and characters of aftershock activity are being revealed.

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 examine the inhomogeneous structure around the earthquake fault, by using aftershocks data of the West off Fukuoka Prefecture earthquake.

We use an earthquake cluster as a buried seismometer array and applied array analysis techniques to the array, we would like to estimate the location of scaterrer. We found an earthquake cluster have a similar waveforms and determined relative location of hypocenters.

The seismogram of the cluster have similar shape to each other, can be applied an array analysis technique. A scatterer location of a scattered phase can be estimated from its slowness vector and lapse time from origin time. We determined scatterer locations by analyzing many scattered phases seen in the S coda waves. For instance, a distinct phase was found just after a direct S wave arrival , which had similar slowness vector to that of the direct S wave. This implies the scattered wave was generated by the scatterer existing around the seismic station. In similar way, we confirmed this technique could be estimated scatterer distribution in this region.