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An attempt to detect the inhomogeneous structure beneath the Bungo channel using reflected waves

Masahiro Miyazaki^{1*}, Satoshi Matsumoto², Hiroshi Shimizu², Kenji Uehira²

¹Grad. Sch. Sci., Kyushu Univ., ²SEVO, Kyushu Univ.

In the seismograms observed by stations near the Bungo channel, southwestern Japan, many reflected phases are found. In the previous studies, the shape of the Philippine Sea plate subducting beneath the Bungo channel and the structure of crust have been estimated by using reflected phases in the records of the interplate earthquake (Oda et al., 1990; Ohkura, 2000; Miyoshi and Ishibashi, 2007). We attempted to reveal the inhomogeneous structure from data of a earthquake cluster in the shallower part of the crust.

Assuming horizontal reflectors, we estimated the depth distribution of the reflectors from the differences in travel time between a direct S wave and reflected S wave. The hypocenters were determined by the relative hypocenter determination method (Ito, 1985) in order to reduce some errors. We analyzed only the seismograms having impulsive direct S wave. We use the data at 18 stations including 1 temporal station.

As a result, we recognized the reflected phases in most of the observed seismogram from reflectors in depth range from 15 to 20 km depths. Reflected waves from reflector deeper than 30 km depth were also seen in some traces.

Long-term slow slip events (Hirose et al., 1999; Ozawa et al., 2004) and nonvolcanic deep tremors occurred beneath the Bungo channel. Our result indicates a possibility that the reflected waves from deeper parts have a relationship with these slow earthquakes.

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Keywords: reflect waves, the Bungo channel