

P-wave heterogeneous structure around the Kego fault inferred from reflection analysis for seismic network data

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The Kego fault is one of the active fault in Japan, running through the western margin of the Fukuoka plain. On March 20, 2005 the west off Fukuoka earthquake (M7.0) occurred at northwestern extension of the Kego fault. In order to evaluate the effect on the fault by the earthquake, crustal structure is basic information to model the fault condition. This study estimated the subsurface structure around the Kego fault from artificial source used in the reflection survey.

In the survey, vibrator tracks are used as seismic sources at 8 shot points. Sweep time of the source is 24 seconds and sweep frequency range is from 6 Hz to 30 Hz. We recorded the signal from the vibrators at seismic stations deployed by Kyushu University and NIED. Seismic reflection analysis was applied to the data for detecting reflectors beneath the CMP line located between the reflection profile and the station. As simplicity, we processed observed data on the assumption that basement is homogeneous.

We obtained seismic depth sections at CMP lines for the seismic stations. Numerous reflectors in the lower crust are found in the sections; therefore the lower crust is heterogeneous. The reflective zone in the lower crust is from the depth 20 to 32 km in the section, suggesting that the lower limit of the zone corresponds to the Moho discontinuity. Since the section imaged heterogeneous structure across the Kego fault, we compared characteristics of reflectivity between footwall and hanging walls of the fault. The structure of the superficial part is different depending on the place. At the some point CMP lines, there are reflector in the western side, however in the eastern side of the fault it is not so. This difference in reflectivity depends on the cross point between the CMP line and the fault. This suggests that there isn't clear difference in east and west of the fault at other point. Consequently, there might be variation of the structure along the strike of the Kego fault.

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