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Crustal Structure beneath Eastern Kyushu from Reanalysis for 1994 and 1996 Refraction / Wide-angle Reflection Data

Hironu Otsu^{1*}, Takaya Iwasaki¹, Hiroki Miyamachi²

¹ERI, The University of Tokyo, ²Kagoshima University

In 1994 and 1996, a refraction/wide-angle reflection profiling was carried out in the eastern part of Kyushu to reveal the crustal structure. The about 230km-long seismic line was laid out in NS direction, crossing major tectonic lines of Beppu-Shimabara graben, Usuki-Yatsuchiro tectonic line, Butsuzo tectonic line and Nobeoka tectonic line. On this line, 6 shots with 500kg were recorded by receivers with about 1-km interval.

So far, Miyamachi et al. (1996), Tashiro et al. (1999) and Ando et al. (2002) presented seismic velocity crustal structure models from travel-time analysis. One of the most important features in their models is a huge sedimentary packages ($V_p=3.5-4.9$ km/s) with a thickness of 4.0 km situated in the southernmost part of this profile. These studies, however, are based only on the travel time analysis. So, there still remains a problem whether these models explain complicated features of the observed wave forms. This study is aimed to reconstruct a velocity model for this profile from travel-time and amplitude analyses, taking geological information into account in the modeling.

The Seismic tomography for first arrivals provides a model almost comparable to the previous models. The forward modeling by ray-tracing technique provides sedimentary packages ($V_p=3.3-4.9$ km/s) with a thickness of 4.5 km situated in the southernmost part of this profile. The boundary of this layer forms the Nobeoka tectonic line that separates the northern Shimanto belt from the southern Shimanto belt. Moreover, on northern part of line, there are sedimentary packages ($V_p=3.8-4.5$ km/s) and Oita ? Kumamoto tectonic line, well corresponding to the result by gravity experiment (Kusumoto et al, (1999)).

Our analysis proceeds to constructing the deep structure both from travel time and amplitude calculations.