# The 2-D velocity distribution along a profile running through the central part of Kyushu, derived from the 2011 seismic experiment

*Hiroki Miyamachi[1], Eiji Kurashimo[2], Takaya Iwasaki[2], Jun Oikawa[2], Takahiro Ohkura[6], Hiroshi Katao[3], Satoshi Matsumoto[4], Ueki Sadato[5], Satoshi Hirahara[5]

1. Graduate School of Science and Engineering, Kagoshima Univ., 2. Earthquake Reserach Institute, Univ. of Tokyo, 3. Disaster Prevention Research Institute, Kyoto Univ., 4. Graduate School of Science, Kyushu Univ., 5. Graduate School of Science, Tohoku Univ., 6. Graduate School of Science, Kyoto Univ.

In November 2011, in order to reveal the 2-D velocity structure in the upper and middle crust along the profile crossing the Beppu-Shimabara graben and the Aso volcano, we carried out a seismic experiment along a profile with about 155 km in length, running through the central area of Kyushu. The Beppu-Shimabara graben and the Aso caldera are located in the central part of the profile. Geologically the north and middle parts of the profile are widely covered by the volcanic rock group. On the other hand, the Chichibu Belt and the Shimanto Belt, which are composed of the sedimentary rocks, are distributed in the south part of the profile. The seismic experiment was composed of 7 explosive sources with charge of 100 - 300 kg dynamite. We deployed about 190 temporary seismic stations at about 500 m intervals in the northern and southern parts of the profile, and about 340 temporary seismic stations at about 250 m intervals in the central part (Miyamachi et al. 2012JpGU).
We could observe clear P wave onsets and obvious reflection waves at the stations located in the southern part of the profile. On the other hand, at the stations in the central and northern parts, it was difficult to pick the clear P wave onsets due to attenuation of seismic signals caused by a thick surface layer of the volcanic sediments and rocks.
Previously Kurashimo et al. (2012JpGU) analyzed the travel time data by using the “FAST” tomography method (Zelt and Barton, 1998) and showed the preliminary velocity distribution. In this study, we also applied the 2-D tomography method based on the LTI method (Asakawa and Kawanaka, 1993) and the SIRT method (Trampert and Leveque, 1990) to the travel time data. In modeling the 2-D velocity distribution, we divided the whole target region into fine cells with a size of 200 m by 200 m. To diminish the initial value dependency for a tomography solution, we set 100 independent initial models and performed the tomography for each initial model. The final velocity model is derived from averaging the 100 solutions obtained from the 100 independent initial models. In this report, we will show the more detailed 2-D velocity model.

Keywords: velocity structure, kyushu, tomography

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