

Velocity structure in the crust and upper mantle under the north-western part of Kyushu area

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North-western Kyushu area lies in the north edge of Okinawa Trough, the back-arc side of Ryuku Trench. The existence of an active rift zone (Beppu-Shimabara Rift Zone) at the south edge, makes this area a particular tectonic region. The extension of the Beppu-Shimabara rift zone toward north-south, formerly observed by triangular and gravity survey. The complexities in deploying seismic stations and the less number of earthquakes occur make the previous studies of tomography mostly focused on the fore-arc of the Ryuku Trench. Previously the partial of Ryuku Trench back-arc, had been studied by Wang and Zhao (2006), based on that our study purpose is extending tomography study area, to coverage and detailing the entire back-arc of Ryuku Trench. According to our study, the dense seismic network of temporally deployed seismograph stations provides a means of direct use for investigating velocity structure in the North-Western part of Kyushu area.

A total of 2,343 earthquakes recorded by 191 stations; which is 24 temporary stations installed by Kyushu University have been carried out for this study. The number of P-wave and S-wave is 62,413 and 38,622, respectively. In this study we applied the double-difference tomography method (Zhang and Thurber, 2003) to obtain accurate event locations and velocity structure near source region by reducing systematic errors using relative arrival times.

The result points out the image of velocity pattern with high resolution, particularly in the crust. Low velocity anomalies were found under active volcanoes, in the mantle wedge and Miyazaki plane. High velocity anomalies were found in the subducting Philippine Sea slab and in the crust under the north-western part of Kyushu area. The results also describe the existence of a low velocity zone around the active rift zone (Beppu-Shimabara Rift Zone). The cause of velocity anomaly will be explained in detail using the images result.

Wang, Z. and D. Zhao (2006) Vp and Vs tomography of Kyushu, Japan: New insight into arc magmatism and forearc seismotectonics, *Phys Earth Planet. Inter.*, 157, 269-285.

Zhang, H. and C.H. Thurber (2003) Double-Difference Tomography: The method of its application to the Hayward fault, California, *Bull. Seism. Soc. Am.*, 93, 5, 1,875-1,889.