Three-dimensional seismic velocity structure and focal distribution of Kirishima Volcano

Kiyoshi Nishi[1], Tsuneomi Kagiyama[2]

[1] Sakurajima Volcano Res. Center, DPRI., Kyoto Univ, [2] Earthquake Research Institute, University of Tokyo

In order to obtain a three-dimensional velocity structure and focal distribution at the Kirishima volcanic complex, simultaneous travel time inversion for velocity and hypocenter was performed using travel time data of experimental explosions, quarry shots and selected natural earthquakes. A newly developed 3-D seismic ray tracer (Nishi, 2001) which is robust for highly heterogeneous velocity structure was employed for the forward problem in the tomographic inversion. Grid spacing was 0.5 km for the horizontal and 1.0 km for the vertical. Travel time residual was reduced from 0.118 to 0.064 sec after 6 iterations.

High velocity anomaly was found in the central region of volcanic edifice as was found from previous studies. However, this high velocity anomaly turns to low velocity around Shinmoe-dake. Another low velocity anomaly from -4 to -6 % was found in the SE of Ebino-dake at 3km depth. Low seismic activity in this region suggests the partial melting of this region. From the results of hypocenter calculation based on the 3-D velocity structure, focal distribution closely related to the geological structure was obtained.