

# Imaging of the Magma Supply System of Unzen Volcano by Double-Difference Tomography

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In a volcano, it is important to perform imaging of the magma supply system, when predicting the eruption and transition of activities. So, in this research, we presume the three-dimensional seismic velocity structure around Unzen volcano by the analysis of seismic tomography, and perform imaging of the magma supply system.

Unzen volcano is an active volcano located at the center of Shimabara peninsula in Nagasaki Prefecture. The eruption activity was resumed after an interval of 198 years in 1990, and the lava dome was formed near the summit of the mountain in 1991. Then, generating of pyroclastic flows and debris flows were repeated and activity was continued till 1995. In this eruption, many observations, such as leveling and gravity survey, are performed and researches on the magma supply system are also done in various fields (geodesy, seismology, geomagnetism, geochemistry, etc.). According to those results, although the almost same model is advocated in the west side of Unzen volcano till depth of about 10km, about the magma supply system of a place deeper than it, the opinion is different depending on models.

In this research, We presumed the three-dimensional velocity structure around Unzen volcano by double-difference tomography (DD tomography) developed by Zhang and Thurber (2003). DD tomography select pairs by the earthquake which occurred nearby spatially and define the difference of those travel-time residuals, in addition to the conventional seismic tomography. So, relative hypocenter locations and the velocity structure near the hypocenter are presumed with high resolution. Therefore, it is expected that imaging of the depths magma reservoir presumed from geodesy data etc. near the source region at deeper than 10km becomes possible .

As a result, clear structure which is adapted for the depths magma reservoir (C source, D source) presumed from geodesy data etc. was not seen. From now on, It is necessary to examine the earthquake data to be used and arrangement of a grid further, and to presume the structure in higher resolution.