

## Magma pathway and recent eruptions of Asama Volcano, Japan

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Asama Volcano is one of the most active volcanoes in the Japanese islands with recent eruptions in 2004, 2008, and 2009. The magma pathway beneath Asama is now quite well understood because of a dense geophysical network. Precise relocation of earthquakes combined with the deformation field during the 2004 eruptions delineated the magma pathway; during the 2004 eruptions, magma first intruded to a depth of about 1-1.5 km several kilometers to the west of the summit, migrated horizontally to the right beneath the summit crater, and migrated vertically to make the surface.

To address a question that what controls such a winding pathway, an active source seismic experiment was conducted. The P-wave velocity structure derived from the experiment shows that the area of dikeing previously inferred is imaged by a high velocity body, indicating that the high velocity body is formed by repeating intrusions and solidifications of the magma during the geological past. The high velocity body is extended to shallower depths as well as the dikeing area. Combining this with the resistivity structure suggests that the high density body at the shallower depths prevents the intruded dike from moving upward by negative buoyancy, leading the magma to move horizontally to find a way to move up.

The deformation field associated with the more recent eruptions in 2008 and 2009 also indicates the dike intrusion to the west of the summit. The deformation field also suggests an inflation source within several hundred meters beneath the summit, which is unidentified during the 2004 eruptions probably due to the lack of a continuous GPS site at the summit and spatial resolution of the P-wave velocity structure. The origin of the shallow source is still an open question, but it could have something to do with volcanic earthquakes with peculiar waveforms occurring at shallow depths of Asama Volcano.