

Active source seismic experiment in Asama Volcano, Japan

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Asama Volcano is one of the most active volcano in Japan with eruptions including moderate-sized (VEI=2) ones in 2004. Combination of seismic and geodetic observations successfully delineated the magma pathway associated with the 2004 eruptions, in which 1) dike striking WNW-ESE intrudes at a depth of 1-1.5 km below sea level to the ~4 km west of the flank, 2) magma migrates horizontally to right beneath the summit crater, and 3) propagates vertically to make the surface. With this point of view, we conducted an active source experiment in October, 2006, to delineate the shallow subsurface structure beneath Asama Volcano and understand the material properties in areas of magma pathway. We recorded seismic waves exerted from five dynamite shots with charges of 250-300 kg by ~450 2-Hz seismometers spacing every 100-150 m. Most of the seismometers are occupied linearly to north-south and east-west traversing the volcano for two-dimensional analysis. Some seismometers form arrays to observe scattered waves. As a first step, we manually picked first arrival times of each site for each explosion, depicting that the apparent velocity is about 6 km/s at an epicentral distance farther than about 10 km and about 3 km/s closer than about 10 km. This rough estimate indicates that the depth to the top of the basement with a P-wave velocity of 6 km/s is approximately 3 km below seismic sites with an altitude of 1000-2500 m. Spatial variations of P-wave velocities are shown in the presentation.