Seismic reflection survey around Unzen Volcano

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A seismic reflection survey was carried out around Unzen volcano. Unzen volcano located at the center of unzen graben erupted in 1990 - 1995. According to geophysical research about the volcano (i.e. hypocenter distribution, volcanic tremor source, and pressure source location estimated by geodetic data), it is expected that pressure source of deflation/inflation associated with the eruption exist at about sea level beneath the lava dome formed in the eruption. From 1999, a project named Unzen Scientific Drilling Project (USDP) started, which investigates structure of the volcano and conduit and a mechanism of the eruption. The survey is done as a preceding project to conduit drilling The profile was deployed at about 2km west of the lava dome. Total length of survey line is about 12km. Numbers of geophone sites and shot are 580 and 200, respectively. Geophones are set every 25m on the profile. Vibrator is adopted as a artificial source with sweep frequency range of 8 to 40Hz. Seismic signal is generated by three vibrators and shot interval is about 50m. The signal is stacked 34 times to get high quality signal. Observed data are processed by ordinary methods used in seismic reflection experiments such as static correction, velocity analysis, CDP stacking, and migration. After the processing, we obtained seismic section beneath the survey line. The results show several interesting features about the volcanic structure beneath Unzen volcano. 1) Many faults are found corresponding to that appear in the surface. These faults, are basically normal fault, suggest that crust in this region has a graben structure. 2) At about 3km depth, there is strong reflector which is found as layer boundary estimated refraction survey carried out in 1995. 3) Reflected phases are detected at two-way travel time between 6 to 12 seconds. These phases can be interpreted as reflecting waves from Moho discontinuity and reflectors existing in the lower crust.