

A 3-D seismic reflection profiling beneath the central cones of Aso Volcano, central Kyushu, Japan

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A 3-D seismic reflection profile beneath the central cones of Aso Volcano is presented down to 7.5km below sea level. Aso Volcano locates on the middle part of Kyushu. Aso Volcano is the one of the most famous active volcanoes. Aso Volcano consists of active central cones and of a huge caldera with dimensions 18km east west and 25km north south, forming an elliptically shaped depression.

A seismic exploration, the project ASO98, had been carried out on November 1998 in order to study seismological structure beneath the central cones of Aso Volcano. The project ASO98 includes six shot points and 296 temporal stations that comprise a network over an area of 10km north south by 8km east west around the active crater in the central cones.

The reflection analysis revealed a 3-D distribution of reflectors down to 7.5km below sea level with data conditioning techniques in the modern reflection seismology. The deep structure of the target area is sectored into three parts through the profiling: an eastern part, a western part, and northwestern part respectively. The eastern part includes many reflectors between 2km and 6km below sea level. The active crater bounds the eastern part from the western part. A reflector void locates between 2.0km and 4.0km below sea level on 0.5 km west of the active crater. The western part consists of clear reflectors that spread continuously at 2km below sea level. The reflector at 2km below sea level may imply a bottom of caldera or a kind of a stratigraphic interface. There is another void of clear reflection that lies between 4km and 7.5km below sea level in the western part. A location of this reflection void is consistent with results of previous seismic studies, such as low-velocity and attenuation region. In the northwestern part of the central cones, less clear reflectors appear. The northwestern part is bounded by a reflector discontinuity that strikes ENE-WSW direction. The strike and the location of the reflector discontinuity are coincident with those of Oita-Kumamoto tectonic line that pinches Aso Caldera. The reflector discontinuity may correlate with this major tectonic line because of its location and its strike.