

九州中央部縦断人工地震探査 2011 (観測概要)

Seismic Exploration along a longitudinal profile in the central part of Kyushu, 2011 - The outline of the experiment -

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Seismic exploration using artificial sources was conducted in Kyushu, Japan in November, 2011, in order to clarify the detailed velocity structure in the crust beneath Kyushu. Our seismic profile runs longitudinally across the central part of Kyushu, and the Beppu-Shimabara graben and the Aso caldera are located in the middle part of the profile. Geologically the north and middle parts of the profile are widely covered by the volcanic rock group. On the other hand, the Chichibu Belt and the Shimanto Belt, which are composed of the sedimentary rocks, are distributed in the south part of the profile.

On the about 152 km long profile, we deployed 535 temporary seismic stations and 7 shot points with charges of 100 to 300 kg dynamite. The seismic stations, located mainly in the middle part of the profile, equipped a 4.5Hz vertical component seismometer and a portable data logger "LS-8200SD". The other stations located in the north and south parts have a 2Hz vertical component seismometer and a portable data logger "LS-8000SH" or "LS-8200SD". Seismic waves are digitally recorded by the loggers with a 250Hz or 200Hz sampling. The locations of the stations and shots are basically estimated by the handy GPS instrument.

The shots were fired on November 28, 2011. We can successfully observe the seismic signals generated from each shot. However, it is found that the signals from the shots S1, S2, S3, and S7 located in the north and middle part of the profile are greatly attenuated due to the thick surface layer of the volcanic rocks. And also no obvious reflection waves are observed. On the other hand, the refraction and reflection signals from S4, S5, and S6 in the south part, can be clearly observed. It is suggested that preliminary travel time curves obtained from all shots are well correlated with the surface geology.

We installed the 8 hours long recording time schedule to the portable logger, and aimed for detecting seismic waves derived from micro earthquakes. We can fortunately observe the seismic waves generated by some micro earthquakes occurred near the profile. These data may be available for validate the velocity model estimated from the travel time data.

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