

Observation system mounted on MOVE (mobile observatory for volcanic explosion)

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The mission of MOVE, Mobile Observatory for Volcanic Explosion, is to take data and samples in the hazardous areas in an active volcano. The observations are made by the system mounted on the vehicle and the instrument boxes which can be distributed on the way. In the year of 2004, we have undertaken construction the former, which is named E-Pack.

E-pack mainly measures the pressure and temperature with video images. Such multi-parametric observation have already been conducted in many volcanoes worldwide. The feature of the present system is its applicability to the severe environments and phenomena where no quantitative measurement has ever been conducted. For example, sequential measurements of pressure and temperature in the surges and blasts are expected.

Broad-band data for pressure change associated with volcanic explosion are required in order to evaluate the total energy and energy release rate of a volcanic explosion and to understand the cause of the damages. The ordinary monitoring systems for volcanoes take infrasound data. On the other hand, Shock Wave Research Center proposed that detection of shockwaves associated with volcanic explosion requires a data acquisition system with a frequency range up to hundreds of kHz. They have set such a system at Aso volcano (Takayama, 2000). However, it is not easy to maintain such high-performance and delicate instruments at volcanoes for long time. MOVE, which can carry the instruments to an adequate observation point after possibility of an explosion of the volcano gets high, could increase the possibility to take data from the explosion.

For the above purposes, we selected instruments with high resistance against heat and shock and assembled several kinds of sensors so that the system has broad dynamic and frequency ranges. Most of the instruments are new in the monitoring for volcanoes. In the present work, we show the response characteristics of the pressure sensors in our system and compare them with the sensors which are generally used in the monitoring.