

Observation System of the Miyake-jima Volcano via Microwaves and Its Tentative Report

Tadashi Takano[1]; Yoji Miki[2]; Sayo Akatsuka[3]; Shingo Yoshida[4]; Kohei Nagata[5]; Katsumi Hattori[6]; Masahide Nishihashi[7]; daishi kaida[8]

[1] ISAS, JAXA; [2] Tokyo Univ. of Science; [3] Dept. of electrical engineering, Tokyo Univ. of Science; [4] ERI, Univ. of Tokyo; [5] ERI; [6] Chiba University; [7] Geosys. and Biosys. Sci. Div., Graduate School of Sci. and Tech., Chiba Univ.; [8] Earth Science Sci, Chiba Univ

It is expected that rock fails in association with earthquakes or volcanic eruptions. On the other hand, microwave emission was found due to rock failure in indoor experiments. Therefore, it is considered that microwave is emitted in natural phenomena, and that the microwave in a volcanic activity can be detected more easily than that in an earthquake because of the known location and hopefully time.

We installed the microwave detection system on Oyama of Miyake-jima which is still active, and completed the system which gathers and transmits the observation data through a communication circuit. This paper reports the constitution and characteristics of the volcano observation system, and the obtained data.

In the system, microwave antennas were placed to point the rock cliff of Oyama crater. The output signals are amplified with low noise, then down-converted and detected. Observation is carried out in 300 MHz-, 2GHz- and 18GHz-bands. Seismometer is also installed around the crater. The low frequency signals are digitized to be supplied to data storage and transmission. The data circuit is composed of a wireless LAN from the crater to the mountain skirt, and an ADSL from the skirt to Tokyo.

After the observation start, a computer for data transmission failed without the confirmed reason to make data loss several times. From the obtained data, the following points are significant:

- (1) In 300 MHz-band, pulse-shaped signals with several second duration occur several times.
- (2) There are several cases when the signal pulse occurs in correspondence with the indication of the seismometer.
- (3) In 2GHz-band, strong artificial interference is observed.
- (4) In 18GHz-band, no pulse-shaped signal is observed.

Later, we will improve the observation system, and try to obtain more data.