Real-time monitoring for Sakurajima plumes by ground observation from multiple stations and by satellite data

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http://www-sci.edu.kagoshima-u.ac.jp/volc/

1. Introduction

The height of volcanic clouds is one of the most important factors for estimating the volcanic activity. Sakurajima volcano has been active continuously with ejection of ash clouds from the Minamidake crater since 1955. Such a long-term activity is rare in the world.

The purpose of this study is as follows: (i) to collect information about the volcanic cloud heights, the advection and dispersion of plumes, and the ash-fall areas. (ii) to analyze the behavior of volcanic clouds and gas, and to estimate the ash-fall areas, in conjunction with satellite data analysis. (iii) to archive the monitoring pictures and to provide these pictures and correlated informations, such as satellite images and published volcanic hazard reports.

This study will contribute to forecasting studies of volcanic gas and ash-fall hazards, and provide valuable safety information to inhabitants. Furthermore, satellite data analysis, combined with ground observations, makes it possible to monitor the long-range transport of volcanic clouds. Thus the study will contribute to aviation safety around Kagoshima Airport.

2. Video monitoring system for Sakurajima plumes

We have constructed a real-time video monitoring system for observation of Sakurajima plumes. Multiple observations make it possible to avoid the overestimate or underestimate of volcanic cloud heights caused by their flow directions, and it is useful for distinguishing between volcanic and meteorological clouds. In order to investigate the SO2 high concentration episodes observed at the atmospheric-gas monitoring stations located in the lee of strong winds, we are able to obtain pictures of plumes taken from multiple angles.

The multiple observation system consists of the following three stations.

Korimoto camera (Host station):

Located at Faculty of Education, Kagoshima University, 10 km WSW from Minamidake crater.

Real-time pictures are updated every 5 min., and the archived images are provided through the Internet.

Terayama camera (Branch station):

Located 10 km NW from Minamidake crater.

This station is connected with the host station by the Kagoshima University LAN, thus real-time pictures are seen at the host station, and archived there.

Tarumizu camera (Branch station):

Located 10 km SSE from Minamidake crater.

Pictures are taken by the network camera system and they are transported to the host station automatically.

3. Satellite data

NOAA/AVHRR data received at Kagoshima University is provided through the LAN, thus we can analyze the real-time data. As for other satellite data, Terra/MODIS and Aqua/MODIS data are able to be downloaded from the NASA Distributed Active Archive Center via Internet. We can obtain GMS-5/VISSR data from the Japan Weather Association.

4. Internet display

The multiple observation system has been published at 'http://arist.edu.kagoshima-u.ac.jp/volc/tetra/' since February 2003. We are planning the addition of branch stations.