UV imaging for sulphur dioxide amount distribution in the volcanic plumes

Toshiya Mori[1]

[1] Lab.Earthquake Chem., Univ.Tokyo

www.eqchem.s.u-tokyo.ac.jp

Flux of volatiles from volcanoes is one of the indicators transmitting information from depth of the volcanoes and, thus, is a crucial item for volcanic monitoring and hazard assessment. Sulfur dioxide, among many volcanic gas components, is the only species that can be remotely quantified by simple ultraviolet spectroscopy. Until recently, remote measuring instruments such as COSPECs or compact UV spectrometers were used for monitoring of SO_2 flux from volcanoes. These instruments can only measure SO_2 column amount of one direction at one time, and it is necessary to scan the plume to obtain SO_2 flux from volcanoes. Thus, time intervals for measuring SO_2 flux using

these two methods is constrained by the time required for scanning the volcanic plume which takes a few minute to a few tens of minutes. With such a long time intervals, it is insufficient to discuss the short time variations of flux which may be related to volcanic tremors and earthquakes. . If SO_2

in the plume can be visualized with time interval of order of seconds, we can examine SO_2 flux on the order of seconds, and quantitatively constrain detailed plume behaviours and plume speed, The new capabilities offered by the SO_2 imaging herald a major step forward for understanding degassing processes and therefore civil defence.

Recently, a method to visualize SO_2 amount in volcanic plumes has been developed using UV sensitive CCD camera and UV band-pass filters (Mori and Burton, 2006; Bluth et al., 2007). This paper describes this newly developed method for visualizing SO_2 distribution in the volcanic plumes and show results of observations carried out at Sakurajima volcano, Japan and Stromboli volcano, Italy.. We also discuss applications, problems and prospects of the new method.