Geophysical Research Abstracts, Vol. 7, 08987, 2005
SRef-ID: 1607-7962/gra/EGU05-A-08987

Mobile solar FTIR measurements of SO2 and halogens in the gas plumes of active volcanoes.

J. Mellqvist (1), B. Galle (1), M. Kihlman (1), M. Burton (2)

(1) Radio and Space Science, Chalmers University of Technology, SE-41296 Göteborg, Sweden

(2) INGV, Nicolosi, Sicily, Italy

A mobile solar infrared system for flux measurements of volcanic plumes, denoted Solar Occultation Flux (SOF), has been developed and deployed at several field campaigns (MtEtna 2000 and 2004 and Popocatepetl in 2003). With the SOF system the integrated amounts of SO_2, HCl and HF along the path of the solar light are retrieved. By conducting the measurements from a car driven orthogonally to the wind, leeward of the volcano, the total amount of species over the cross section of the gas plume is estimated. This value is further multiplied by the wind speed and then the flux in kg/s is obtained. Both the absolute fluxes but also the ratios of the mentioned species can be used for the interpretation of volcanic activity.

The columns are retrieved by analyzing the amount of absorption occurring in the solar spectrum and this is done with the optimal estimation method (code SFIT2) and line parameters from the HITRAN compilation (www.Hitran.com).

The degree of automation is high for the SOF system, and the system provides real time information of the column amount of various species. In this paper the measurement system will be described and examples of results from the above-mentioned field campaigns will be given.