Geophysical Research Abstracts
Vol. 14, EGU2012-6556, 2012
EGU General Assembly 2012

Bromine monoxide evolution in early plumes of Mutnovsky and Gorely (Kamchatka, Russia)

N. Bobrowski (1), L. Vogel (1), U. Platt (1), S. Arellano (2), B. Galle (2), T. Hansteen (3), and S. Bredemeyer (3)

(1) Institut für Umweltphysik, University of Heidelberg, Germany (nicole.bobrowski@iup.uni-heidelberg.de), (2) Department of Earth and Space Sciences, Chalmers University of Technology, Gothenburg, Sweden, (3) Leibniz Institute of Marine Sciences at the University of Kiel (IFM-GEOMAR), Germany

In September 2011 during the 11^{th} Field Workshop of the Commission on the Chemistry of Volcanic gases (CCVG) Multi-axis Differential Optical Absorption Spectroscopy (MAX-DOAS) measurements and Mini-DOAS traverses were carried out at the volcanoes Mutnovsky and Gorely in Kamchatka, Russia. A SO_2 camera was applied in parallel.

Mutnovsky (52˚27'N, 158˚12'E, 2322 m.a.s.l.) is a stratovolcano whose volcanic activity is currently characterized mainly by strong fumarolic degassing. Gorely (52˚33N, 158˚'02E, 1829 m) is a caldera volcano which currently comprises an acidic crater lake a large, and often displays a non-condensing volcanic plume. It is a peculiarity that the plume of Gorely volcano cannot (or only rarely) be recognized by visual observation, even though it has a similar emission source strength as Etna (several thousand tons of gas every day).

BrO/SO_2 ratios were for the first time determined in the young volcanic plumes of both Mutnovsky and Gorely volcanoes on the 5^{th} and 6^{th}September 2011, respectively. The instruments were set up at a distance to the summit of about 8 km in the case of Mutnovsky and 4 km in the case of Gorely. Measurements were carried out at various azimuth angles and therefore several plume ages. The investigated plume age could be calculated from the wind velocity determined by the SO_2 camera which was applied simultaneously with the MAX DOAS system. Furthermore, plume traverses at Mutnovsky and Gorely yielded SO_2 emission fluxes of about 500 t/d and 1000 t/d, respectively. The BrO/SO_2 ratios range from below 0.5 x 10^5 up to about 6 x 10^5 with increasing plume ages and follow therefore the previously observed trend at other volcanic sites.

The data will be compared with earlier studies, e.g., at Mt Etna. Possible influence of the different surrounding conditions, in particular the condensation, is discussed.