



Bromine monoxide measurements in volcanic plumes from S5-P/Tropomi

Simon Warnach (1,2), Holger Sihler (1,2), Christian Borger (1), Nicole Bobrowski (1,2), Christoph Hörmann (1), Steffen Beirle (1), Moritz Schöne (2), Ulrich Platt (1,2), and Thomas Wagner (1)

(1) Max Planck Institut für Chemie, Mainz, Germany (s.warnach@mpic.de), (2) Institut für Umweltphysik, Uni Heidelberg, Heidelberg, Germany

In this presentation, the potential of the recently launched Tropomi instrument to detect bromine monoxide (BrO) in volcanic plumes is investigated. So far BrO in volcanic plumes has been successfully retrieved from satellite only during major eruptions. The higher spatial resolution of Sentinel-5 Precursor/Tropomi (3.5 x 7 km) and the daily coverage allows for an investigation of volcanic BrO during smaller eruptions and even during continuous passive degassing. The continuous observation of passive degassing volcanoes yields the potential for long-term monitoring of volcanoes from satellite. Also, it is expected that the volcanic plumes can be tracked over larger distances.

BrO is a halogen radical altering - inter alia - the atmospheric ozone chemistry. BrO and in particular the molar BrO/SO₂ ratios in volcanic gas emissions have been suggested as proxy for monitoring volcanic activity on several accounts.

In this study, we present maps of BrO column densities as well as SO₂ column densities retrieved using Differential Optical Absorption Spectroscopy (DOAS) and BrO/ SO₂ molar ratios in volcanic plumes with varying emission strength from Tropomi data.

In addition, we compare the retrieved BrO/SO₂ molar ratio to OMI satellite and ground based data as well.