Geophysical Research Abstracts
Vol. 19, EGU2017-14918, 2017
EGU General Assembly 2017

Investigation of BrO in volcanic plumes: Comparing satellite data from OMI and GOME-2

Simon Warnach (1), Christoph Hörmann (1,2), Holger Sihler (1,2), Nicole Bobrowski (1,2), Steffen Beirle (1), Marloes Penning de Vries (1), Florian Dinger (1,2), Ulrich Platt (1,2), and Thomas Wagner (1)

(1) Max Planck Institute for Chemistry, Mainz, Germany, (2) Institute for Environmental Physics, University of Heidelberg, Heidelberg, Germany

It has been repeatedly shown in the past by measurements from the ground and from space that volcanic plumes contain widely varying amounts of bromine monoxide (BrO). The relative amount of BrO in a volcanic plume, i. e. with respect to sulphur dioxide (SO_2), is mainly affected by degassing composition as well as chemical processes, but the reasons for the variation is still not fully understood. Our study aims at obtaining a better understanding of bromine emissions from volcanoes. The high spatial resolution of current satellite instruments such as OMI (13x24 km^2) and GOME-2 (40x80 km^2), and particularly that of future instruments like TROPOMI (3.5x7 km^2) allows to resolve the volcanic plume of eruptive events and makes. The combination of the high spatial resolution and the global coverage of satellite instruments make it possible to study the spatial variability of trace gases in a large number of volcanic plumes from a large number of volcanoes. In this study, we investigate the BrO and SO_2 distribution as well as the BrO/SO_2 ratio within volcanic plumes observed by OMI since 2007. We apply a plume detection algorithm which uses the retrieved SO_2 column for plume identification. These data obtained from OMI measurements are compared to plumes identified from GOME-2 data. Differences in the number of identified plumes and the degree of agreement regarding the retrieved spatial distribution of BrO and SO_2, as well as the calculated BrO/SO_2 ratio between plumes observed by both instruments, are discussed. Differences are mainly attributed to the differences between the two instruments with respect to spatial resolution and overpass time (GOME-2 at 9:30, OMI at 13:30 local time).