Geophysical Research Abstracts
Vol. 19, EGU2017-15534, 2017
EGU General Assembly 2017


# Ground-based and airborne measurements of volcanic gas emissions at White Island in New Zealand

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Quantitative understanding of volcanic gas emissions has twofold relevance for nature and society: 1) Variation in gas emission and/or in emitted gas ratios are tracers of the dynamic processes in the volcano interior indicating its activity. 2) Volcanic degassing plays an important role for the Earth's climate, for local sometimes even regional air quality and atmospheric chemistry.
In autumn 2015, a campaign to White Island Volcano in New Zealand was organized to perform ground-based as well as airborne in-situ and remote sensing gas measurements of sulfur dioxide ($SO_2$), carbon dioxide ($CO_2$) and bromine monoxide (BrO). For all three gases the ratios and total emission rates were determined in different plume types and ages. An overview over the data will be presented with focus on the two most notable outcomes:

1) The first determination of the $BrO/SO_2$ ratio in the White Island plume and a minimum estimate of the volcano's bromine emission rate; two of many parameters, which are important to assess the impact of volcanic degassing on the atmospheric halogen chemistry.

2) In-situ $SO_2$ data was very successfully recorded with the PITSA, a prototype of a portable and cost-effective optical instrument. It is based on the principle of non-dispersive UV absorption spectroscopy and features different advantages over the customary electrochemical sensors, including a sub second response time, negligible cross sensitivities to other gases, and inherent calibration. The campaign data demonstrates the capabilities and limitations of the PITSA and shows, that it can be well applied as substitute for conventional electrochemical systems.