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# Measuring volcanic sulphur species from IASI.

Elisa Carboni (1), Lucy Ventress (2), David England (2), Isabelle Taylor (3), Catherine Hayer (4), Tamsin Mather (3), and Roy Grainger (1)

(1) COMET, University of Oxford, AOPP - Physic, Oxford, United Kingdom (elisa.carboni@physics.ox.ac.uk), (2) University of Oxford, AOPP - Physic, Oxford, United Kingdom, (3) COMET, University of Oxford, Earth Science, Oxford, United Kingdom, (4) Michigan Thecnological University, Houghton, USA

Satellite thermal infrared spectrometer (as IASI) are used to detect and retrieve different atmospheric constituent as aerosol and gases.
There is a lot of uncertainties on the amount of $SO_2$ emitted from the volcano, on the conversion $SO_2$ to H2SO4 and on the sulphur circle/budget in atmosphere. Volcanic eruptions are a significant source of atmospheric $SO_2$ and its effects and lifetime depend on the $SO_2$ injection altitude.
In the stratosphere, $SO_2$ oxidizes to form stratospheric H2SO4 aerosol that can affect climate for several years.
The effects of $SO_2$ in the atmosphere and the speed of conversion into H2SO4 depend on the amount released and on the altitude of the plume.
Thermal infrared spectra are affected by both $SO_2$ and H2SO4 droplets and are here used to quantify both and study the conversion.
Here we exploit the high resolution nadir spectral measurements from IASI for $SO_2$ and H2SO4 retrievals and we present:
1) the results of the $SO_2$ retrieval (Carboni et al. 2012, Carboni et al 2016), of column amount and altitude (vertical distribution), for recent eruptions.
2) A new optimal estimation aerosol retrieval scheme for H2SO4 (optical depth and effective radius), together with sensitivity study and error analysis.
Measurements of $SO_2$ and H2SO4 can be particularly important to quantify climatic effect of volcanic plumes that reach stratosphere, here we show the results for recent eruptions as Calbuco 2014.