

A central graphic for 'ATMOS 2021' featuring a globe with a satellite in orbit. Surrounding the globe are several circular inset images showing various atmospheric data visualizations, including cloud patterns and temperature maps. The text 'ATMOS 2021' is prominently displayed in the center of the globe.

ATMOS 2021

Quantification of SO₂ emission rates of the Kīlauea volcano in Hawaii using S5P-TROPOMI satellite measurements

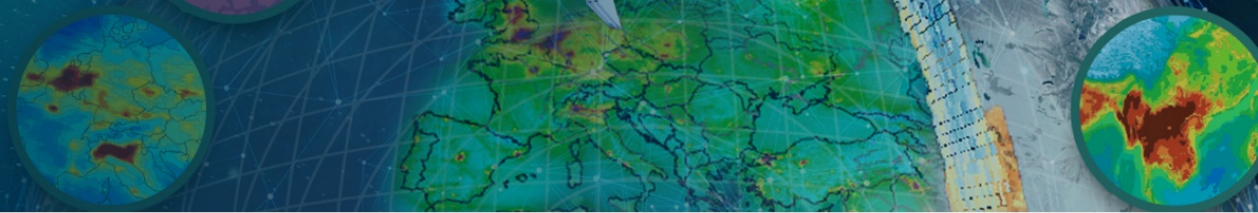
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FOR CHEMISTRY



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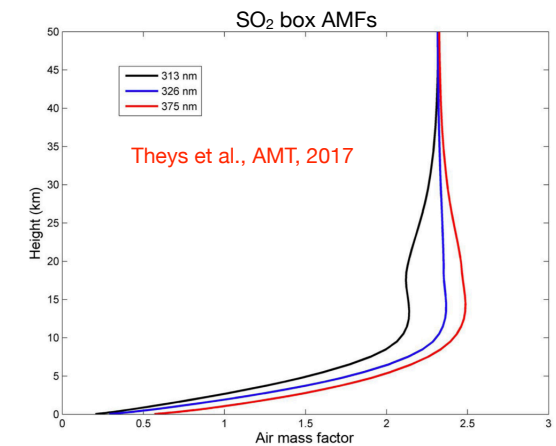
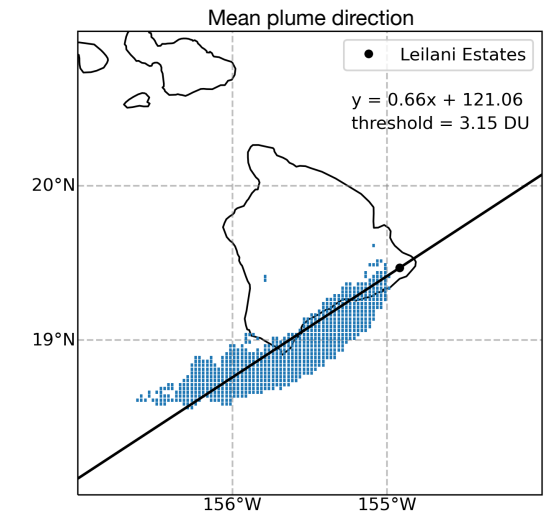
25/11/2021



- 2018: Lower East Rift Zone eruption (Kīlauea)
- TROPOMI provides high spatial resolution measurements of 3.5 x 7 km

Determination of the location and strength of SO₂ emissions

- application of the divergence to the mean SO₂ flux (Beirle et al., Sci. Adv., 2019)
- data preparation and basic analysis:
 - gridding & filtering
 - determination of plume altitude
 - AMF estimation



- emission site can be determined very precisely in a high spatial resolution
- total SO₂ amount emitted from May to August: 1386 kt
- daily emission rates of up to 45 kt/d have been found
- daily emission rates showing low values are likely to be caused by noise and omitted pixels (clouds) —> multi-day averaging solves the problem
- plume height and its properties hold a very large uncertainty and therefore have a decisive impact on the AMF and the derived emission rates

**Poster P 2.4.5 in the
Volcanic Emissions session**

