



Supplement of

VOLCANO₃ – a Miniaturized Chemiluminescence Ozone Monitor for Drone-Based Measurements in Volcanic Plumes

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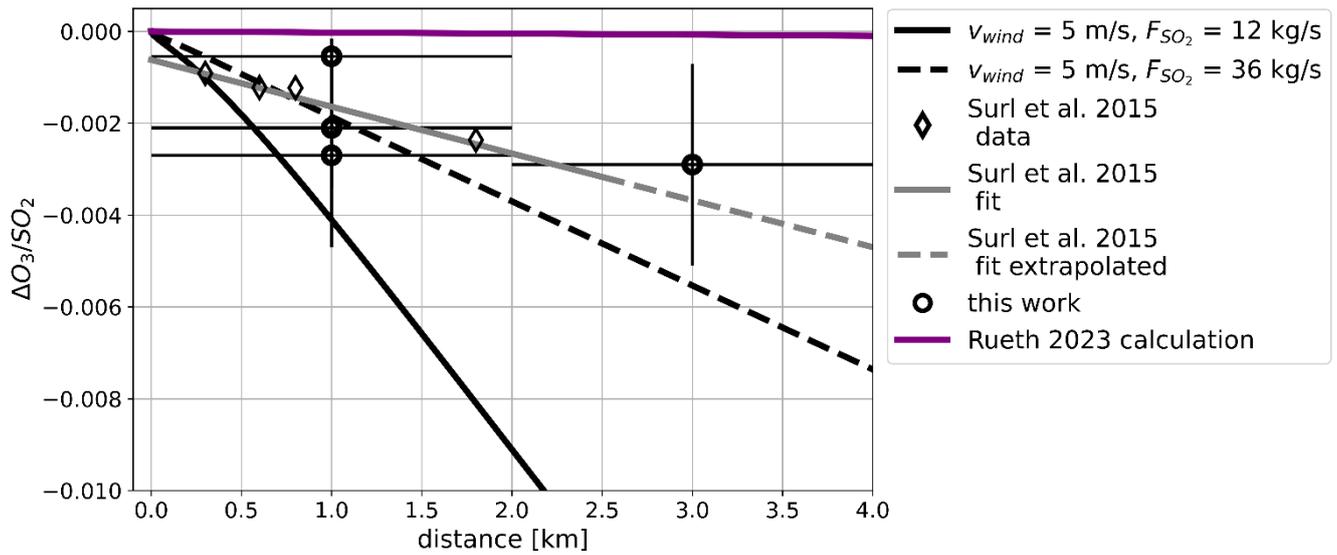
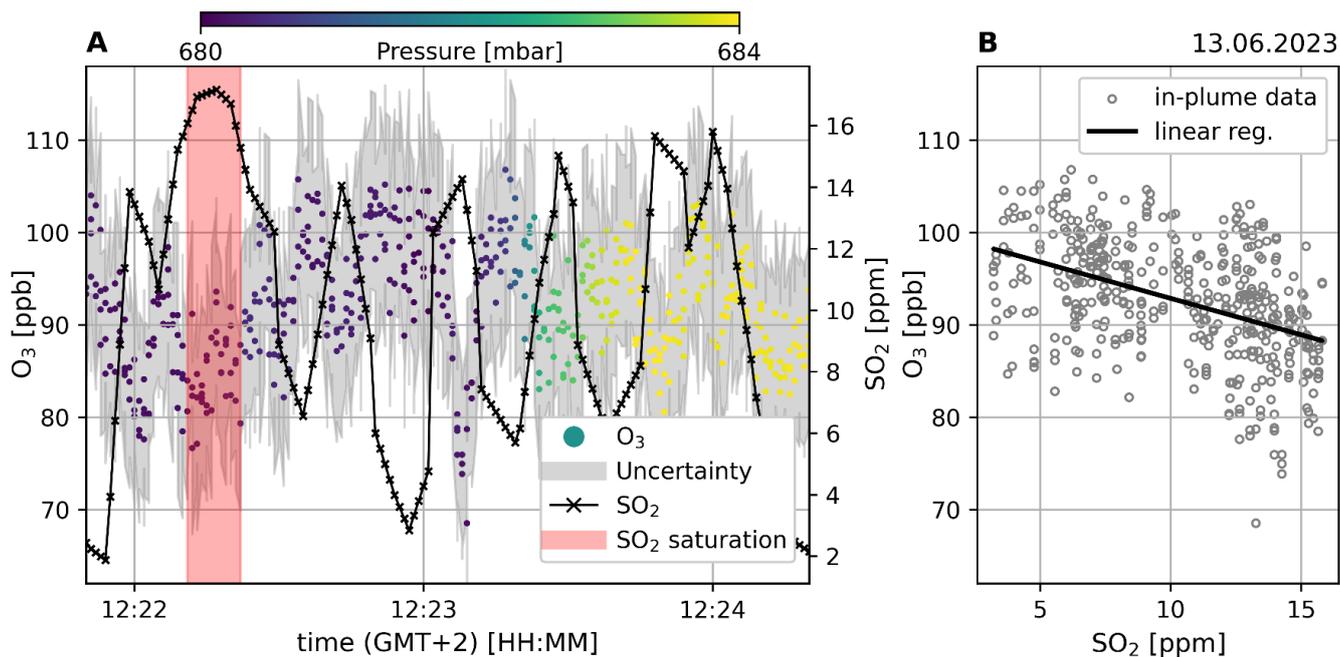


Figure S 1: Comparison of modelled O₃ destruction (Nies et al. 2025) and measurements from Surl et al 2015 (UV O₃ monitor) and this work (CL VOLCANO3, see table 1) in the Mt Etna plume. The x-axis shows the ratio between ΔO₃ (O_{3,in-plume} – O_{3,background}) to SO₂, which is used as a plume tracer. The dashed model run shows fair agreement between both measurements. Furthermore, measurement data and model are compared to the simplified calculation from Rueth 2023, which appears to underestimate the O₃ destruction.



10 **Figure S 2: Plume measurement from 13.06.2023 measuring the BN plume (see Figure 5 black line). Panel A shows the timeseries from the CL instrument and a co-deployed SO₂ sensor. The color-coding indicates ambient pressure during sampling and the gray shaded area marks the uncertainty of the CL O₃ measurement. The red shaded area marks periods where the SO₂ sensor was in saturation. Panel B shows a correlation plot between O₃ and SO₂ for in-plume data points. In-plume datapoints are defined according to the SO₂ mixing ratio for values larger than 1.5 ppm and smaller than the saturation value of 16 ppm. The correlation has a**

15 **Pearson correlation coefficient of -0.49 and an R² of 0.24.**

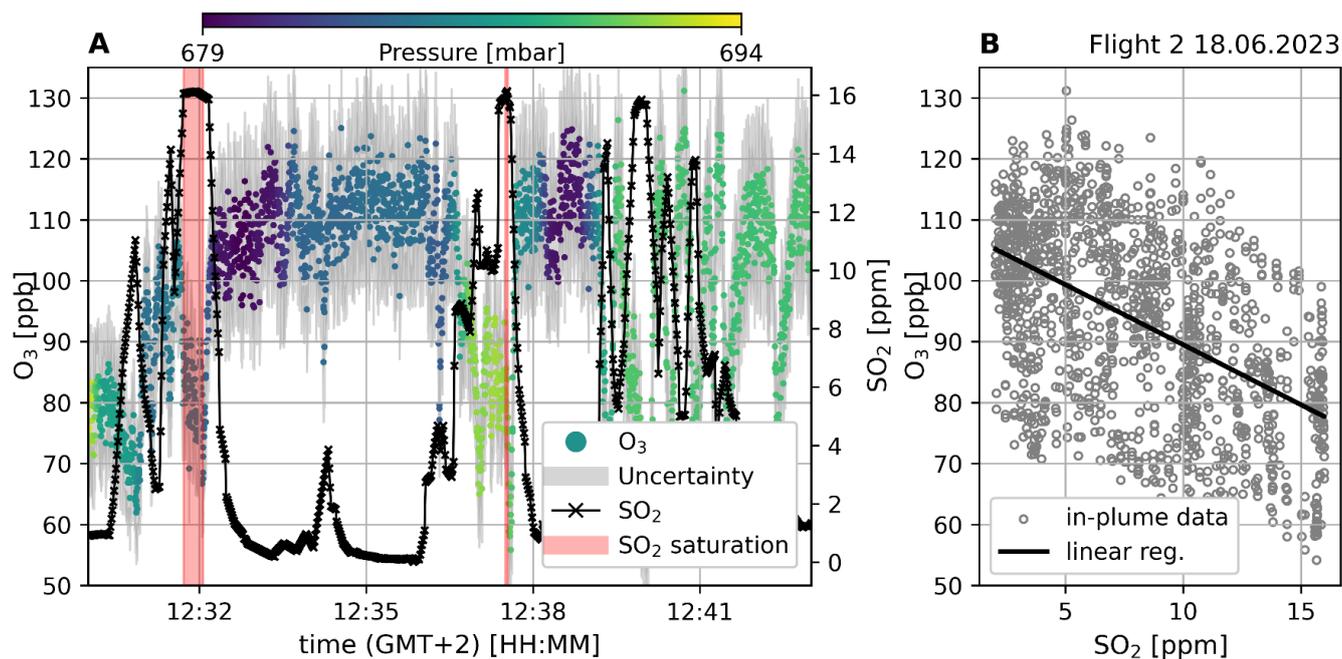
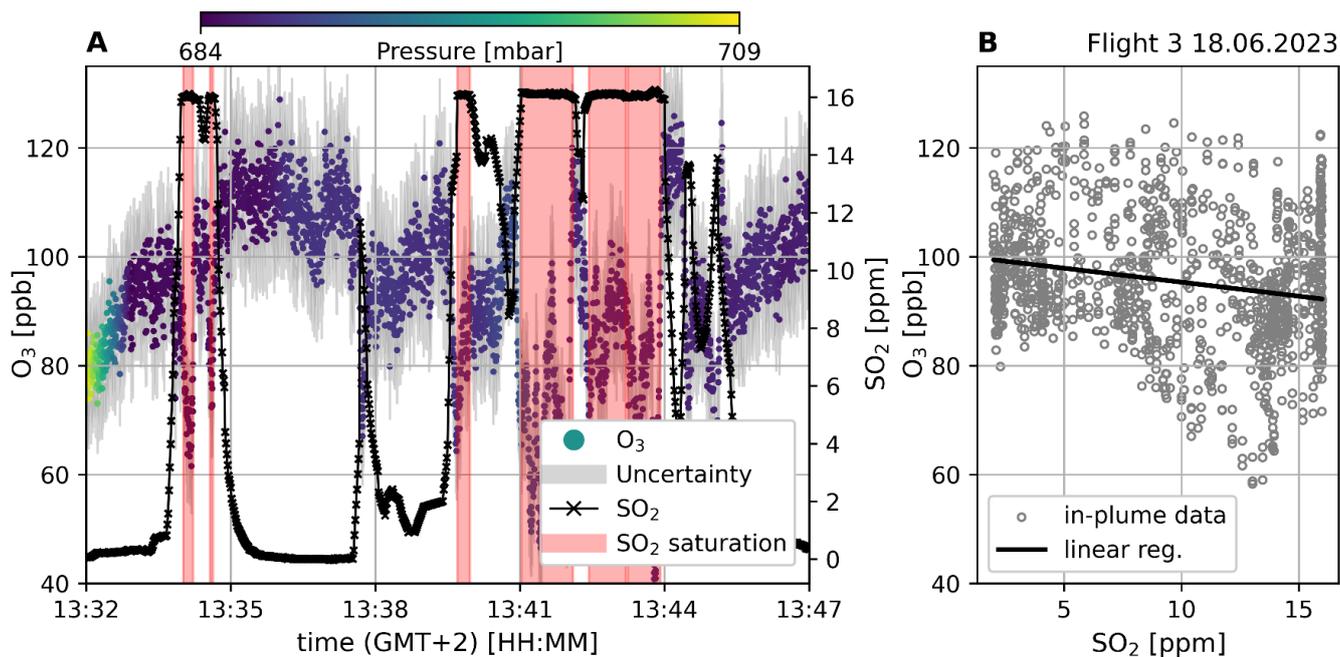


Figure S 3: Plume measurement from 18.06.2023 (flight 2) measuring the SEC and the BN plume (see Figure 5 black line). Panel A shows the timeseries from the CL instrument and a co-deployed SO₂ sensor. The color-coding indicates ambient pressure during sampling and the gray shaded area marks the uncertainty of the CL O₃ measurement. The red shaded area marks periods where the SO₂ sensor was in saturation. Panel B shows a correlation plot between O₃ and SO₂ for in-plume data points. In-plume datapoints are defined according to the SO₂ mixing ratio for values larger than 1.5 ppm and smaller than the saturation value of 16 ppm. The correlation has a Pearson correlation coefficient of -0.54 and an R² of 0.29.



30 **Figure S 4: Plume measurement from 18.06.2023 (flight 3) measuring the SEC plume (see Figure 5 black line). Panel A shows the time series from the CL instrument and a co-deployed SO₂ sensor. The colour-coding indicates ambient pressure during sampling and the gray shaded area marks the uncertainty of the CL O₃ measurement. The red shaded area marks periods where the SO₂ sensor was in saturation. Panel B shows a correlation plot between O₃ and SO₂ for in-plume data points. In-plume data points are defined according to the SO₂ mixing ratio for values larger than 1.5 ppm and smaller than the saturation value of 16 ppm. The correlation has a Pearson correlation coefficient of -0.54 and an R² of 0.29.**

