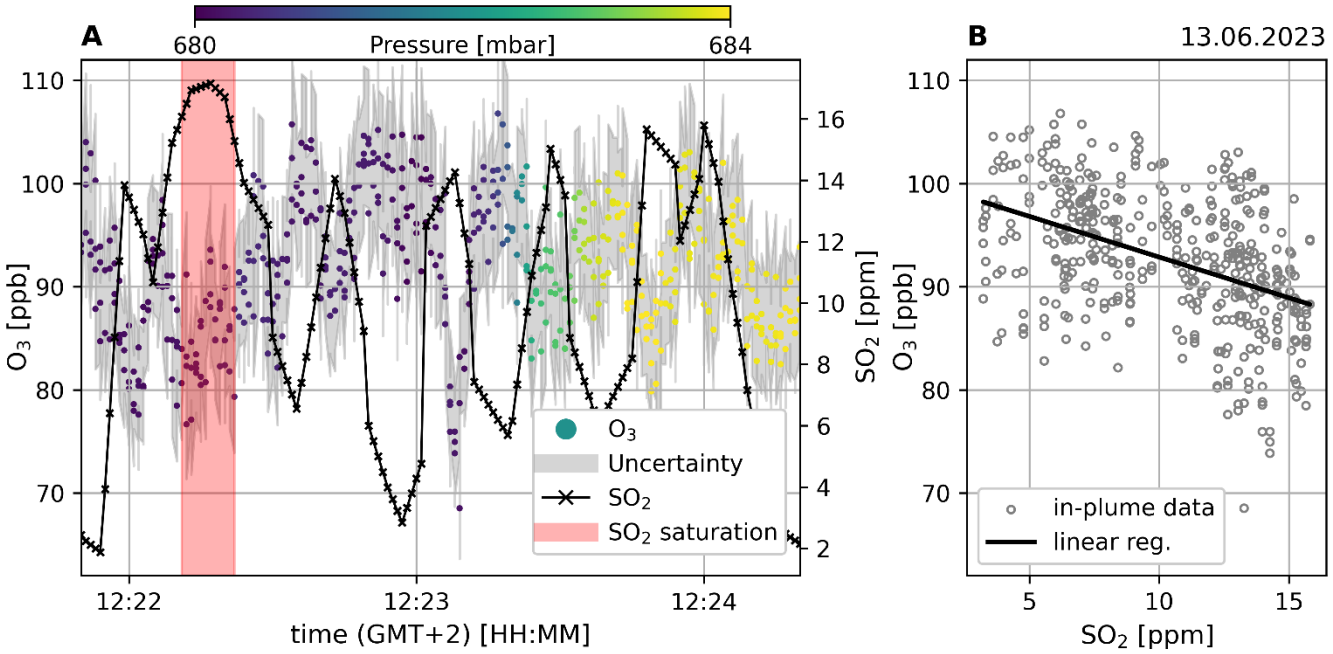

Figure S 1: Plume measurement from 13.06.2023 measuring the BN plume (see Figure 5 black line). Panel A shows the timeseries from the CL instrument and a co-deployed SO_2 sensor. The color-coding indicates ambient pressure during sampling and the gray shaded area marks the uncertainty of the CL O_3 measurement. The red shaded area marks periods where the SO_2 sensor was in saturation. Panel B shows a correlation plot between O_3 and SO_2 for in-plume data points. In-plume datapoints are defined according to the SO_2 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 -0.49 and an R^2 of 0.24.

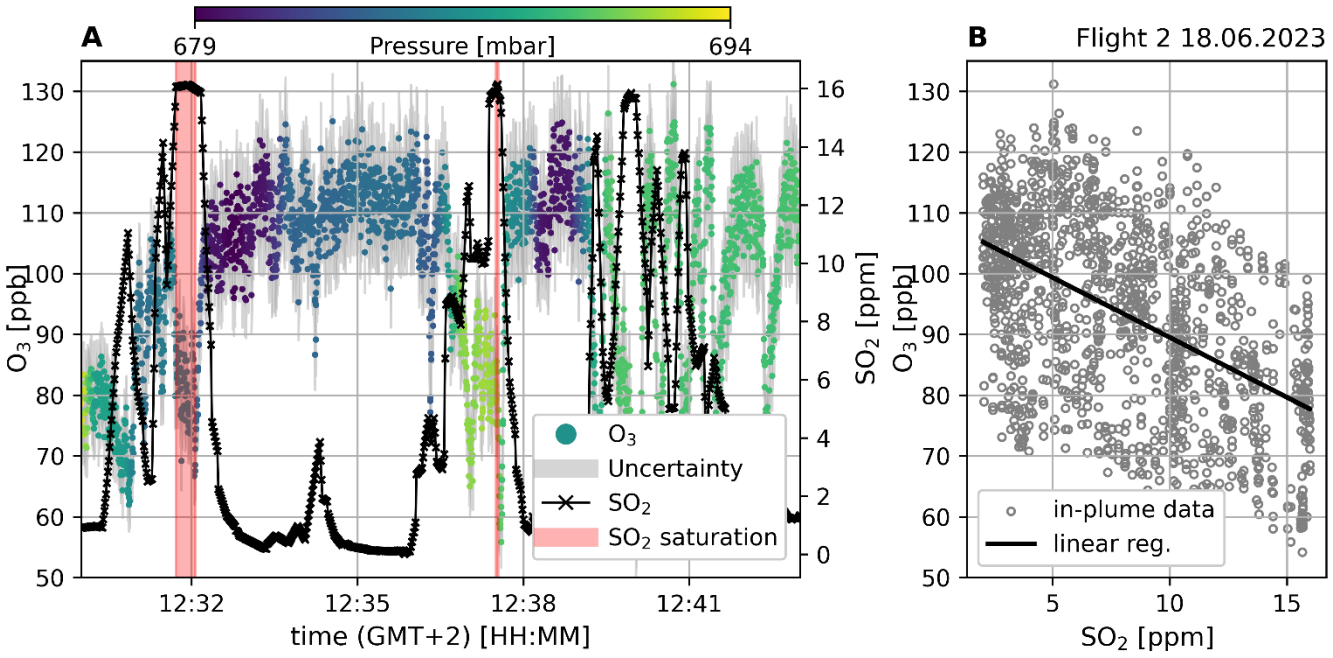

Figure S 2: Plume measurement from 18.06.2023 (flight 2) measuring the SEC and the BN plume (see Figure 5 black line). Panel A shows the timeseries from the CL instrument and a co-deployed SO_2 sensor. The color-coding indicates ambient pressure during sampling and the gray shaded area marks the uncertainty of the CL O_3 measurement. The red shaded area marks periods where the SO_2 sensor was in saturation. Panel B shows a correlation plot between O_3 and SO_2 for in-plume data points. In-plume datapoints are defined according to the SO_2 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 R^2 of 0.29.

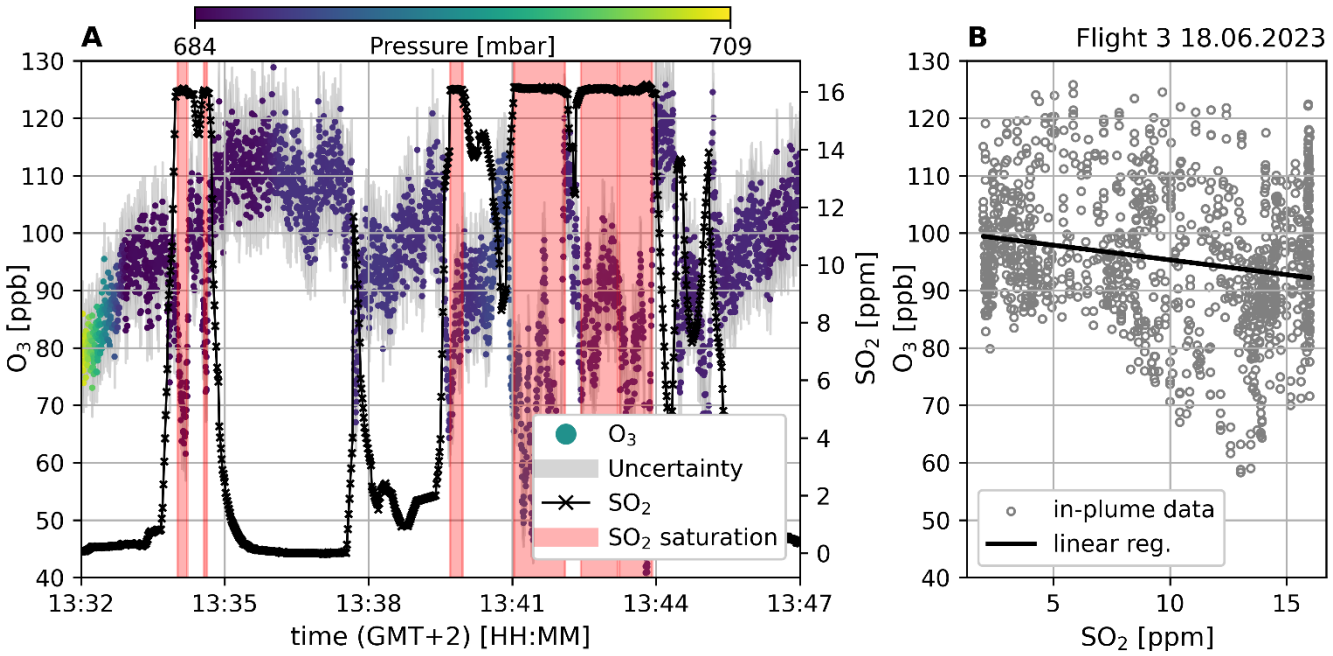

Figure S 3: Plume measurement from 18.06.2023 (flight 3) measuring the SEC plume (see Figure 5 black line). Panel A shows the time series from the CL instrument and a co-deployed SO_2 sensor. The colour-coding indicates ambient pressure during sampling and the gray shaded area marks the uncertainty of the CL O_3 measurement. The red shaded area marks periods where the SO_2 sensor was in saturation. Panel B shows a correlation plot between O_3 and SO_2 for in-plume data points. In-plume data points are defined according to the SO_2 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 R^2 of 0.29.

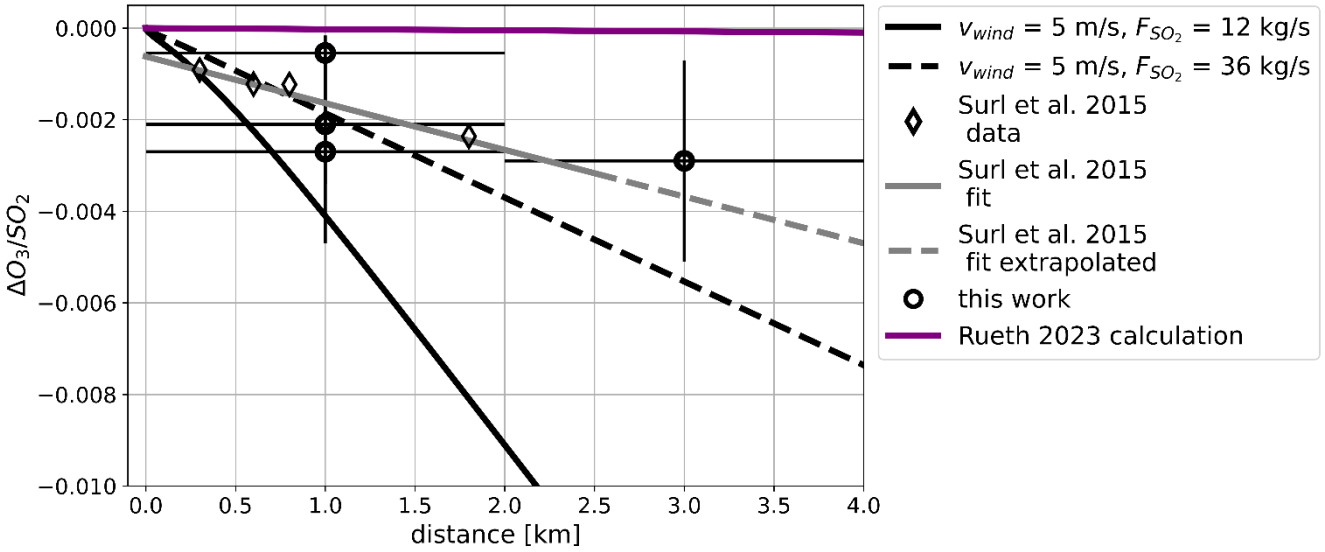

Figure S 4: Comparison of modelled O_3 destruction (Nies et al. 2025) and measurements from Surl et al 2015 (UV O_3 monitor) and this work (CL VOLCANO3, see table 1) in the Mt Etna plume. The x-axis shows the ratio between ΔO_3 ($O_{3,\text{in-plume}} - O_{3,\text{background}}$) to SO_2, which is used 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 O_3 destruction.