Supplement of

Measurement Report: Carbonyl Sulfide production during Dimethyl Sulfide oxidation in the atmospheric simulation chamber SAPHIR

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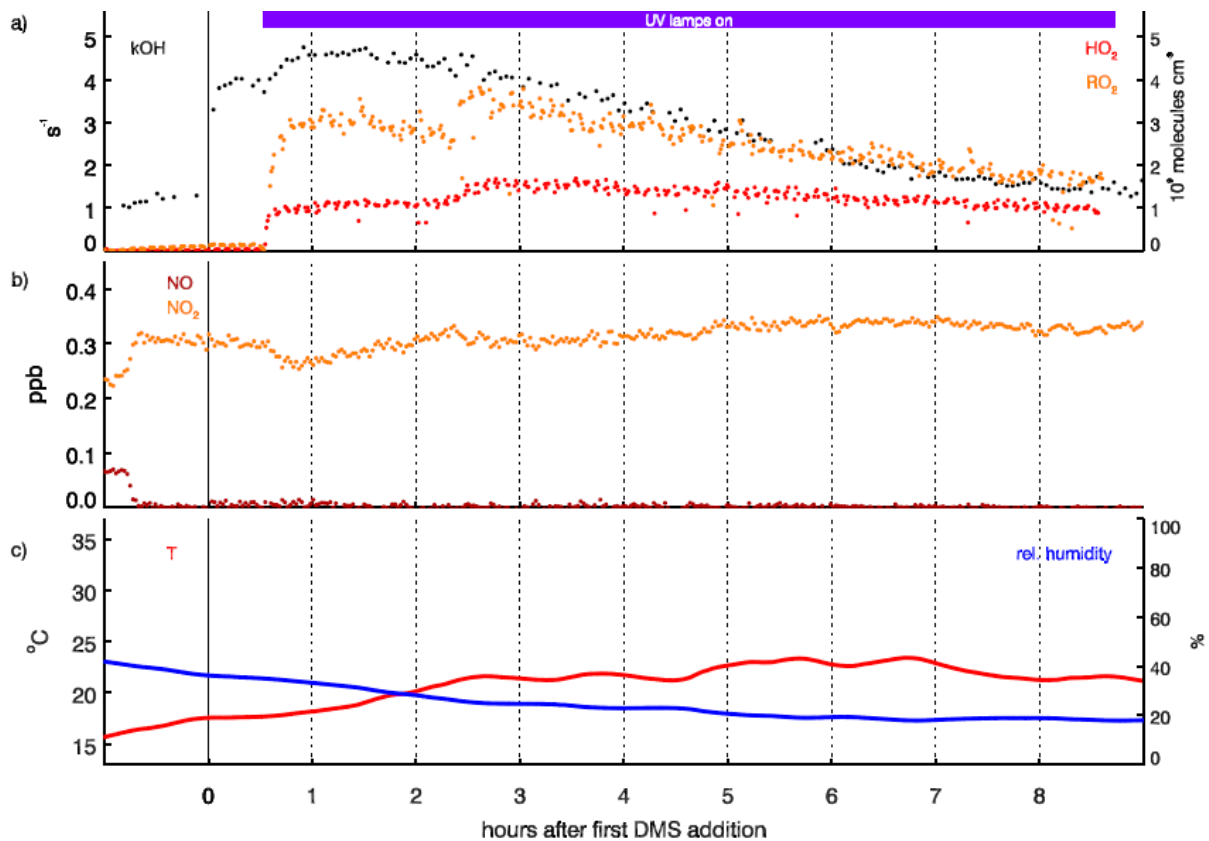


Figure S1 Additional parameters in Experiment I, with time in hours after the first DMS injection and the period with the UV lamps turned on indicated by the coloured bar on the top of panel a. In panel a) k_{OH} and radical concentrations are shown with the position of the labels indicating which axis refers to which species. In panel b), NO and NO$_2$ mixing ratios are given. In panel c), temperature and humidity in the SAPHIR chamber are shown.

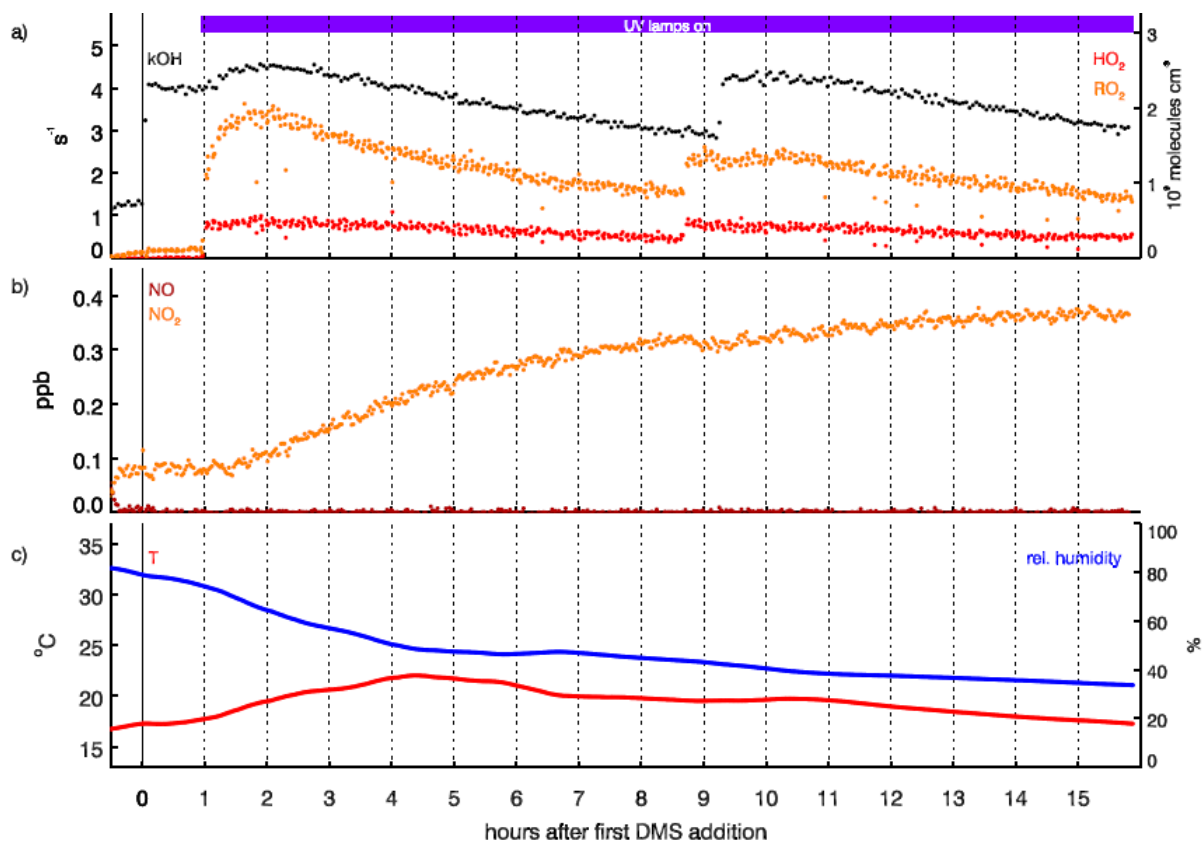



Figure S2 Additional parameters in Experiment II, with time in hours after the first DMS injection and the period with the UV lamps turned on indicated by the coloured bar on the top of panel a. In panel a) k_{OH} and radical concentrations are shown with the position of the labels indicating which axis refers to which species. In panel b), NO and NO_2 mixing ratios are given. In panel c), temperature and humidity in the SAPHIR chamber are shown.

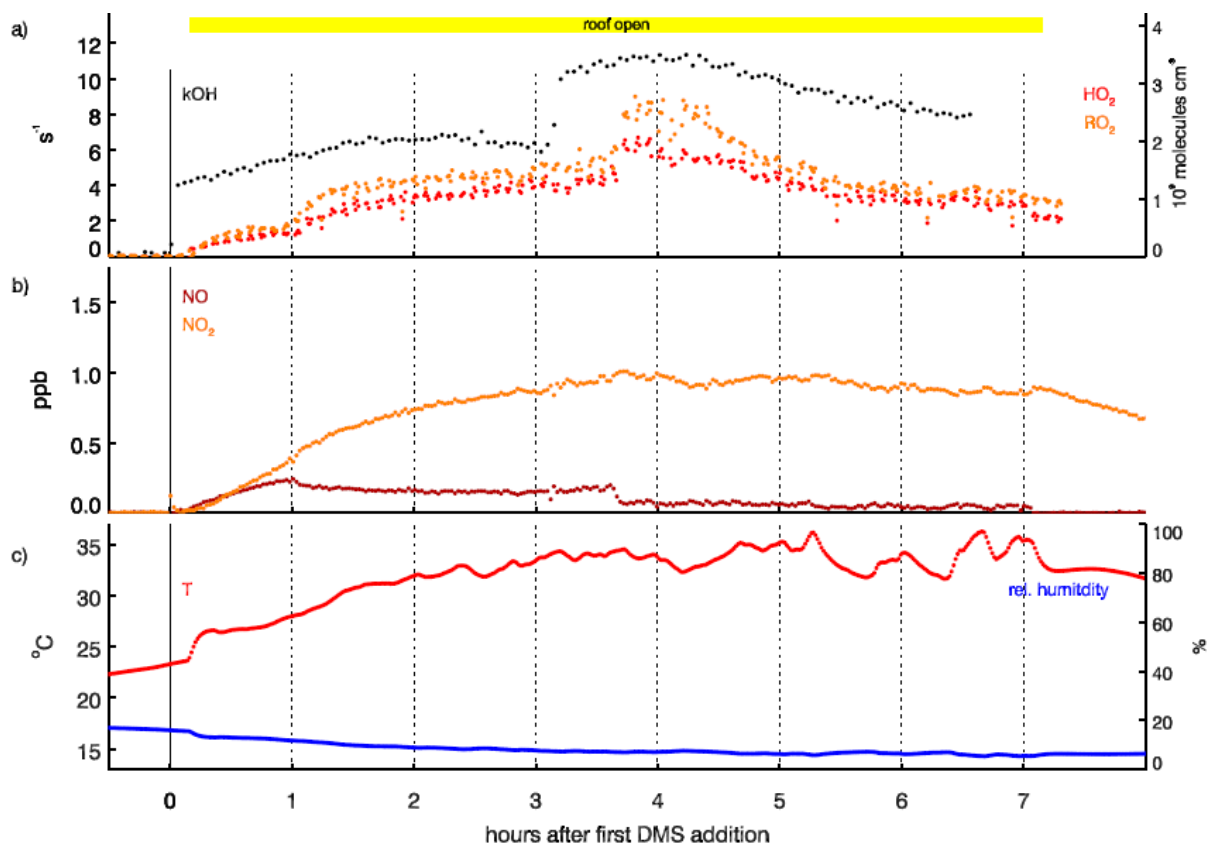



Figure S3 Additional parameters in Experiment III, with time in hours after the first DMS injection and the period with the roof being open indicated by the coloured bar on the top of panel a. In panel a) k_{OH} and radical concentrations are shown with the position of the labels indicating which axis refers to which species. In panel b), NO and NO_2 mixing ratios are given. In panel c), temperature and humidity in the SAPHIR chamber are shown.

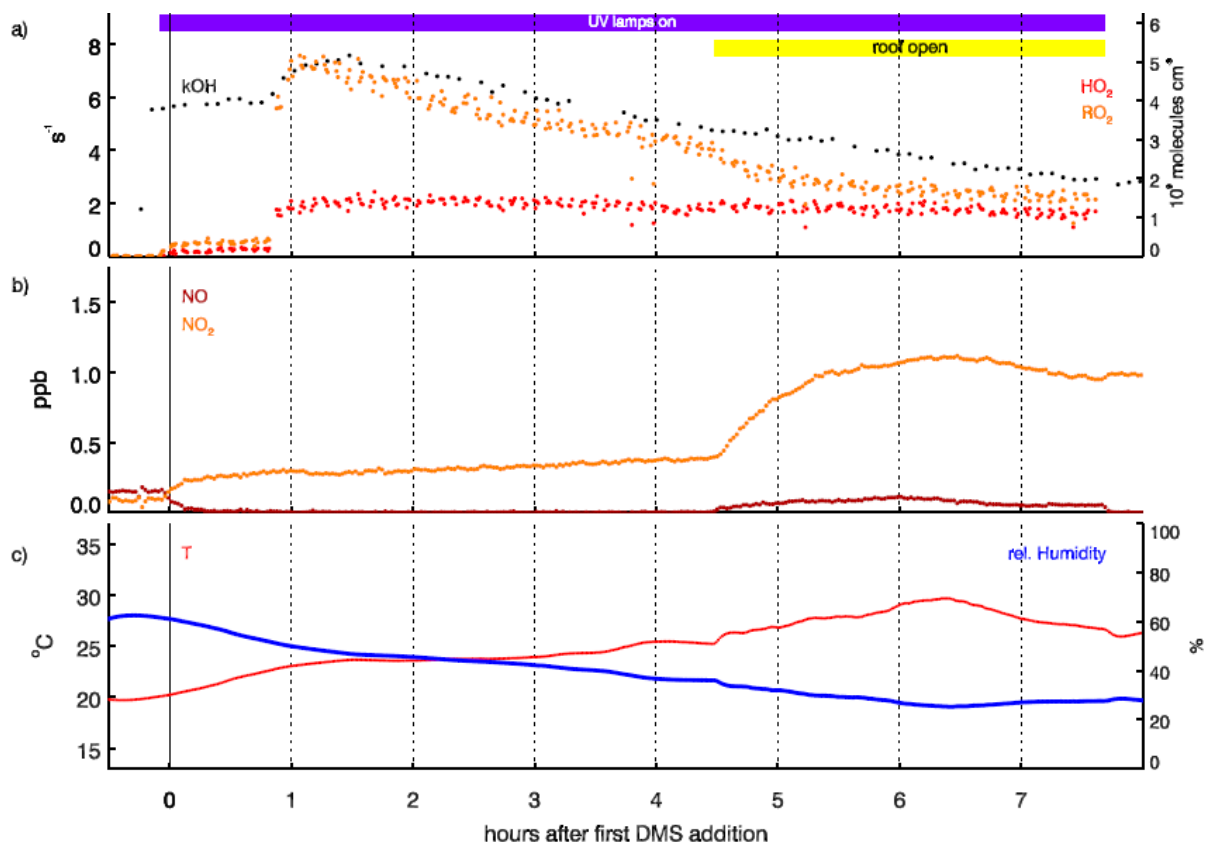
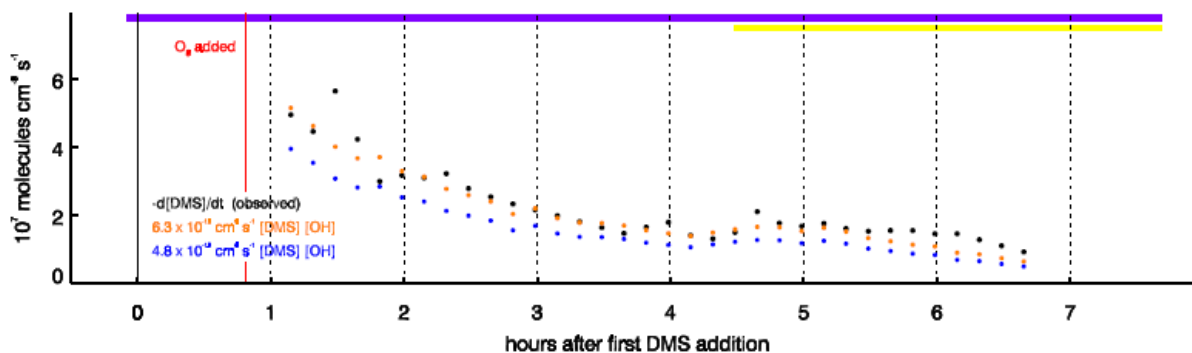



Figure S4 Additional parameters in Experiment IV, with time in hours after the first DMS injection and the periods with the
UV lamps turned on and the roof being open indicated by the coloured bar on the top of panel a. In panel a) k_{OH} and radical
concentrations are shown with the position of the labels indicating which axis refers to which species. In panel b), NO and
NO_2 mixing ratios are given. In panel c), temperature and humidity in the SAPHIR chamber are shown.

580   **Figure S5** Comparison of observed (black) to expected DMS removal rate (orange) in Experiment IV for k_{DMS+OH} from Barnes et al. (2006, and references therin) and OH observed by the DOAS instrument. Also shown is the theoretical DMS removal rate for just the H abstraction channel of the DMS + OH reaction (blue, also with rate constants from Barnes et al., 2006) which represents an upper limit for the HPMTF production rate.

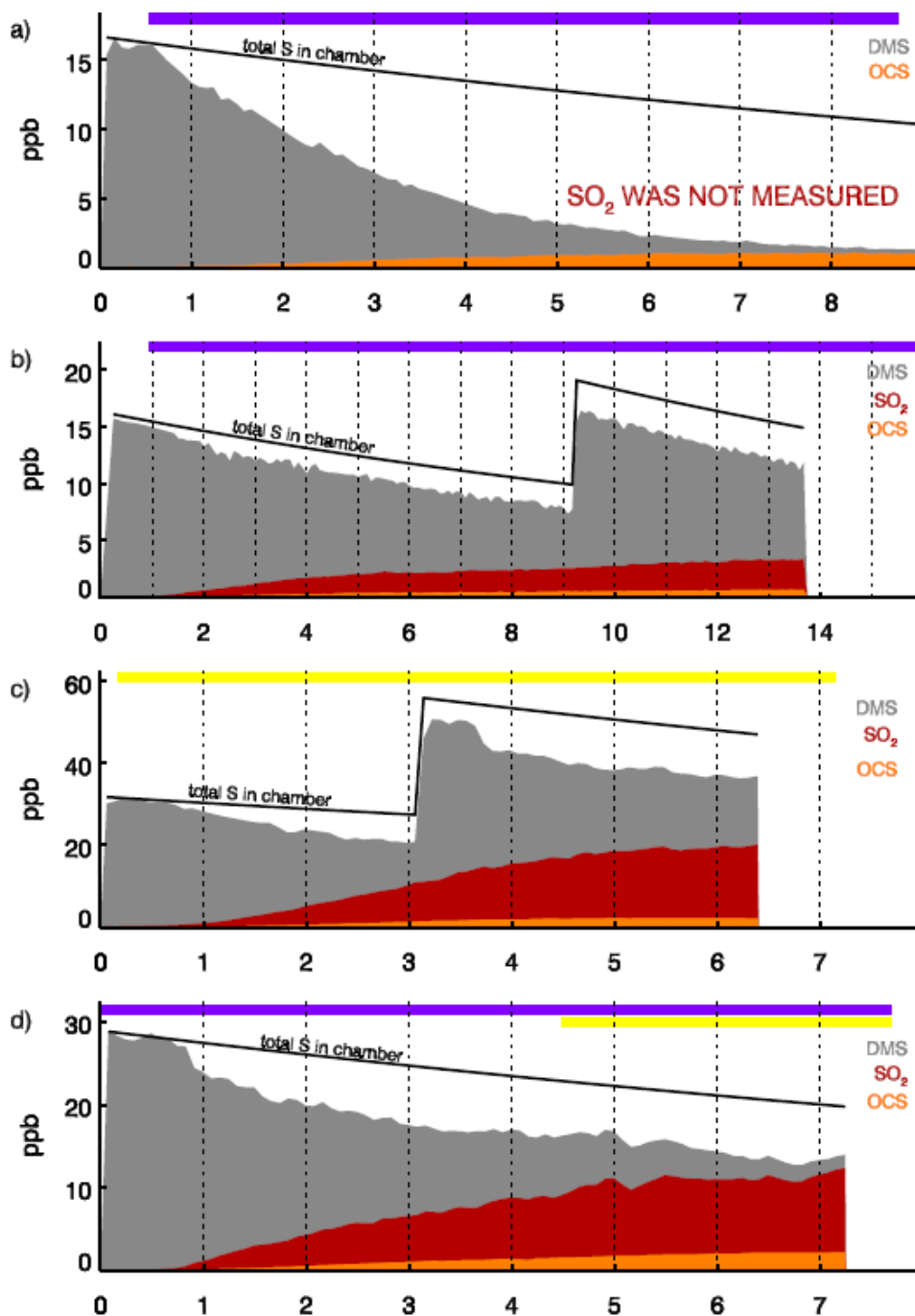



Figure S6 Sulfur budget of measured sulfur gases (panels a – d correspond to Experiments I – IV respectively). The black line indicates the total sulfur expected in the SAPHIR chamber accounting for DMS additions and chamber loss by dilution. In Experiments II – IV, DMS and two main product sulfur gases, SO_2 and OCS, are measured, and together make up between 70 and 80 % of the total sulfur in the chamber (based on injected DMS and the chamber dilution rate). We expect the remaining part of the sulfur budget to be made up by other product gases (e.g. dimethyl sulfoxide, DMSO, as the major product gas of the OH addition channel) and intermediates including HPMTF and TPA.