Supporting Information to "Atmospheric photooxidation and ozonolysis of Δ^3-carene and 3-caronaldehyde: Rate constants and product yields"

Luisa Hantschke[1], Anna Novelli[1], Birger Bohn[1], Changmin Cho[1], David Reimer[1], Franz Rohrer[1], Ralf Tillmann[1], Marvin Glowania[1], Andreas Hofzumahaus[1], Astrid Kiendler-Scharr[1], Andreas Wahner[1], and Hendrik Fuchs[1]

[1]Institute of Energy and Climate Research, IEK-8: Troposphere, Forschungszentrum Jülich GmbH, Jülich, Germany

Correspondence: Hendrik Fuchs
(h.fuchs@fz-juelich.de)

Table S1 . Instrumentation for radical and trace gas detection in the experiments.

measured quantity	measuremente technique	time resolution	accuracy (1 σ)
OH	laser-induced fluoresence (LIF)	47 s	13 %
HO$_2$, RO$_2$	laser-induced fluoresence (LIF)	47 s	16 %
k_{OH}	laser photolysis + LIF	180 s	10 %
Δ^3-carene	proton-transfer-reaction mass-spectrometer	40 s	7 %
CO	cavity ring-down spectroscopy	60 s	1 ppbv
NO	chemiluminescence	180 s	5 %
NO$_2$	chemiluminescence	180 s	5 %
HONO	long-path absorption photometry	300 s	20 %
O$_3$	UV-absorption	10 s	5 %
HCHO	Hantzsch monitor	90 s	8.5 %
HCHO	cavity ring-down spectroscopy	300 s	1.5 ppbv
photolysis freq.	spectroradiometer	60 s	10 %
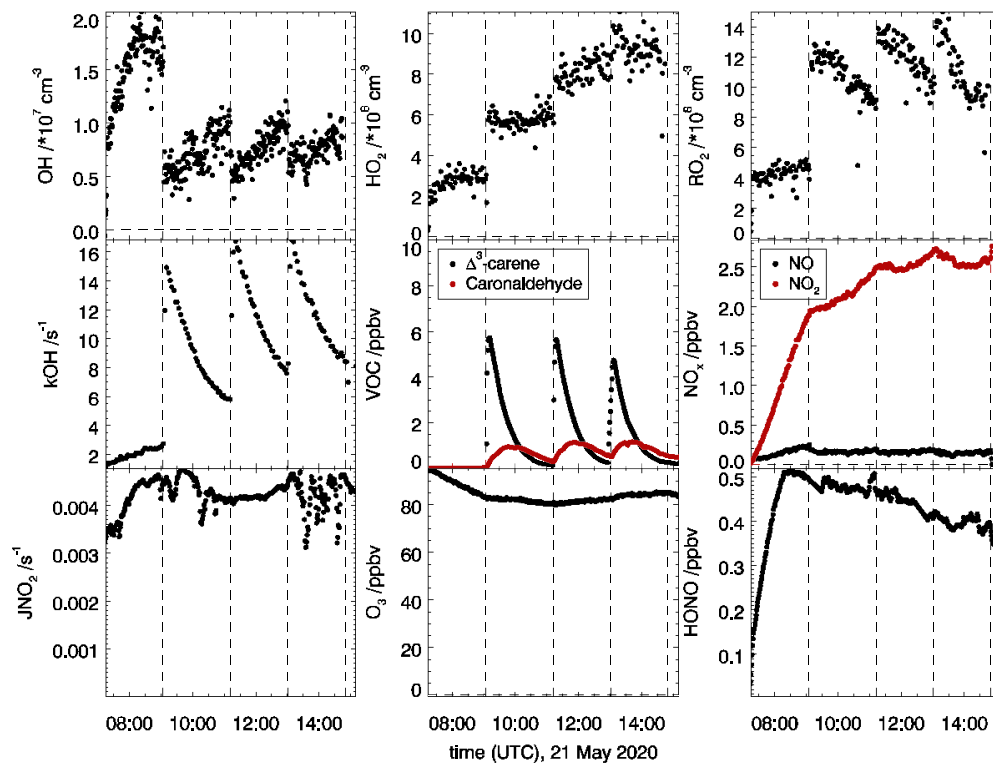
Figure S1 . Overview of measured concentrations for selected species in the SAPHIR chamber for the Δ^3-carene + OH oxidation experiment with low NOx conditions on E2. Dashed lines indicate times when Δ^3-carene was injected into the chamber.
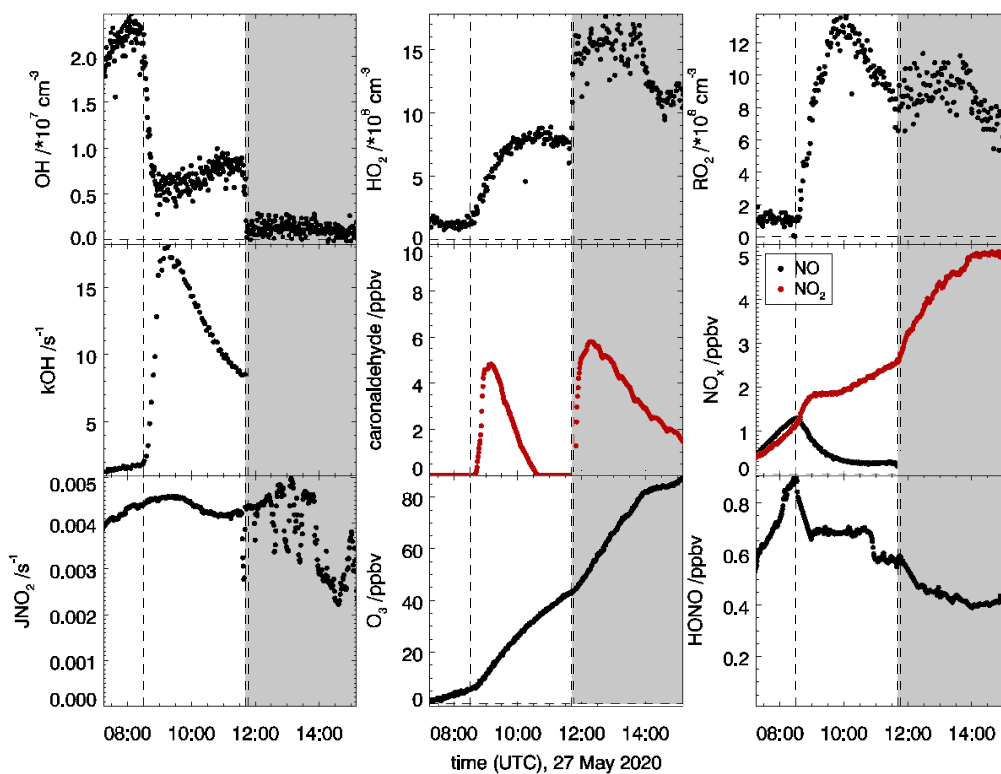
Figure S2 . Overview of measured concentrations for selected species in the SAPHIR chamber for the caronaldehyde photooxidation experiments E5. The shaded area indicates the time where CO was injected as an OH scaveger (experiment E6). Dashed lines indicate times when caronaldehyde was injected into the chamber.
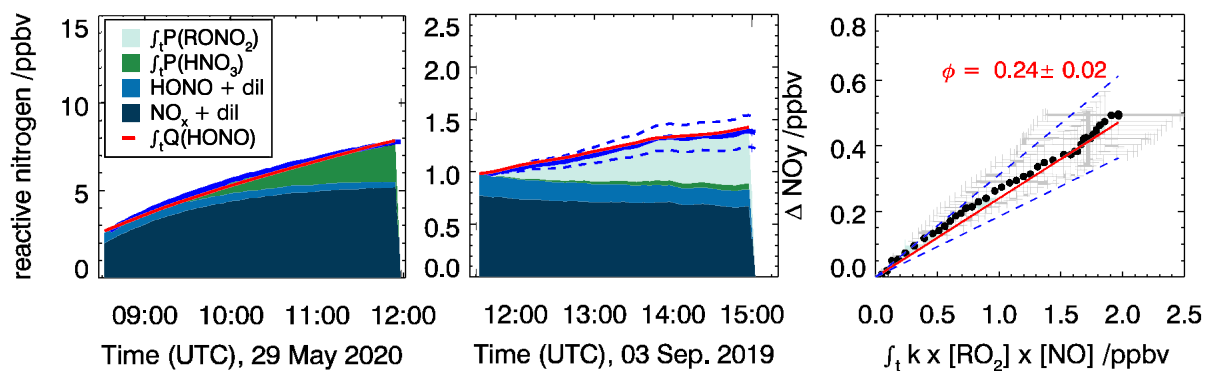
Figure S3 . Experimental NOy budgets for the CH_4 experiment on 29 May 2020 (left) and the α-pinene experiment on 03 September 2019 (right), shown starting from the first injection of VOC into the chamber until closing of the roof. Dotted lines indicate the injection of VOC into the chamber. The obtained $RONO_2$ yield of 25.5 % for α-pinene is a result of the RMSE analysis explained in the text.
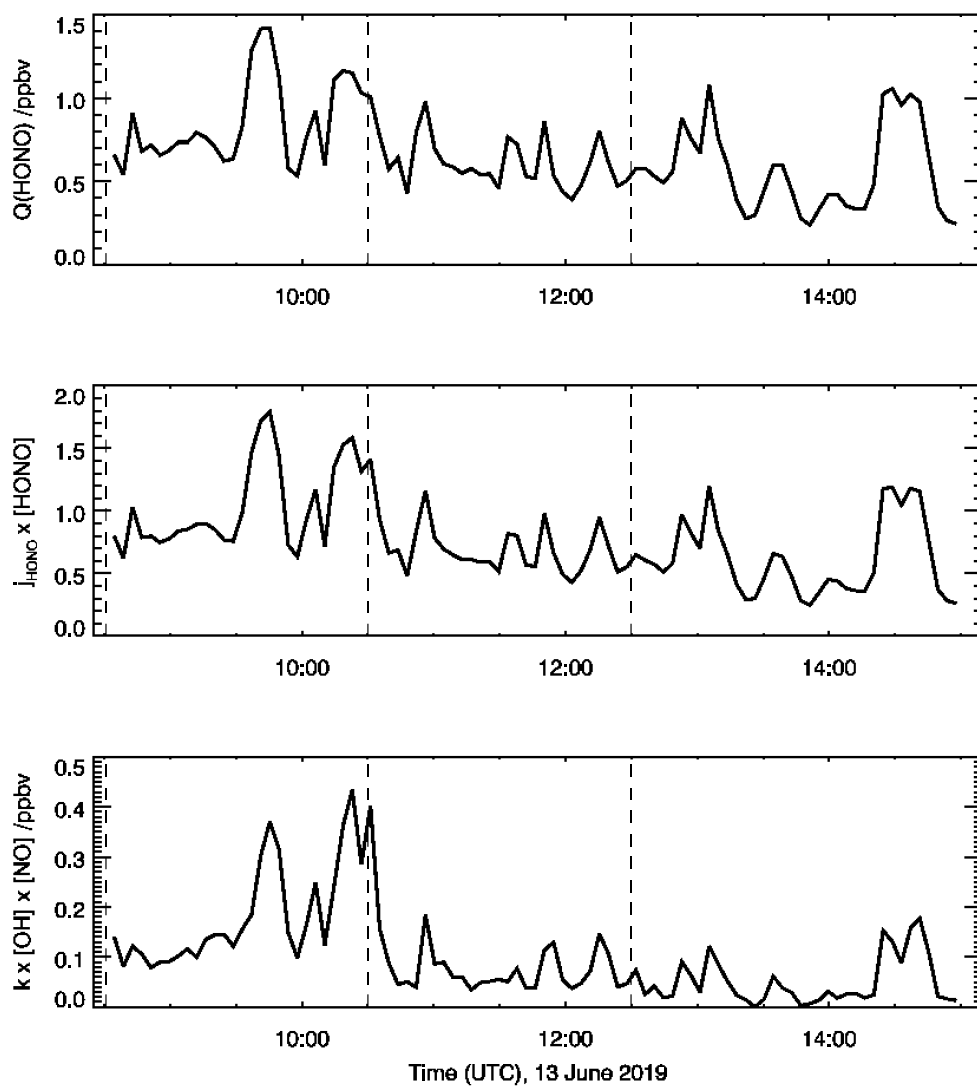
Figure S4 . Timeseries of Q(HONO), $k_{OH+NO} \times OH \times NO$ and $j_{HONO} \times HONO$ used to calculate the organic nitrate yield of the OH + Δ^3-carene in the main text (see Section 2.5).