

Supplement of Atmos. Chem. Phys., 20, 12549–12567, 2020
<https://doi.org/10.5194/acp-20-12549-2020-supplement>
© Author(s) 2020. This work is distributed under
the Creative Commons Attribution 4.0 License.



Atmospheric
Chemistry
and Physics
Open Access
EGU

Supplement of

The Aarhus Chamber Campaign on Highly Oxygenated Organic Molecules and Aerosols (ACCHA): particle formation, organic acids, and dimer esters from α -pinene ozonolysis at different temperatures

Kasper Kristensen et al.

Correspondence to: Kasper Kristensen (kasper.kristensen@eng.au.dk) and Merete Bilde (bilde@chem.au.dk)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

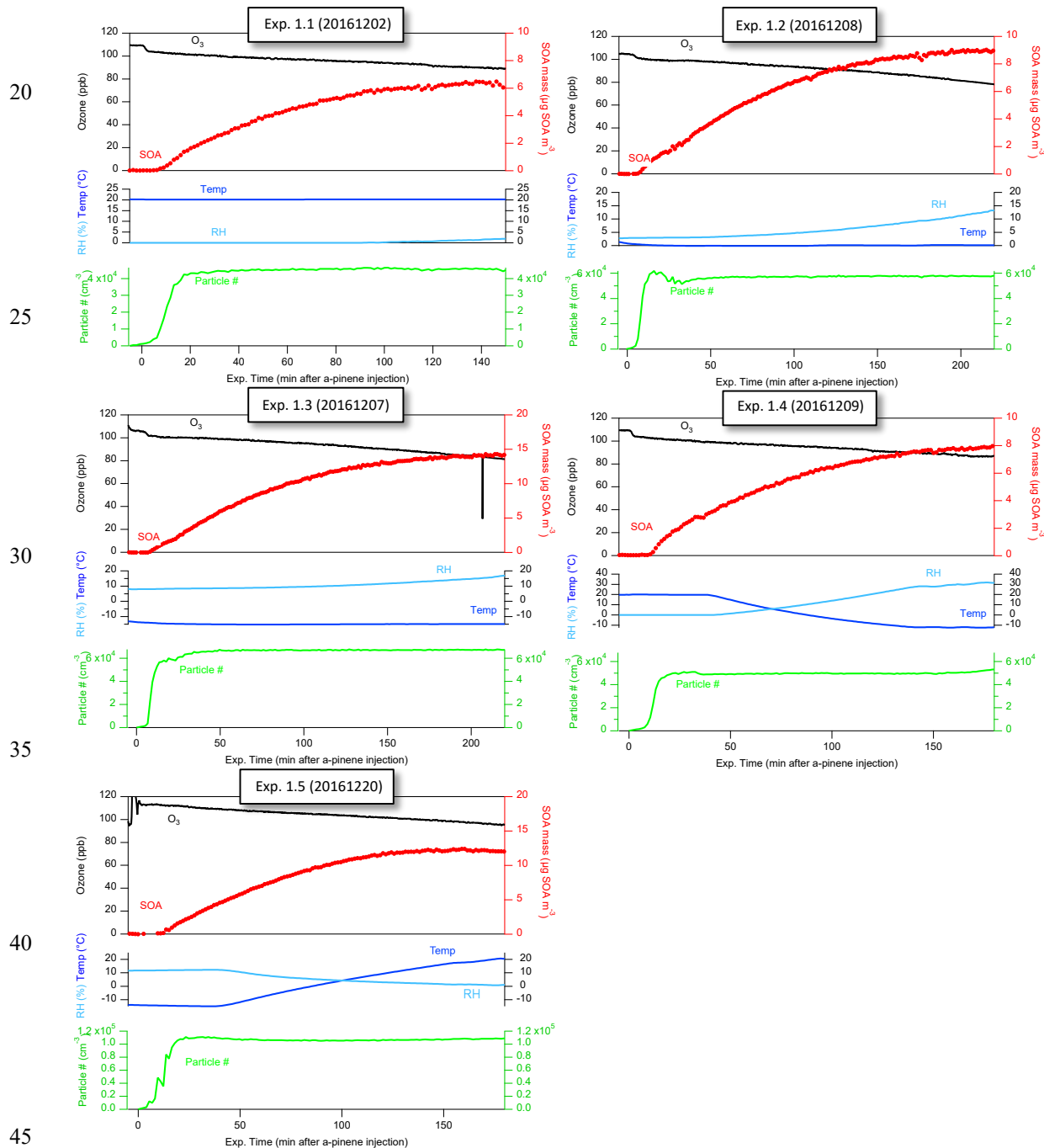
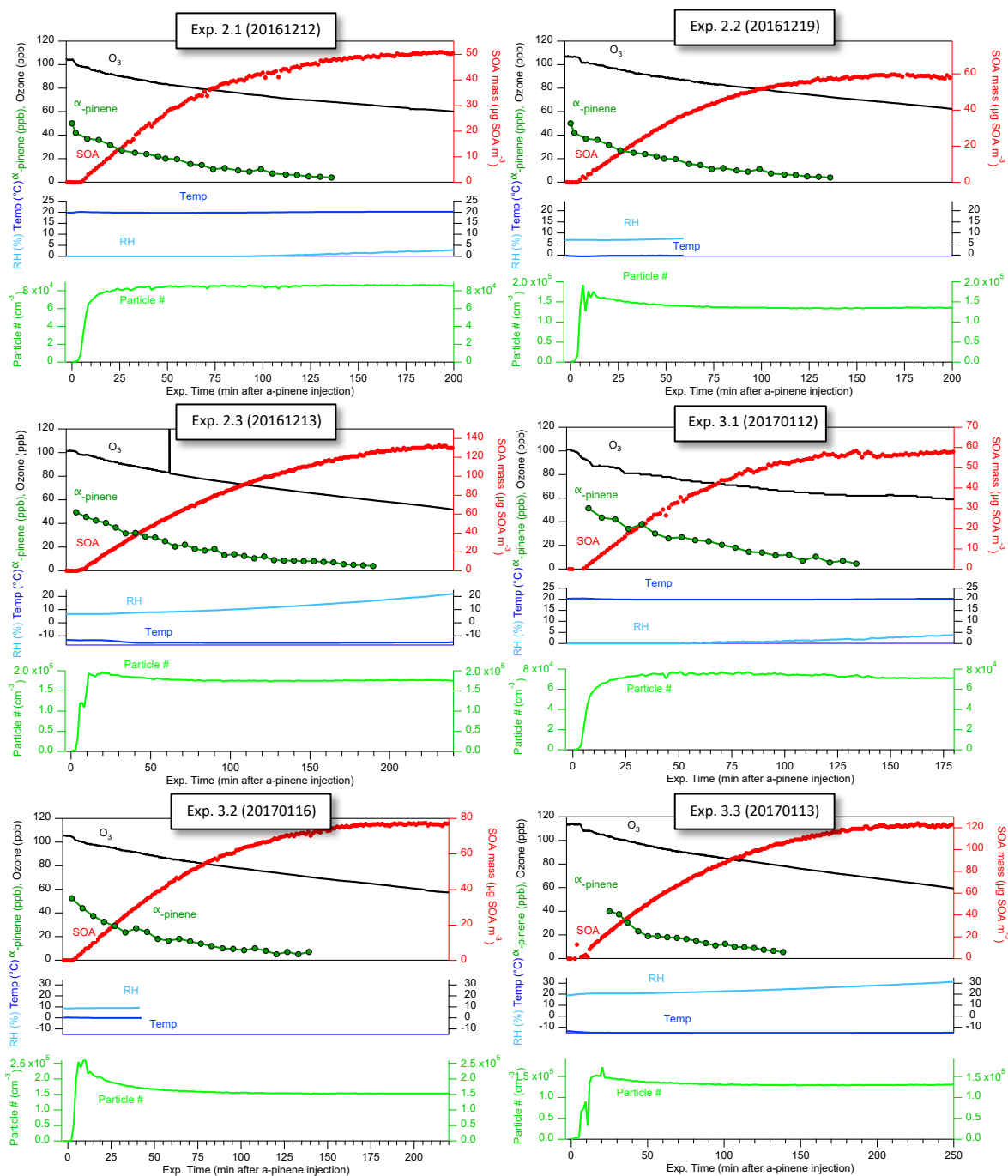


Figure S1. Concentration of O_3 (ppb, black) and wall-loss corrected SOA mass ($\mu\text{g m}^{-3}$, red) and particle number (cm^{-3} , green, particle diameter: 10-400 nm, measured by SMPS) along with recorded RH (%) and Temperature ($^{\circ}\text{C}$, blue) during 10 ppb α -pinene oxidation experiments (Exp. 1.1-1.5)



50

Figure S2. Concentration of O_3 (ppb, black), α -pinene (ppb, dark green), and wall-loss corrected SOA mass ($\mu\text{g m}^{-3}$, red) and particle number (cm^{-3} , green, particle diameter: 10–400 nm, measured by SMPS) along with recorded RH (%) and temperature ($^{\circ}\text{C}$, blue) during 50 ppb α -pinene oxidation experiments (Exp. 2.1–2.3 & 3.1–3.).

55

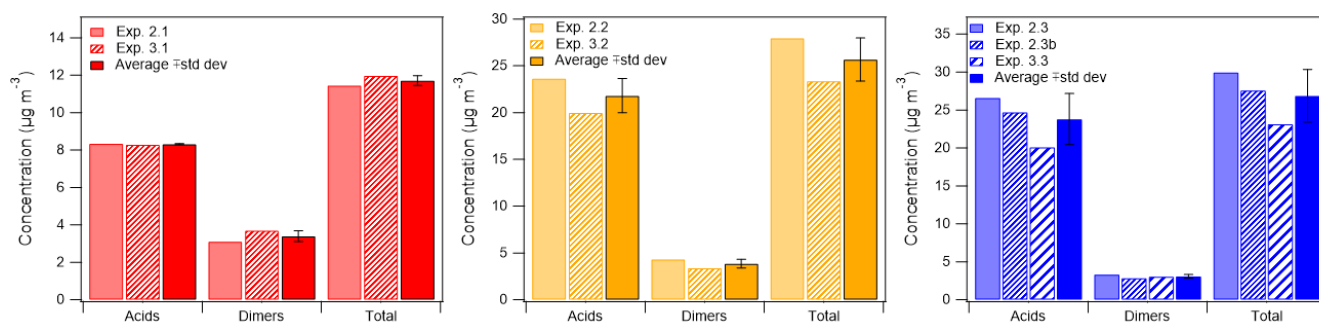


Figure S3. Concentrations ($\mu\text{g m}^{-3}$) of acids and dimers from UHPLC/ESI-qTOF-MS analysis of repeated experiments performed at 50 ppb α -pinene and 20 °C (Exp. 2.1 & 3.1), 0 °C (Exp. 2.2 & 3.2) and -15 °C (Exp. 2.3a, 2.3b & 3.3). Bars to the right (dark colored) represent average concentrations and associated standard deviations.

60

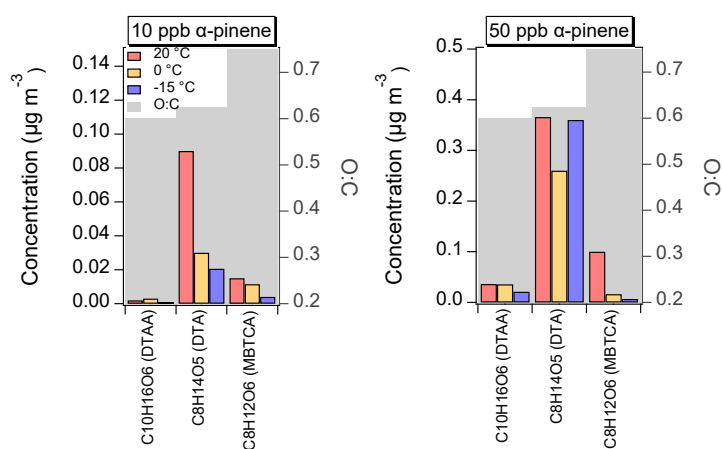


Figure S4. O:C-ratios and concentrations ($\mu\text{g m}^{-3}$) of DTAA, DTA and MBTCA in SOA particles from 10 and 50 ppb α -pinene oxidation experiments performed at 20, 0, and -15 °C (Exp. 1.1-1.3 and Exp. 2.1-2.3).

65

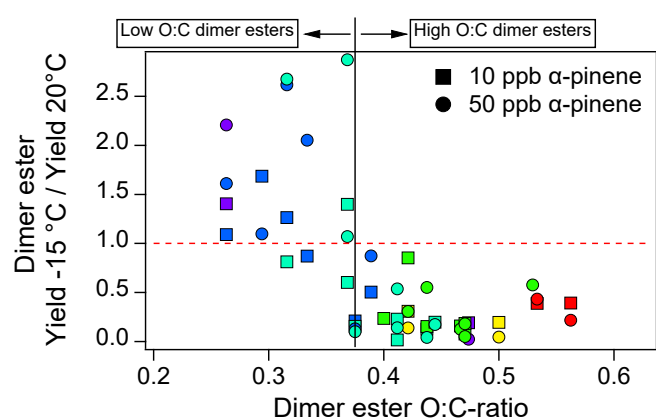


Figure S5. Comparison of relative yields (yield at -15 °C / yields at 20 °C) for specific dimer esters as a function of dimer ester O:C ratio in 10 and 50 ppb α -pinene ozonolysis experiments. Vertical line indicates the O:C value (0.38) above which all dimer esters show a decrease in concentration at -15 °C compared to 20 °C.

70

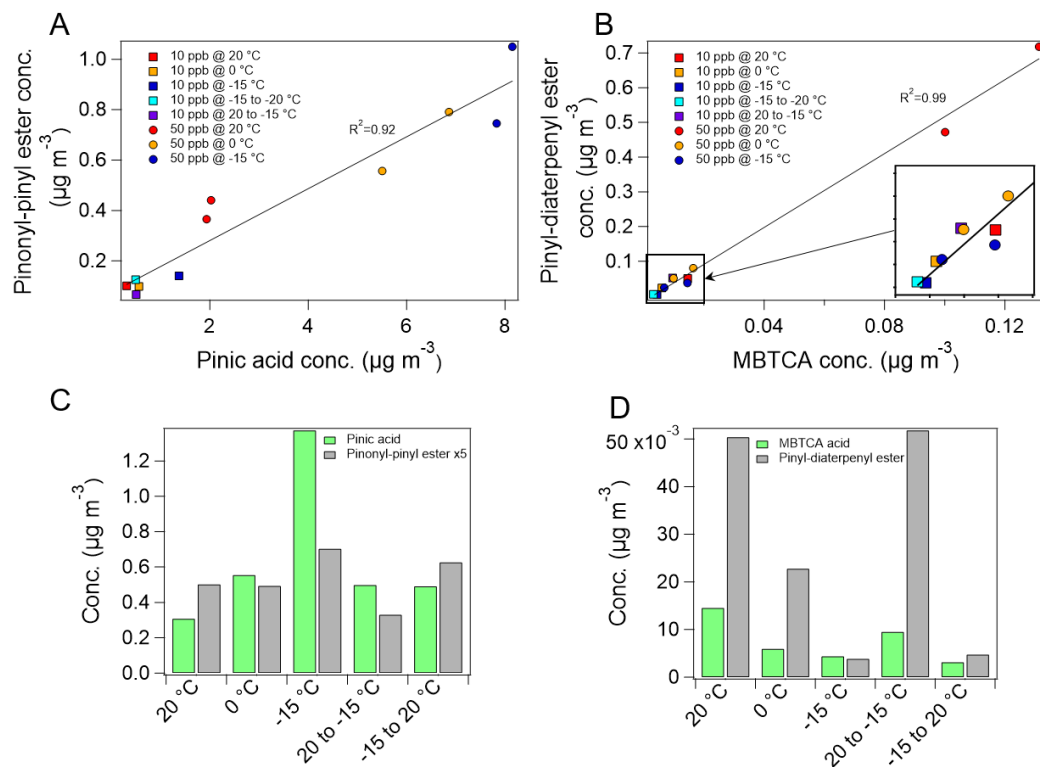


Figure S6. A) Correlation plot of pinonyl-pinyl ester conc. ($\mu\text{g m}^{-3}$) and pinic acid ($\mu\text{g m}^{-3}$) across all conducted experiments. **B)** Correlation plot of piny-diterpenyl ester conc. ($\mu\text{g m}^{-3}$) and MBTCA ($\mu\text{g m}^{-3}$) across all conducted experiments. **C)** Conc. ($\mu\text{g m}^{-3}$) of pinonyl-pinyl ester conc. and pinic acid in SOA particle formed from 10 ppb oxidation experiments performed at 20, 0, and -15 °C and during temperature ramping (20 to -15 °C & -15 to 20 °C). **D)** Conc. ($\mu\text{g m}^{-3}$) of piny-diterpenyl ester conc. and MBTCA in SOA particle formed from 10 ppb oxidation experiments performed at 20, 0, and -15 °C and during temperature ramping (20 to -15 °C & -15 to 20 °C)