Supplement of

Measurement report: New particle formation events observed during the COALA-2020 campaign

Jhonathan Ramirez-Gamboa et al.

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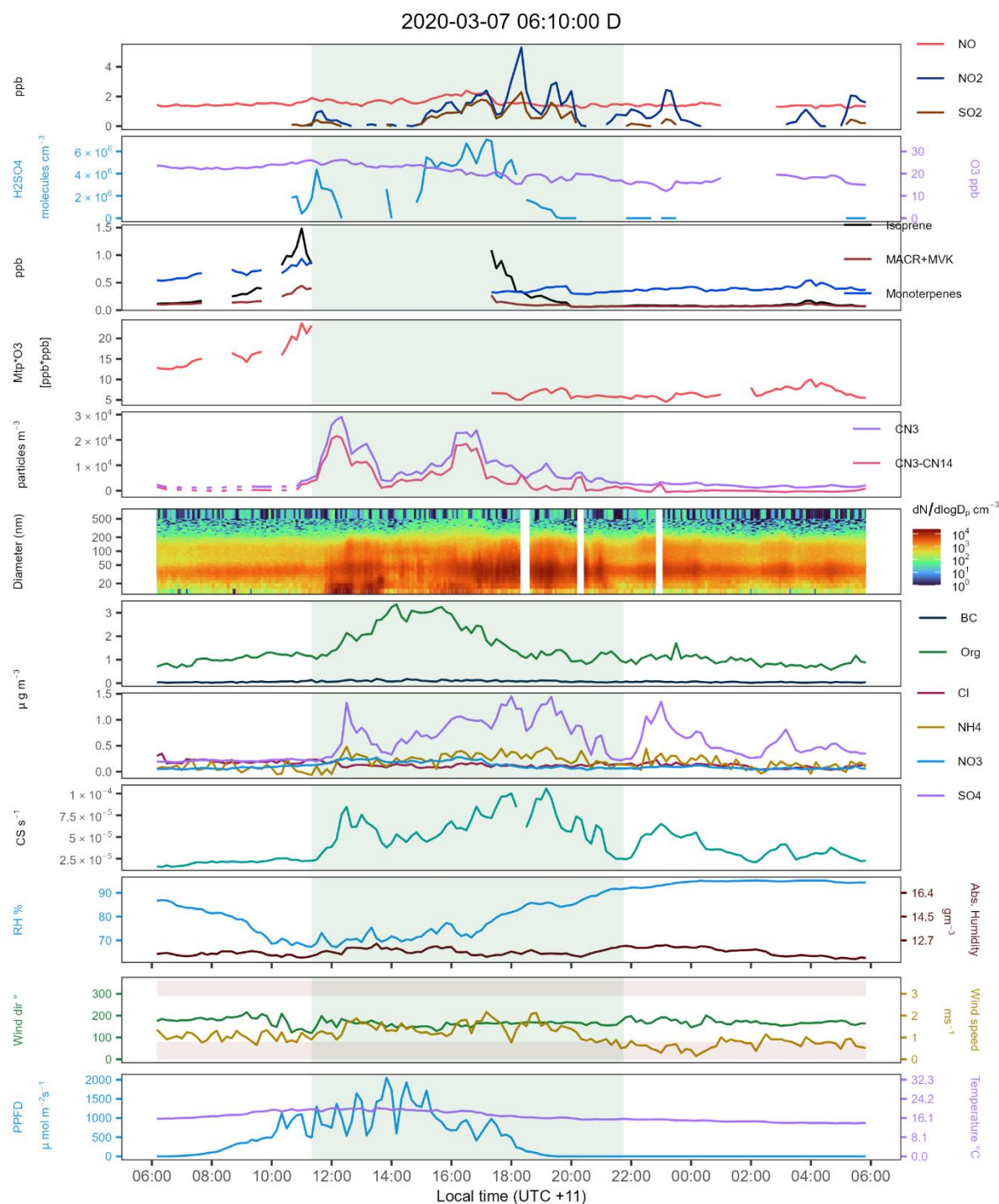
Supplementary Materials:

Figure S1: Time series of all selected variables during the NPF event during 2020-03-07. NO = Nitric oxide, NO₂ = Nitrogen dioxide, SO₂ = Sulphur dioxide, H₂SO₄ = Sulphuric acid, O₃ = Ozone, MACR+MVK = isoprene ox. products methacrolein and methyl-vinyl-ketone, CN₃ = Condensation Nuclei >3nm, CN₃-CN₁₄ = difference of CN₃ minus the sum of all channels from the SMPS data. BC = Black carbon. Org = Organic mass fraction, NH₄ = Ammonium mass fraction, NO₃ = Nitrates mass fraction, SO₄²⁻ = Sulphates mass fraction, Cl = Chloride mass fraction. CS = condensation sink. Mtp*ozone = HOM proxy product monoterpenes and ozone [ppb*ppb]. The light green vertical line marks the NPF approximated starting time of the event. Note how the multiple peaks of SO₂ and NO₂ between 16:00 to 20:00 induce as increase in particle density on the nucleation mode at 16:00 and then at multiple points on the Aitken mode.
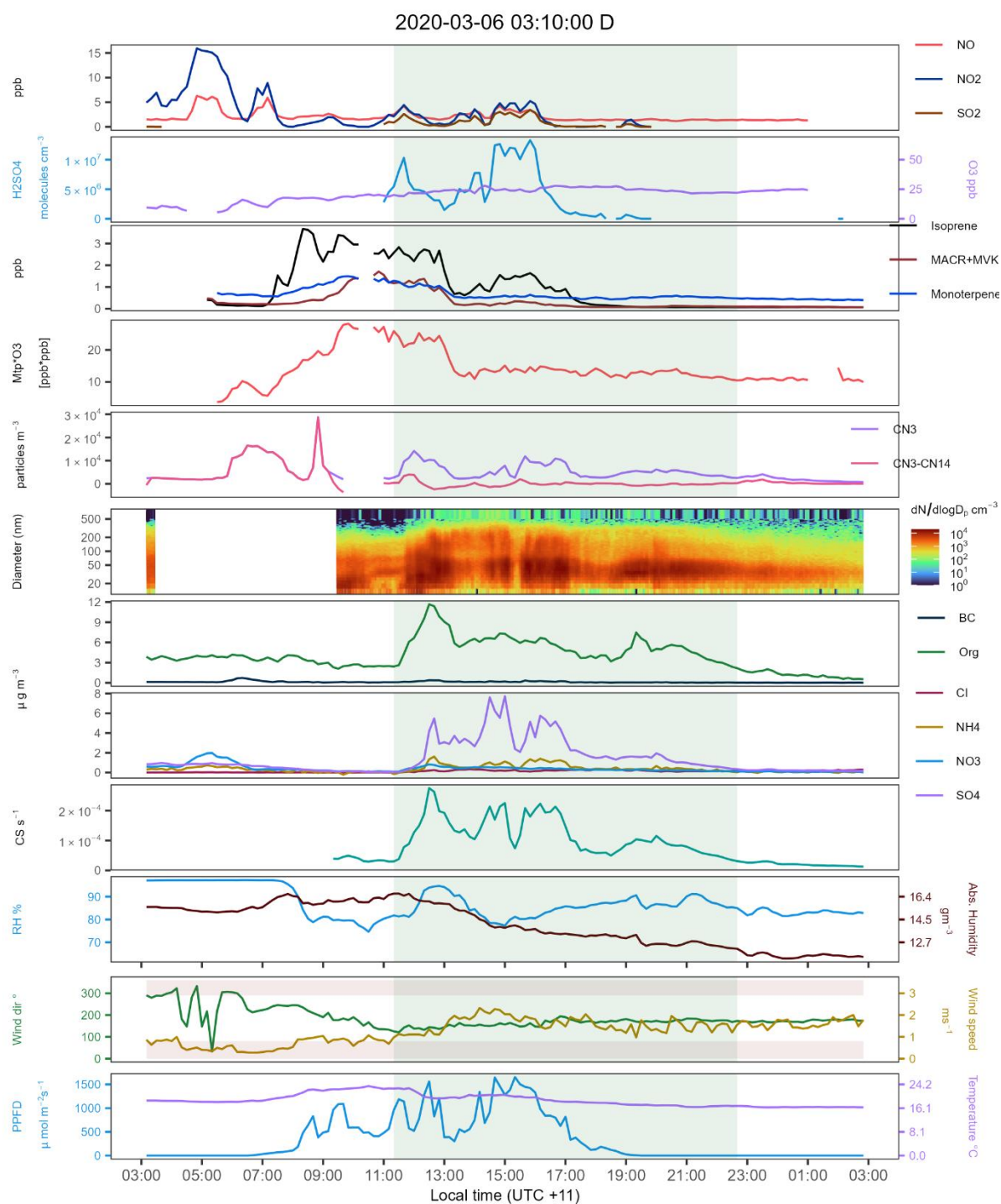
2020-03-06 03:10:00 D

Figure S2: NO = Nitric oxide, NO₂ = Nitrogen dioxide, SO₂ = Sulphur dioxide, H₂SO₄ = Sulphuric acid, O₃ = Ozone, MACR+MVK = isoprene ox. products methacrolein and methyl-vinyl-ketone, CN₃ = Condensation Nuclei >3nm, CN₃-CN₁₄ = difference of CN₃ minus the sum of all channels from the SMPS data. BC = Black carbon. Org = Organic mass fraction, NH₄ = Ammonium mass fraction, NO₃ = Nitrates mass fraction, SO₄²⁻ = Sulphates mass fraction, Cl = Chloride mass fraction. CS = condensation sink. Mtp*ozone = HOM proxy product monoterpenes and ozone [ppb*ppb].Time series of all selected variables during the NPF event during 2020-03-06. Note how the SO_2 increments (around 5:00 and 12:00) are followed by an enhancement in aerosols mass (13:00) and CN_3 (6:00 and 12:00).
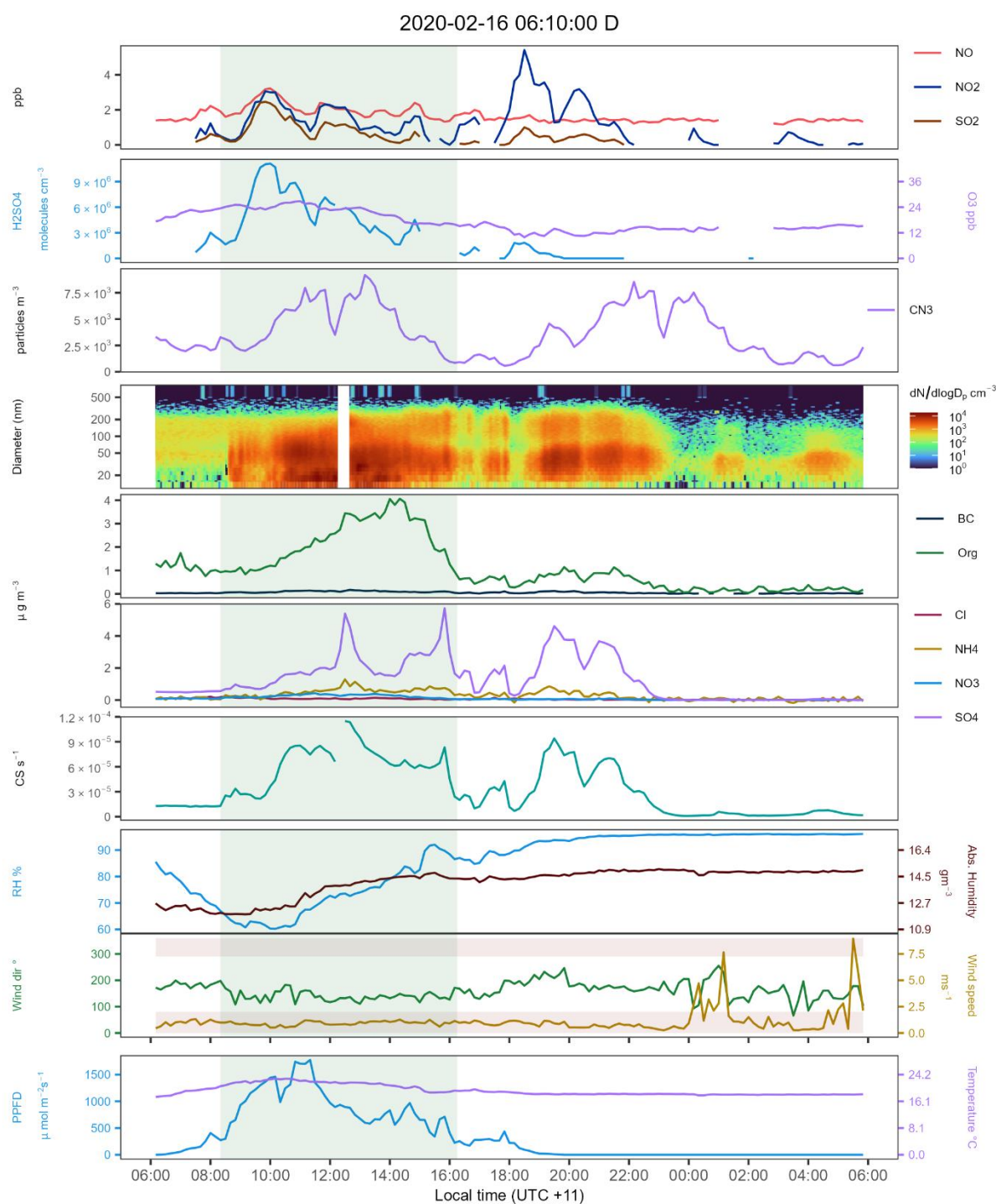
Figure S3: Time series of all selected variables during the NPF event during 2020-02-16. NO = Nitric oxide, NO₂ = Nitrogen dioxide, SO₂ = Sulphur dioxide, H₂SO₄ = Sulphuric acid, O₃ = Ozone, MACR+MVK = isoprene ox. products methacrolein and methyl-vinyl-ketone, CN₃ = Condensation Nuclei >3nm, CN₃-CN₁₄ = difference of CN₃ minus the sum of all channels from the SMPS data. BC = Black carbon. Org = Organic mass fraction, NH₄ = Ammonium mass fraction, NO₃ = Nitrates mass fraction, SO₄²⁻ = Sulphates mass fraction, Cl = Chloride mass fraction. CS = condensation sink. VOCs mole fractions were not available during this specific event. Note how the multiple peaks of SO_2 and NO_2 resemble the SO_4 pattern.
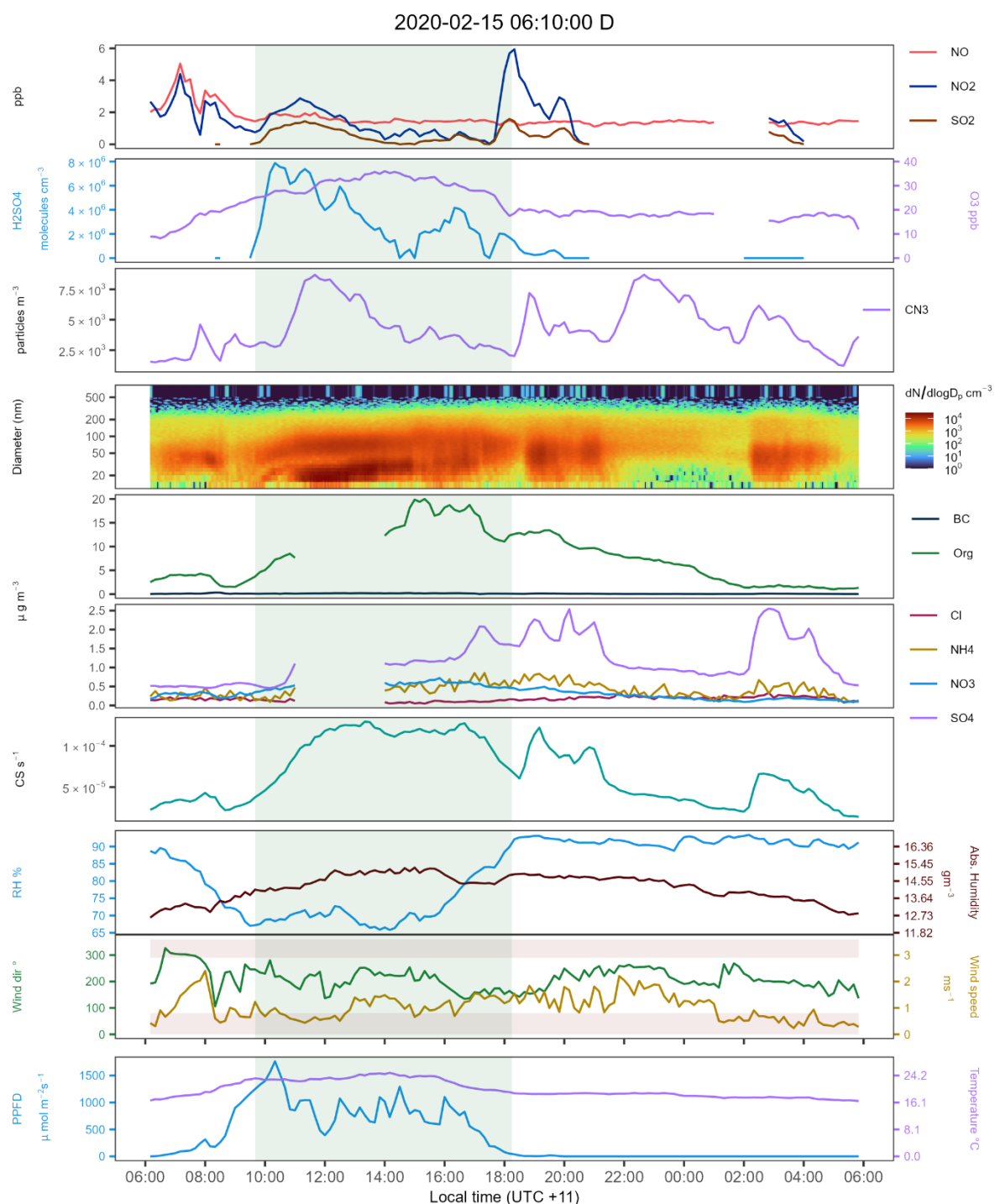
Figure S4: Time series of all selected variables during the NPF event during 2020-02-15 NO = Nitric oxide, NO₂ = Nitrogen dioxide, SO₂ = Sulphur dioxide, H₂SO₄ = Sulphuric acid, O₃ = Ozone, MACR+MVK = isoprene ox. products methacrolein and methyl-vinyl-ketone, CN₃ = Condensation Nuclei >3nm, CN₃-CN₁₄ = difference of CN₃ minus the sum of all channels from the SMPS data. BC = Black carbon. Org = Organic mass fraction, NH₄ = Ammonium mass fraction, NO₃ = Nitrates mass fraction, SO₄²⁻ = Sulphates mass fraction, Cl = Chloride mass fraction. CS = condensation sink. VOCs mole fractions were not available during this specific event.
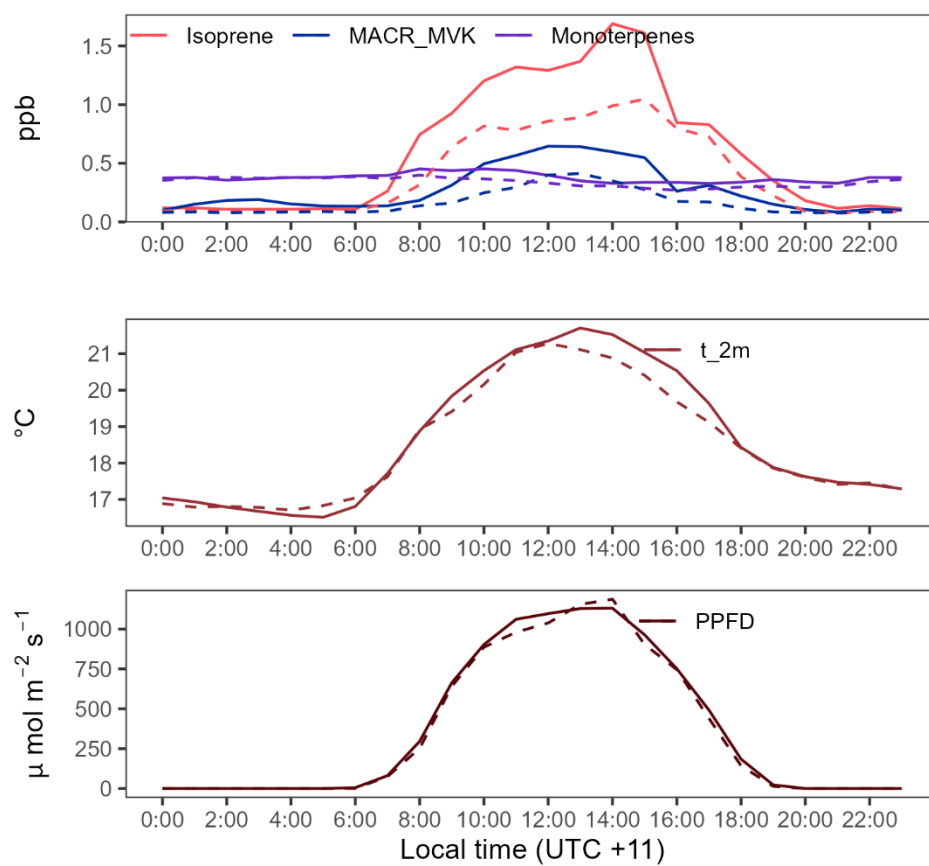
Figure S5: Hourly averages of biogenic VOCs, temperature and PAR (PPFD) for the campaign period. The lines are the mean values per hour and the dashes are the median values per hour.
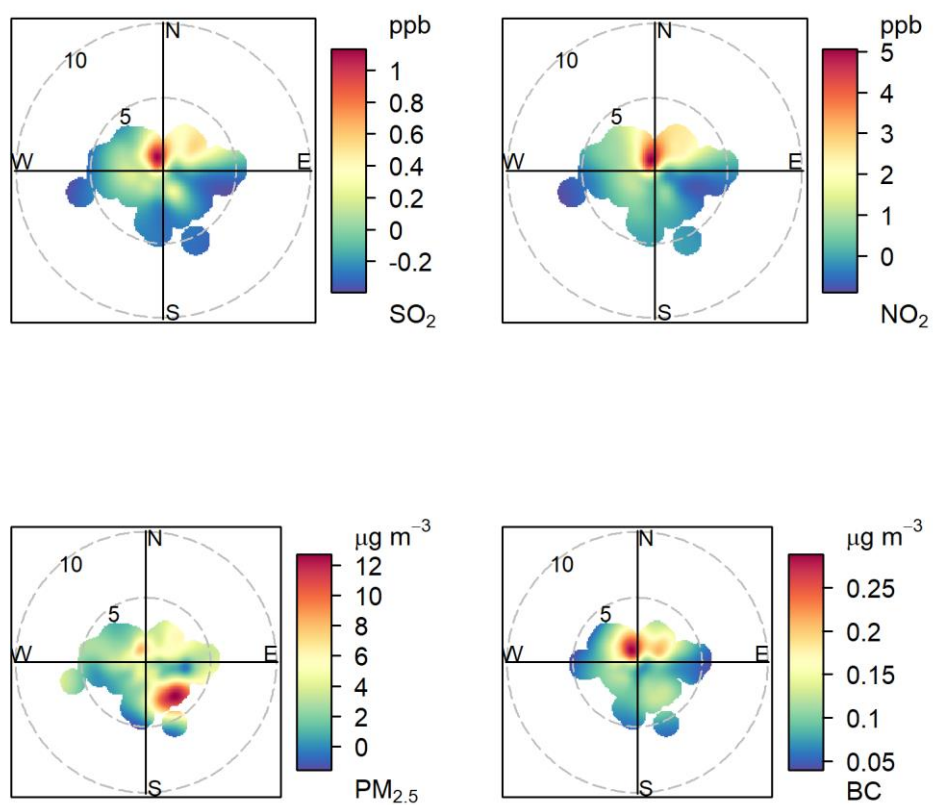
Figure S6: Pollution roses for SO2, NO2, PM2.5 and BC for the period of the campaign. Note how high SO2 and NO2 concentrations come from the north at low wind speeds, suggesting a non-continuous emitting local source in the direction of the main road.
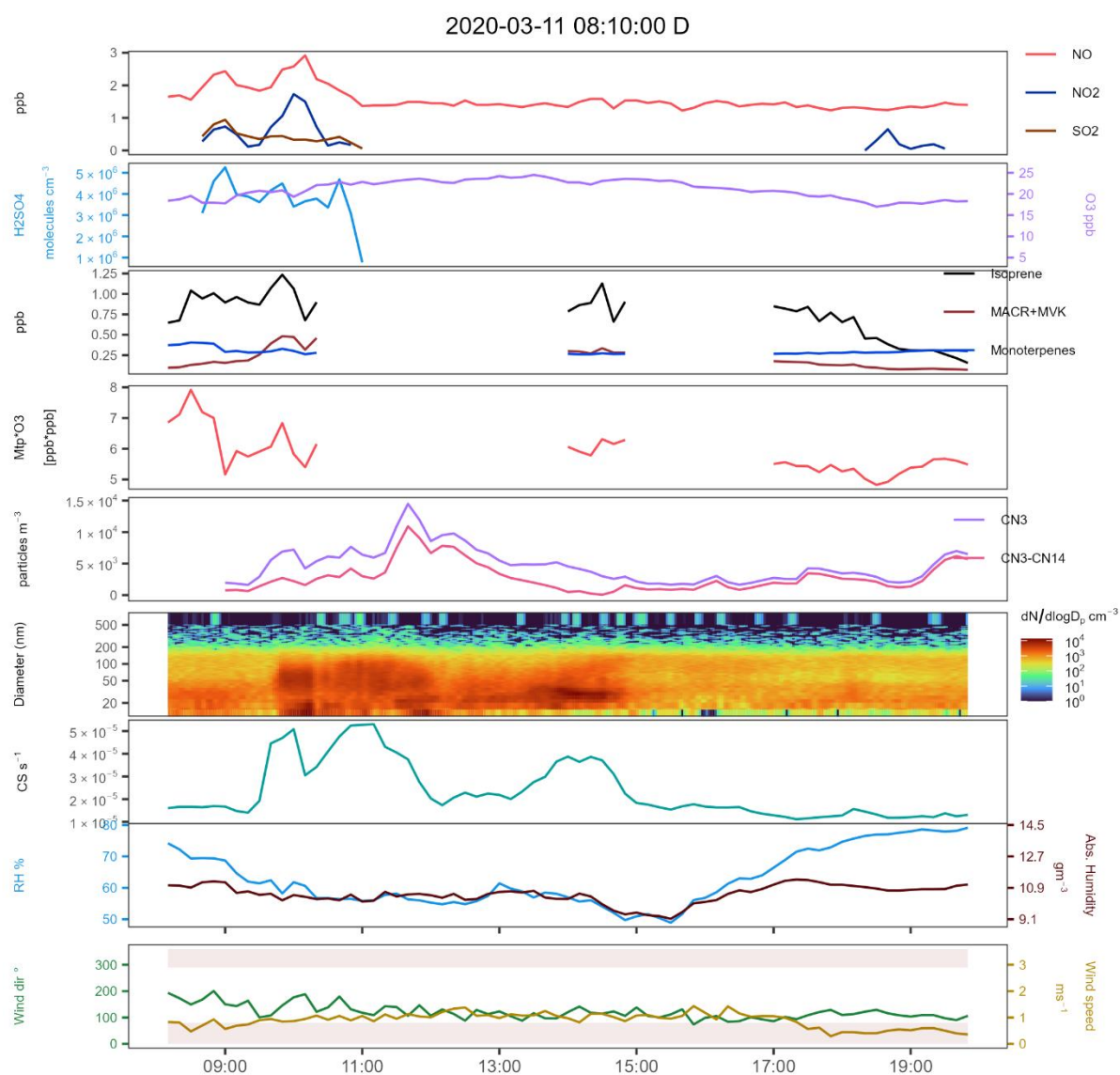
*Figure S7: Time series for the night event on March 11th NO = Nitric oxide, NO2 = Nitrogen dioxide, SO2 = Sulphur dioxide, H2SO4 = Sulphuric acid, O3 = Ozone, MACR+MVK = isoprene ox. products methacrolein and methyl-vinyl-ketone, CN3 = Condensation Nuclei >3nm, CN3-CN14 = difference of CN3 minus the sum of all channels from the SMPS data. CS = condensation sink. Mtp*ozone = HOM proxy product monoterpenes and ozone [ppb*ppb].*
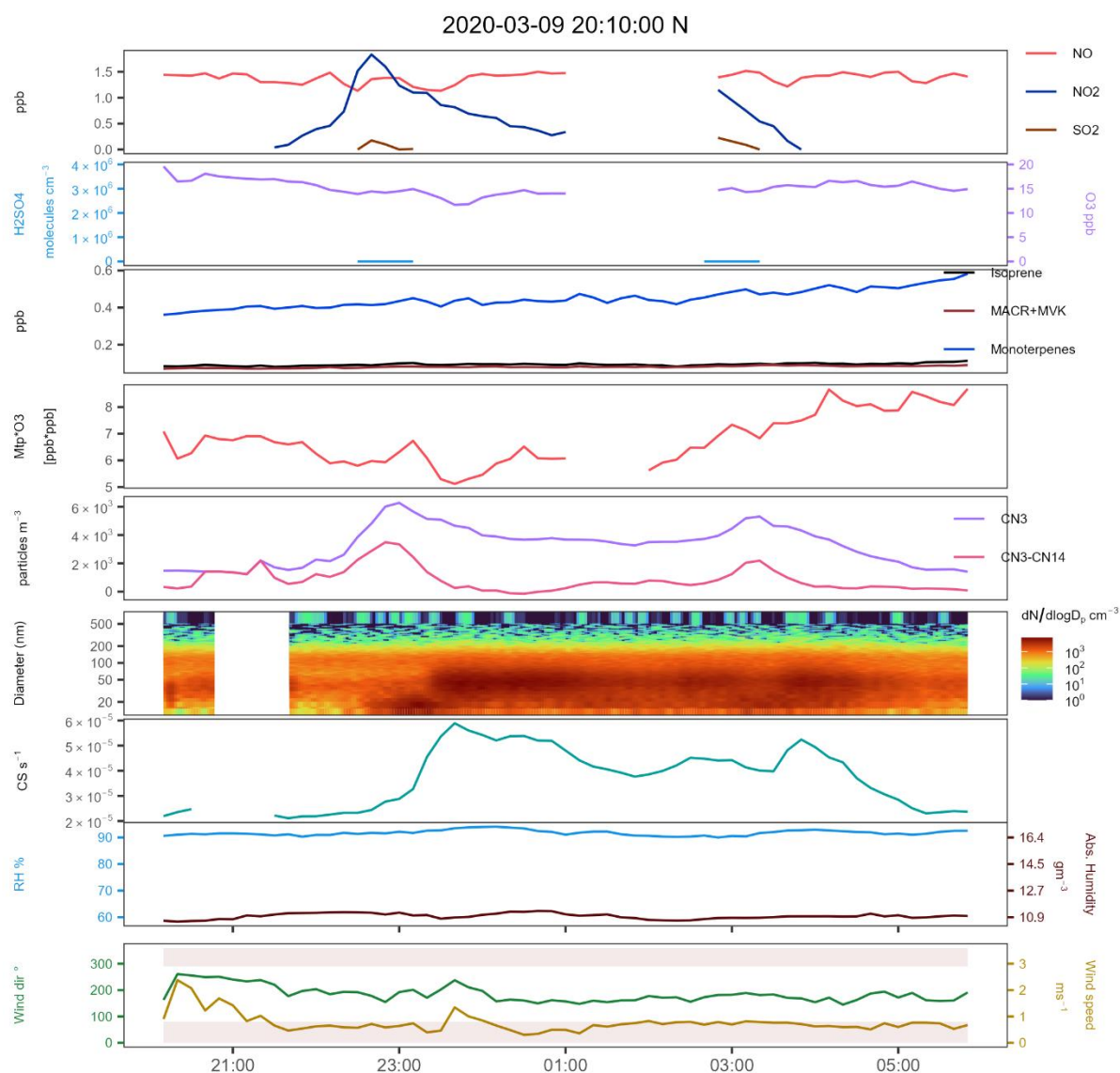
Figure S8: Time series for the night event on March 09th. NO = Nitric oxide, NO2 = Nitrogen dioxide, SO2 = Sulphur dioxide, H2SO4 = Sulphuric acid, O3 = Ozone, MACR+MVK = isoprene ox. products methacrolein and methyl-vinyl-ketone, CN3 = Condensation Nuclei >3nm, CN3-CN14 = difference of CN3 minus the sum of all channels from the SMPS data. Mtp*ozone = HOM proxy product monoterpenes and ozone [ppb*ppb].