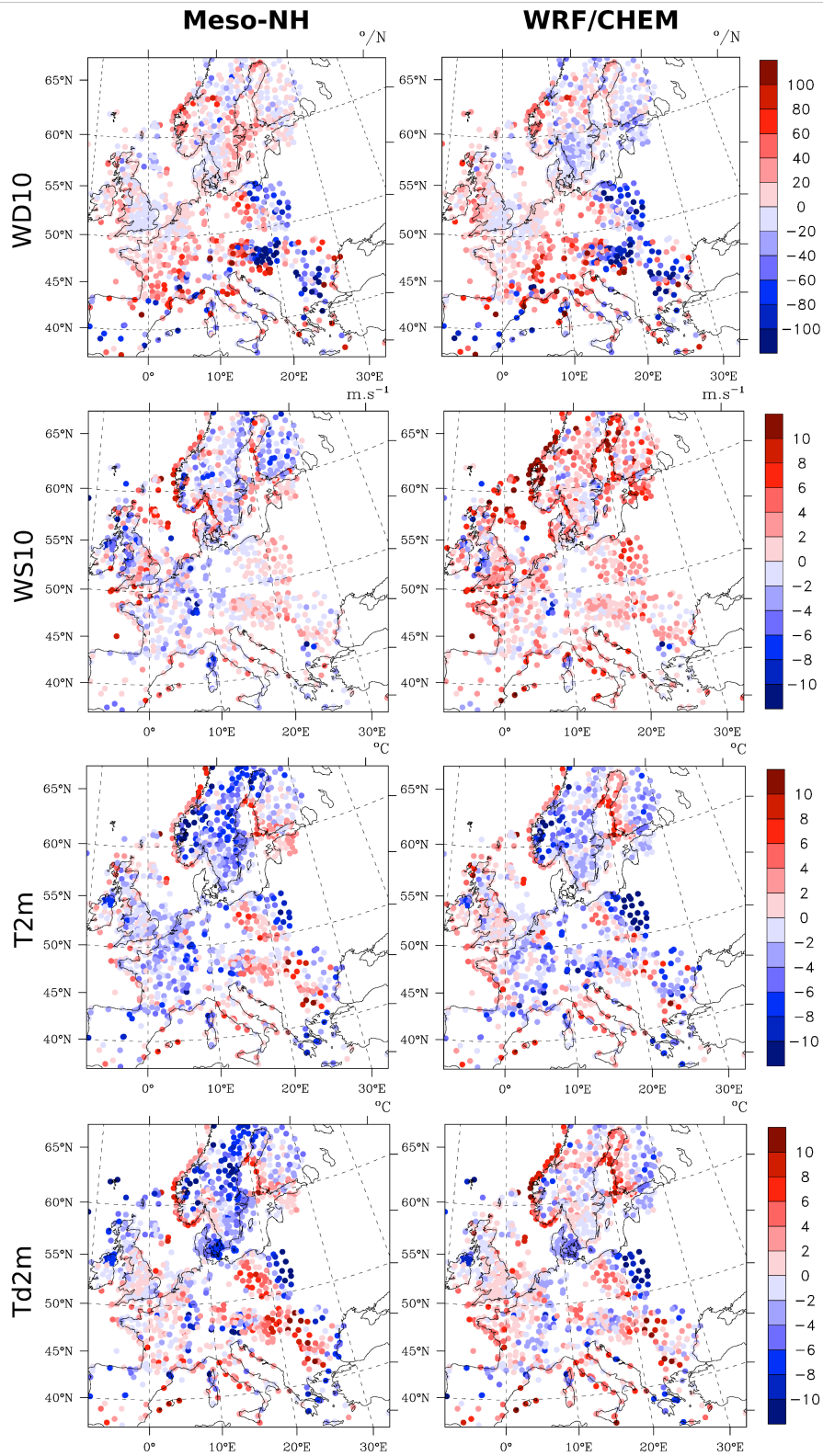


1 Supplementary Materials

2 Manuscript:

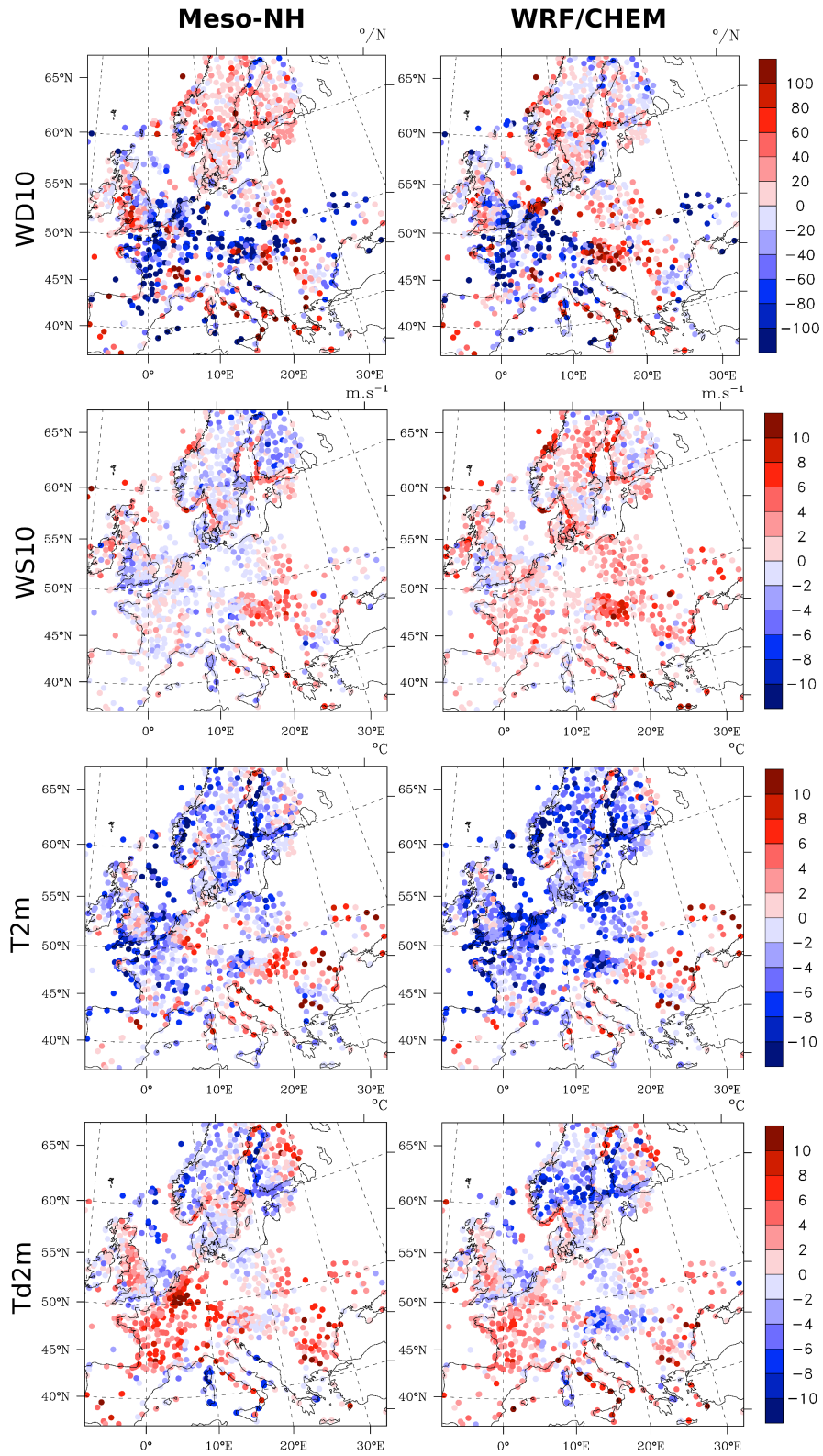
3 Evaluation of Meso-NH and WRF/CHEM simulated gas and aerosol chemistry over Europe based on hourly
4 observations

5 By Berger et al.



1

2 Fig. S1: Simulated daily biases between models and observations for 3 March 2009 at NOAA stations. Wind
3 direction ($^{\circ}$ N), wind speed (m.s^{-1}), temperature ($^{\circ}\text{C}$) and dewpoint ($^{\circ}\text{C}$) are represented for Meso-NH and
4 WRF/CHEM respectively top to bottom and right to left.



1

2 Fig. S2: Simulated daily biases between models and observations for 26 June 2010 at NOAA stations. WD (°/N),
3 WS (m.s⁻¹), T2 (°C) and dewpoint (°C) are represented for Meso-NH and WRF/CHEM respectively top to
4 bottom and right to left.

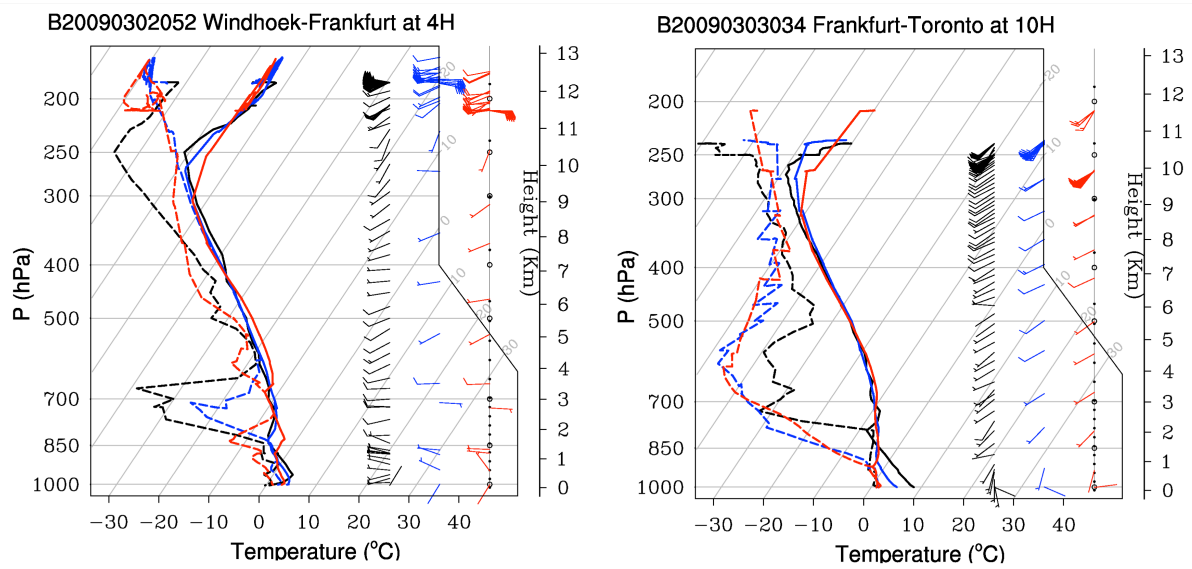
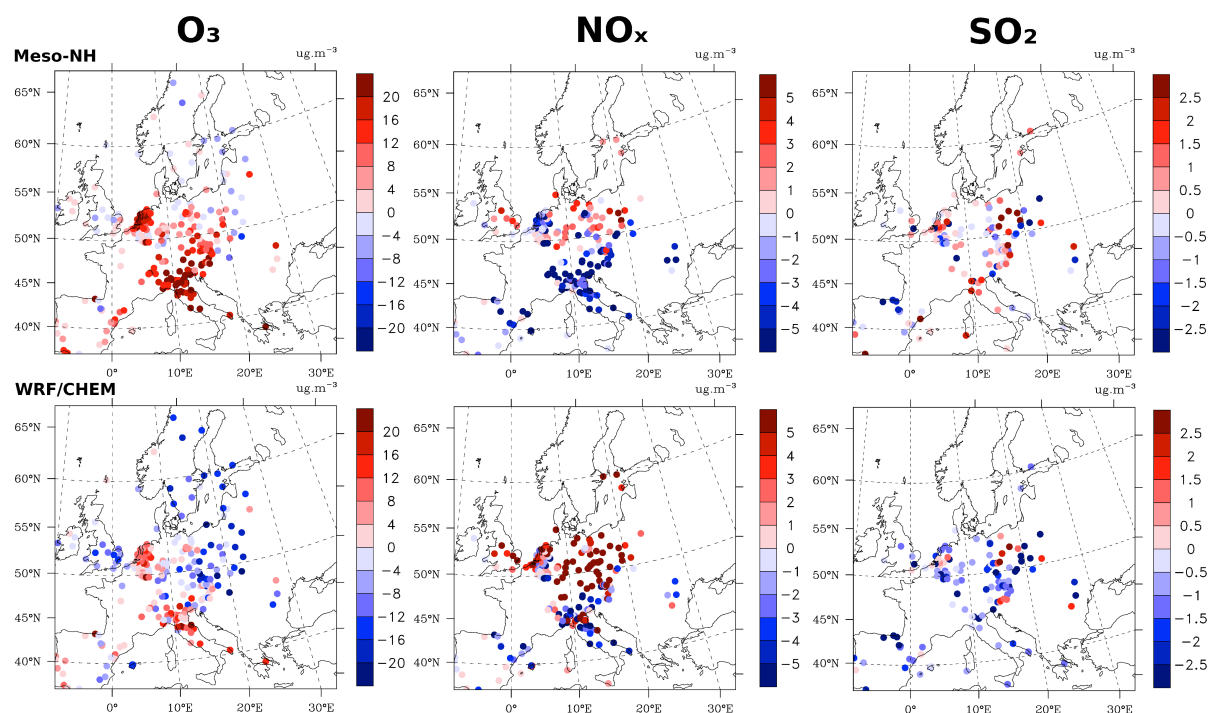


Fig. S3: Simulated (blue and red lines, for Meso-NH and WRF/CHEM respectively) and observed (black line) skew-T plots for temperature (solid lines), dewpoint (dashed lines), wind speed and wind direction (staffs and attached barbs) for IAGOS/MOZAIC flights from/to Frankfurt airport for 3 March 2009 at 2 different times of day.

1

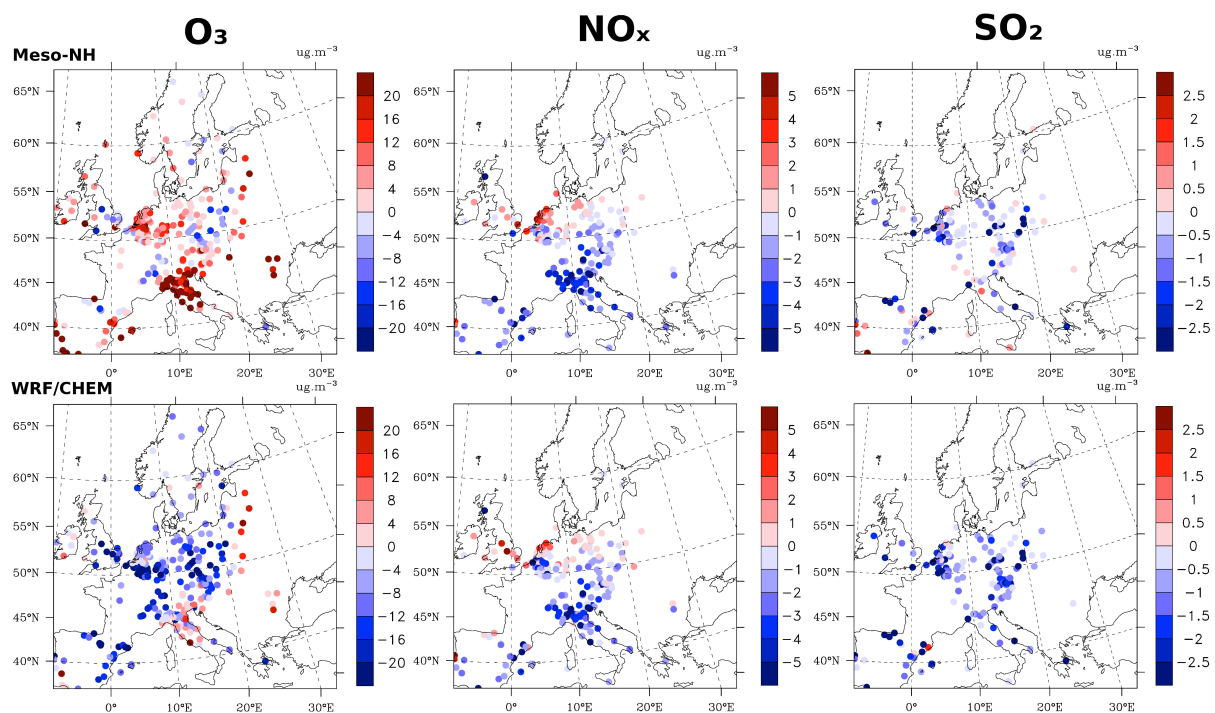


2

3 Fig. S4: Simulated daily biases of mixing ration (in $\mu\text{g.m}^{-3}$) between models and observations for 3 March 2009
 4 at "background" and "rural" AIRBASE stations. O_3 , NO_x and SO_2 are represented for Meso-NH and
 5 WRF/CHEM respectively left to right and top to bottom.

6

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3 Fig. S5: Simulated daily biases of mixing ratio (in $\mu\text{g.m}^{-3}$) between models and observations for 26 June 2010 at
 4 “background” and “rural” AIRBASE stations. O₃, NO_x and SO₂ are represented for Meso-NH and WRF/CHEM
 5 respectively left to right and top to bottom.

6

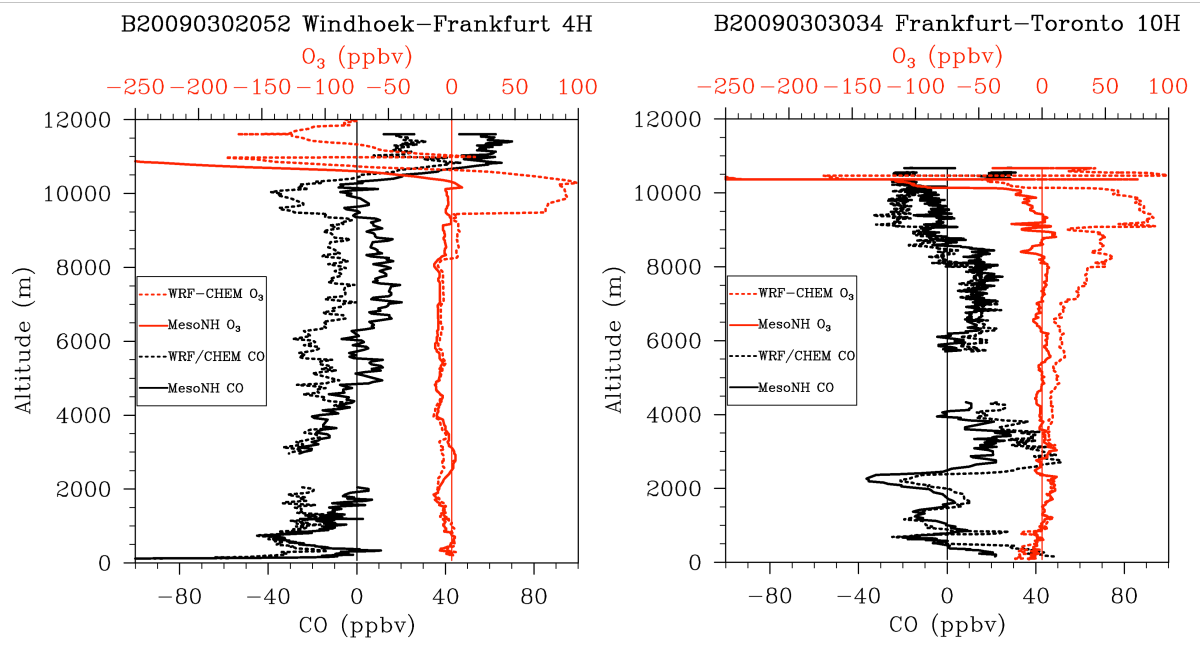
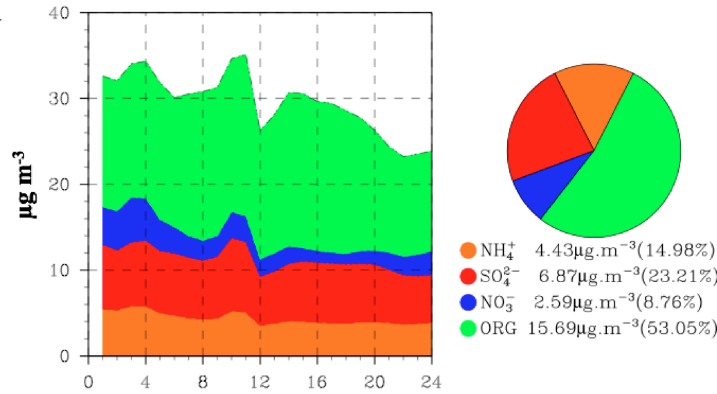


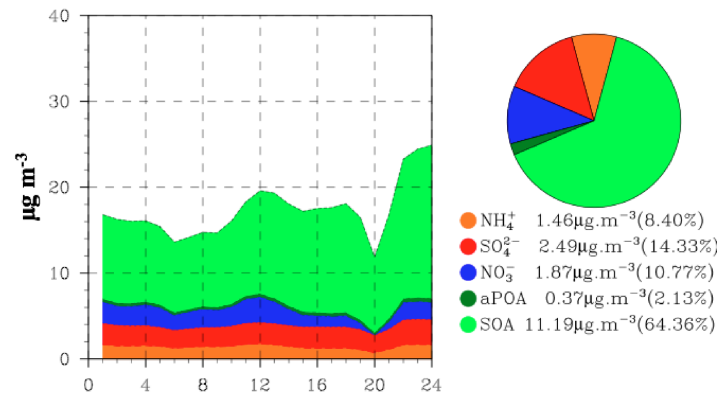
Fig. S6: Vertical profiles of CO and ozone mixing ratios biases (in ppbv) between models and observations from take-off and landing of IAGOS/MOZAIC aircraft at Frankfurt Airport on 3 March 2009 at 2 different times of day. Solid line is for Meso-NH and dotted line is for WRF/CHEM.

puy de Dôme (FR)

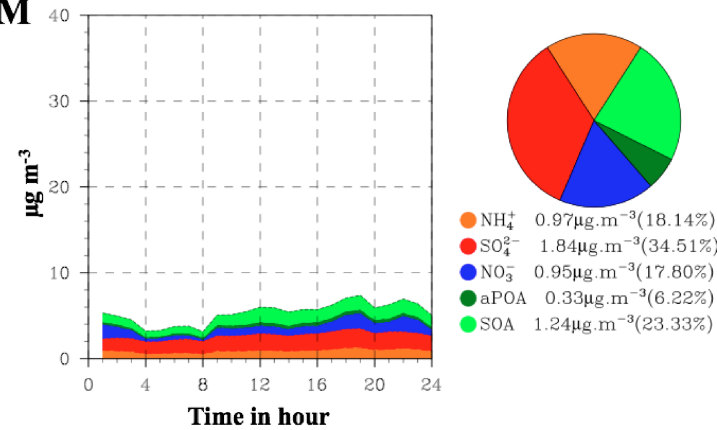
Measured



Meso-NH



WRF/CHEM



1

2 Fig. S7: Diurnal cycle of aerosol chemical composition in mass concentration ($\mu\text{g m}^{-3}$) of NR-PM₁ on right (top:
3 measured by AMS, middle: simulated by Meso-NH and bottom: simulated by WRF/CHEM) for 26 June 2010 at
4 puy de Dome, Melpitz stations. On the left, the corresponding daily averaged fractional mass composition is also
5 indicated by pie charts. Percentages in parentheses correspond to the mass fraction of the total aerosol mass for
6 each compound. NR-PM₁ include NO_3^- (blue), SO_4^{2-} (red), NH_4^+ (orange) and ORG (green). Meso-NH and
7 WRF/CHEM differentiate APOA (dark green) and SOA (light green) in OM.

8

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