

Supplementary

Simultaneous measurements of particle number size distributions at ground level and 260 m on a meteorological tower in urban Beijing, China

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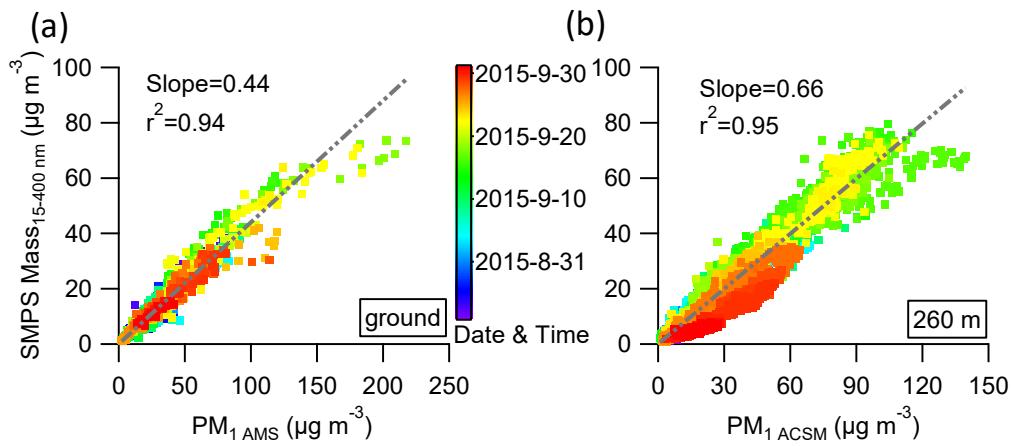
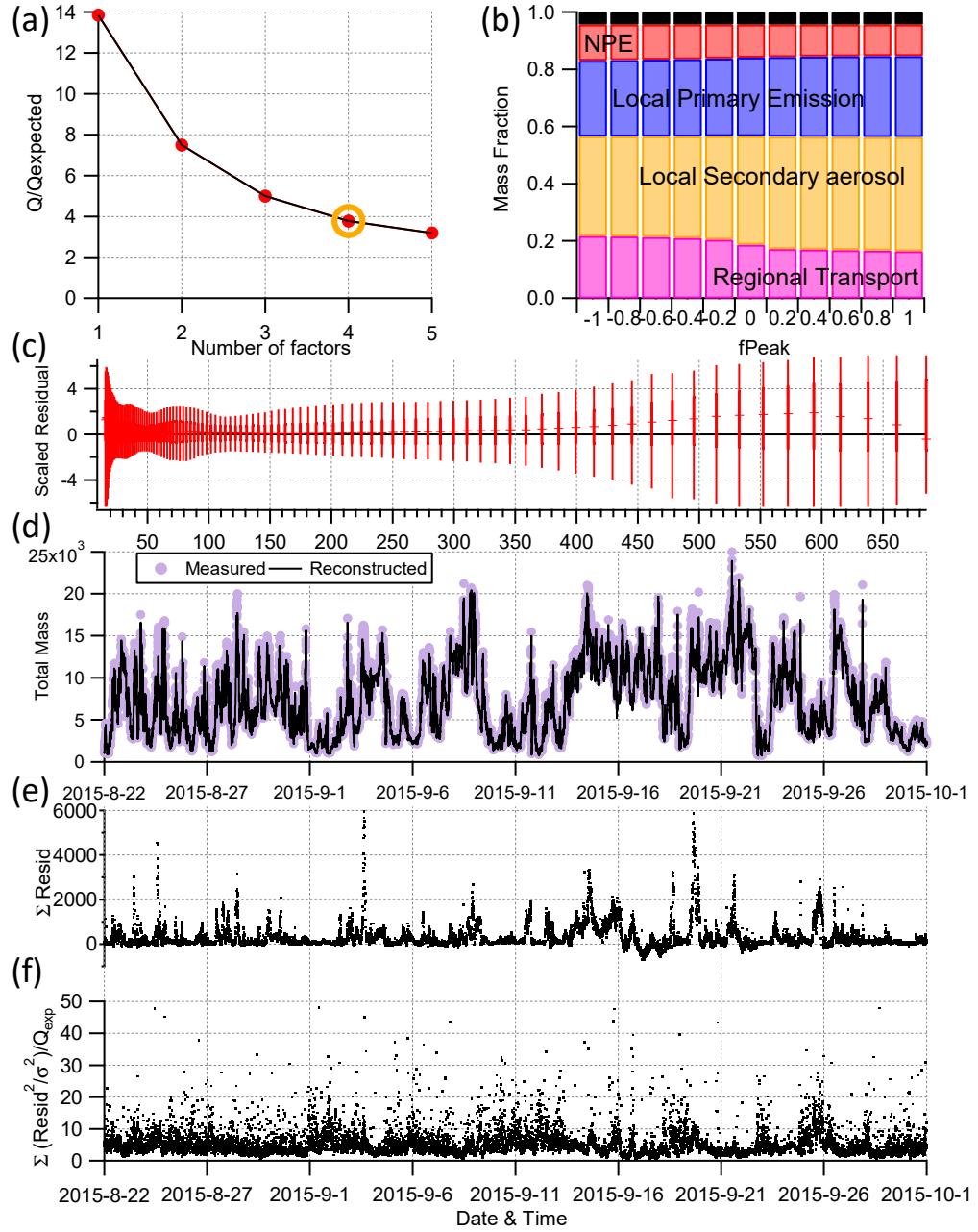


Figure S1. Comparison of the mass concentrations of PM₁ (= NR-PM₁ + BC) with those derived from SMPS

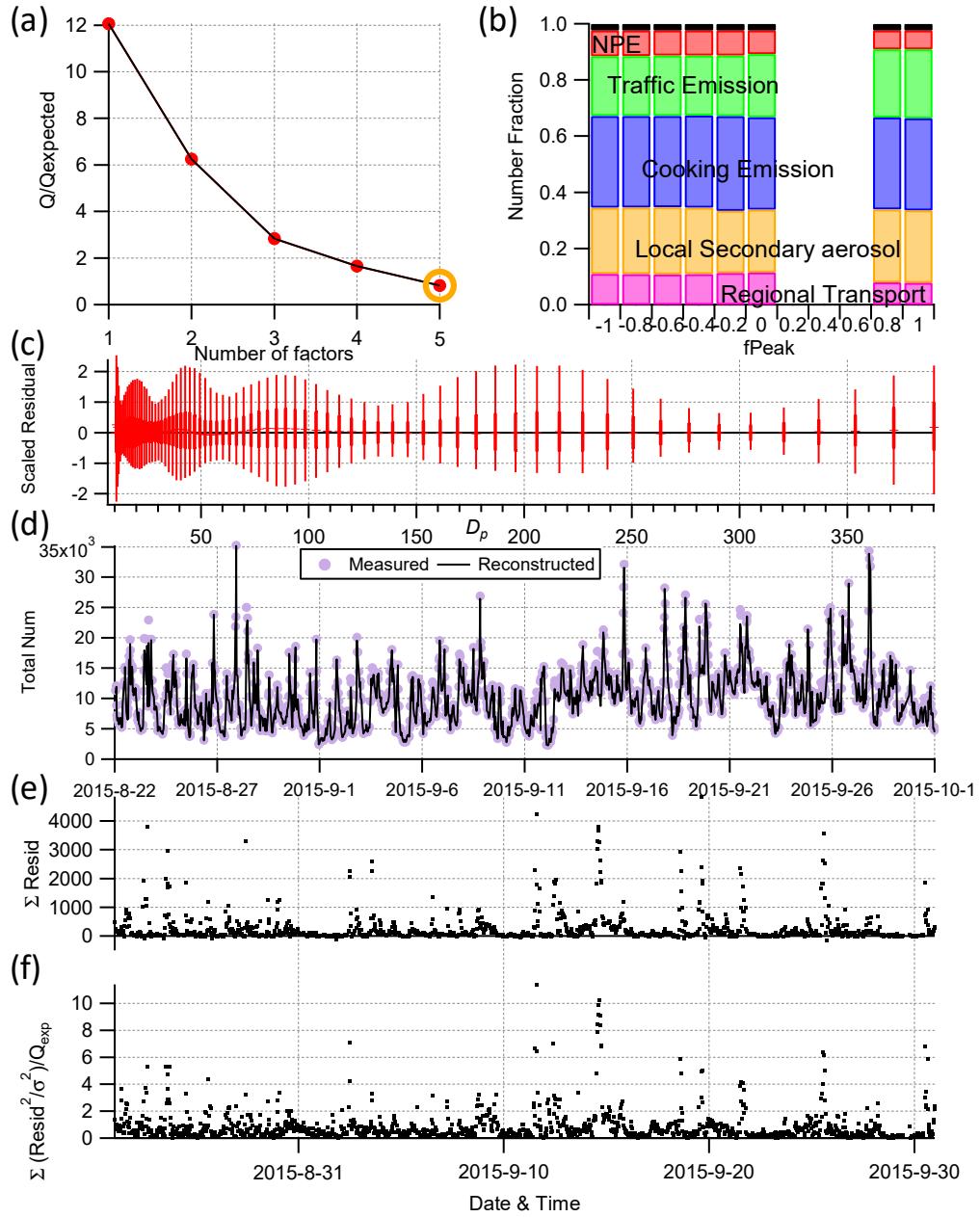
25 measurements ($D_p = 15 - 400 \text{ nm}$) at (a) ground level and (b) 260 m.



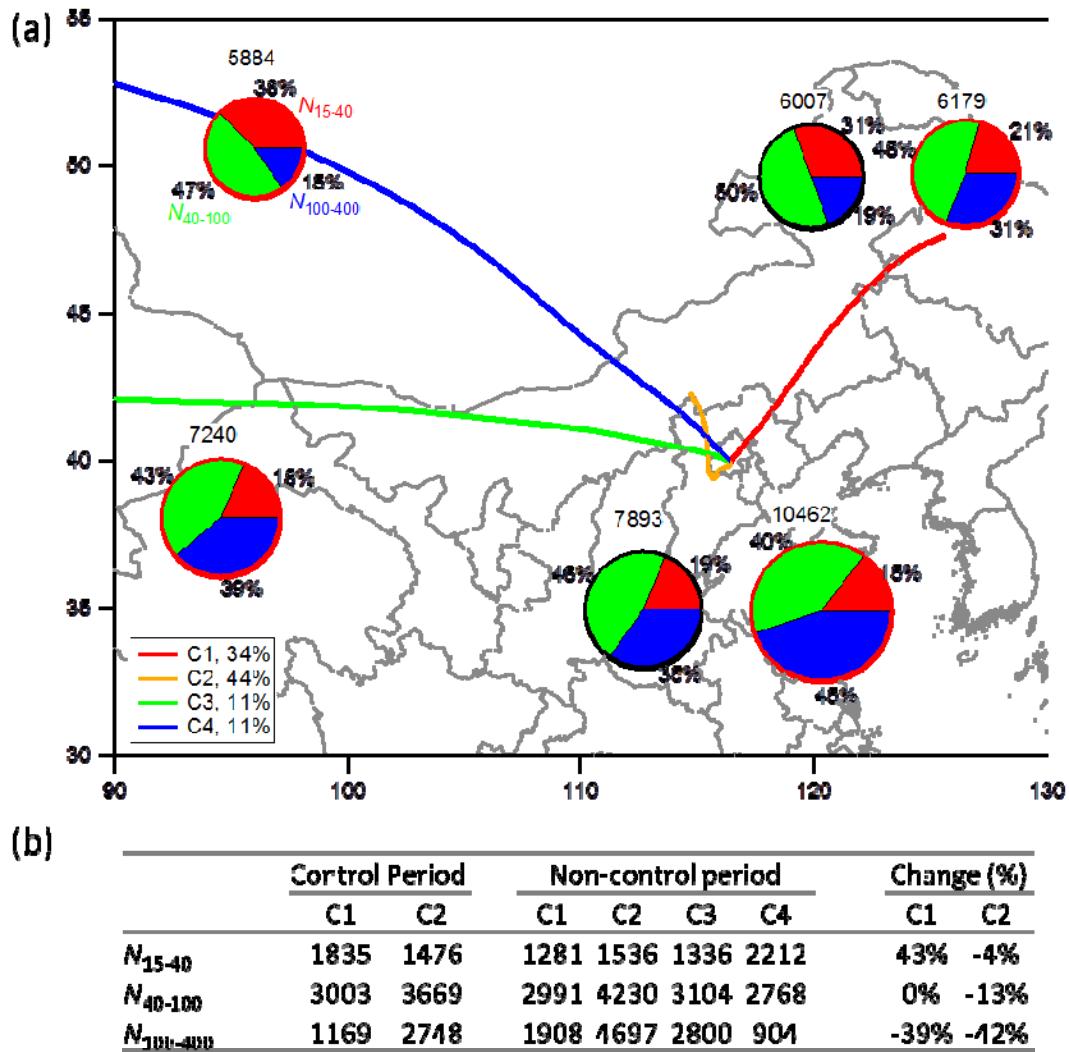
30 **Figure S2. A summary of PMF diagnostic plot at 260 m:** (a) Q/Q_{exp} as a function of number of factors, (b)

number fractions of factors as a function of fpeak, (c) scaled residual for each fragment ion, (d) a
comparison of measured and PMF reconstructed number concentration, (e) time series of residual, and (f)

time series of Q/Q_{exp} .



35 **Figure S3.** A summary of PMF diagnostic plot at the ground level: (a) Q/Q_{exp} as a function of number of factors, (b) number fractions of factors as a function of f_{peak} , (c) scaled residual for each fragment ion, (d) a comparison of measured and PMF reconstructed number concentration, (e) time series of residual, and (f) time series of Q/Q_{exp} .



40 Figure S4. (a) Average number composition for each cluster during (black circles) and after (red circles) the
 control period. Note that air masses during the control period were only from C1 and C2. (b) Summary of
 the number concentration for each cluster and also the changes compared with those after the control
 period. The 3-day (72 h) back trajectories were calculated every hour at 260 m height using the Hybrid
 Single-Particle Lagrangian Integrated Trajectory (HYSPLIT, NOAA) 4.9 model (Draxler and Hess, 1997).
 The trajectories were then grouped into four clusters for the entire study using the algorithm of cluster
 analysis.

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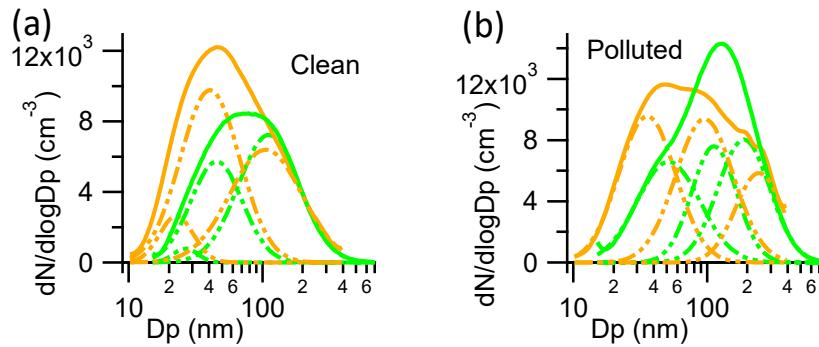


Figure S5. Average particle number size distributions during (a) clean days and (b) polluted days.

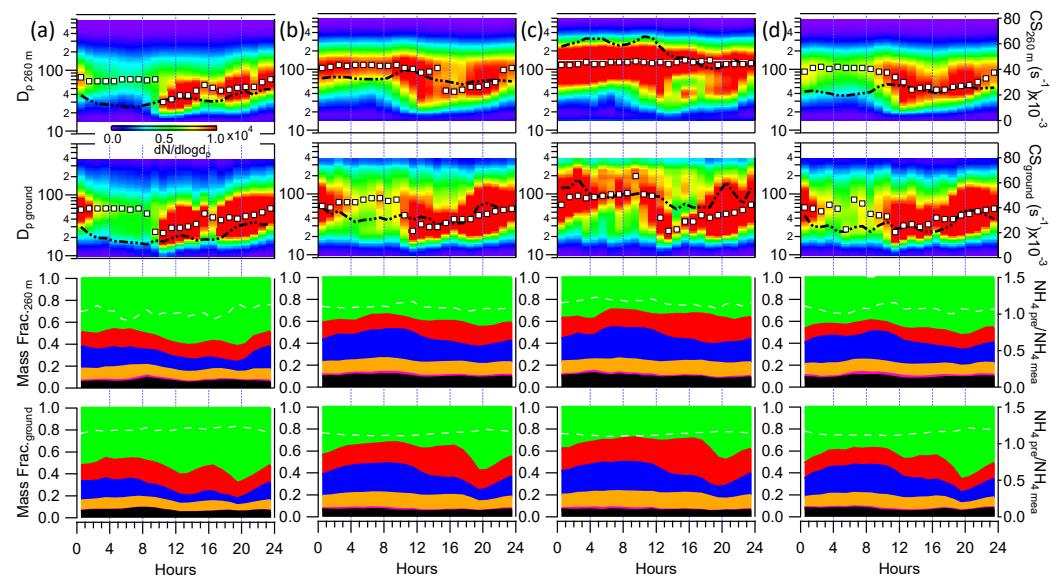
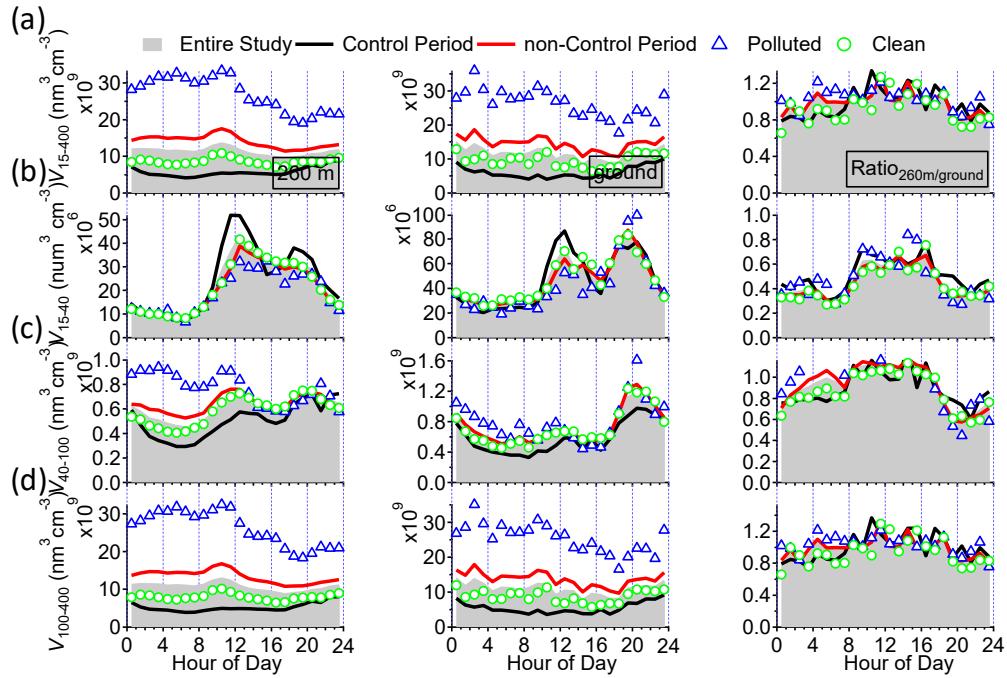
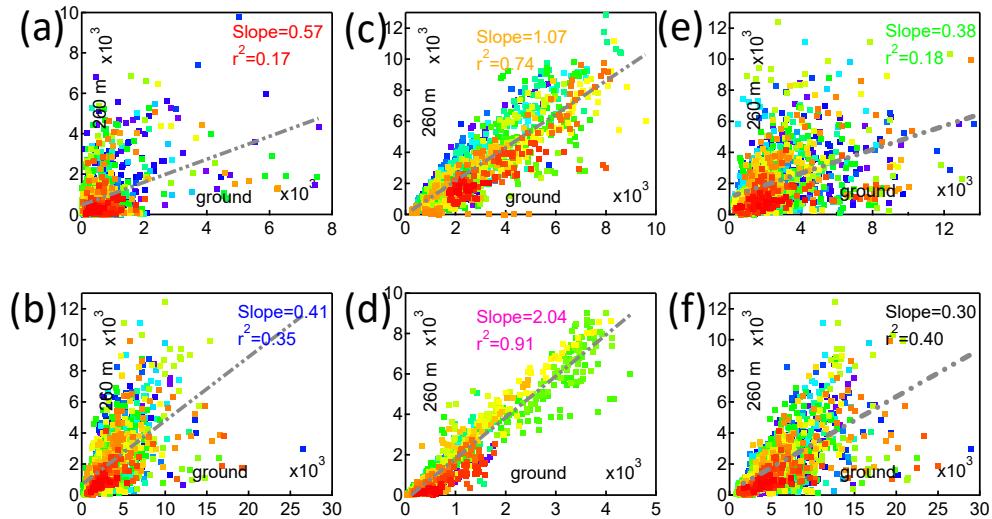


Figure S6. Diurnal variation of mass fraction of PM₁ species and particle number size distributions at two heights during (a) control period, (b) non-control period, (c) polluted days and (d) clean days.



55 **Figure S7.** Average diurnal cycles of particle volume concentrations (V) for different size ranges, i.e., (a) 15 – 400 nm, (b) 15 – 40 nm, (c) 40 – 100 nm, and (d) 100 – 400 nm at 260 m and ground level, and the ratio of 260 m to ground.



60 **Figure S8.** Correlation between two heights for pmf resolved factors including (a) factor 1, (b) factor 3, (c) factor 4, (d) factor 5, scatter plot of (e) factor 3 at 260 m versus factor2 at ground, and (f) factor 3 at 260 m versus factor2 add on factor3 at the ground level.

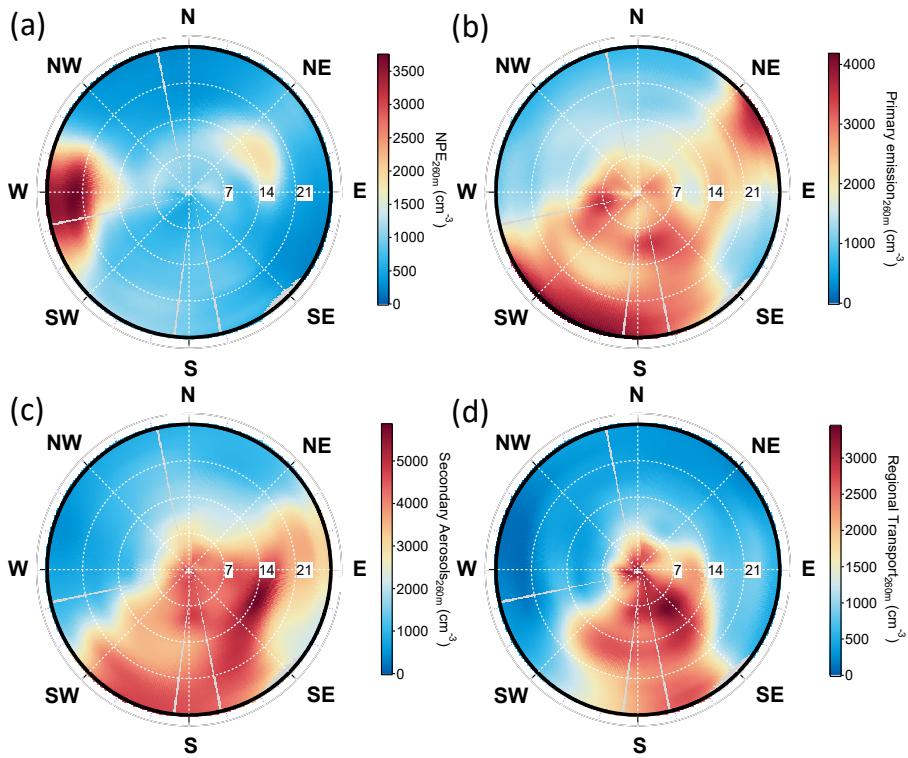


Figure S9. Bivariate polar plots of four PMF factors at 260 m, including (a) new particle events (NPE), (b) primary emissions, (c) local secondary aerosols, and (d) regional transport aerosols.

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References

Draxler, R. R., and Hess, G. D.: DESCRIPTION OF THE HYSPLIT_4 MODELING SYSTEM, National Oceanic & Atmospheric Administration Technical Memorandum Erl Arl, 1997, 197-199.