Supplementary

Factor Analysis of Combined Organic and Inorganic Aerosol Mass Spectra from High Resolution Aerosol Mass Spectrometer Measurements

Y. L. Sun[1], Q. Zhang[2], J. J. Schwab[3], T. Yang[1], N. L. Ng[4], K. L. Demerjian[3]

[1]*State Key Laboratory of Atmospheric Boundary Layer Physics and Atmospheric Chemistry, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, China*

[2]*Department of Environmental Toxicology, University of California, Davis, California, USA*

[3]*Atmospheric Sciences Research Center, State University of New York at Albany, Albany, New York*

[4]*School of Chemical and Biomolecular Engineering and School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, Georgia, USA*

Correspondence to: Y. L. Sun (sunyele@mail.iap.ac.cn)

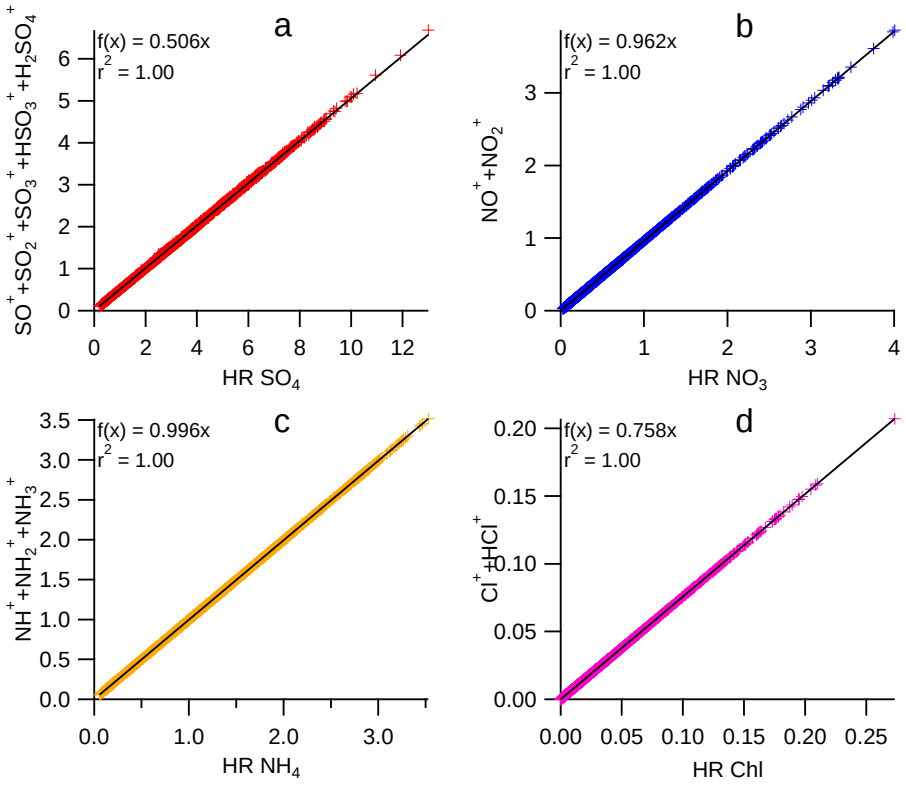

Fig. S1. Correlations between the sum of selected fragmentation ions for PMF analysis and the total mass concentrations of (a) sulfate, (b) nitrate, (c) ammonium, and (d) chloride.

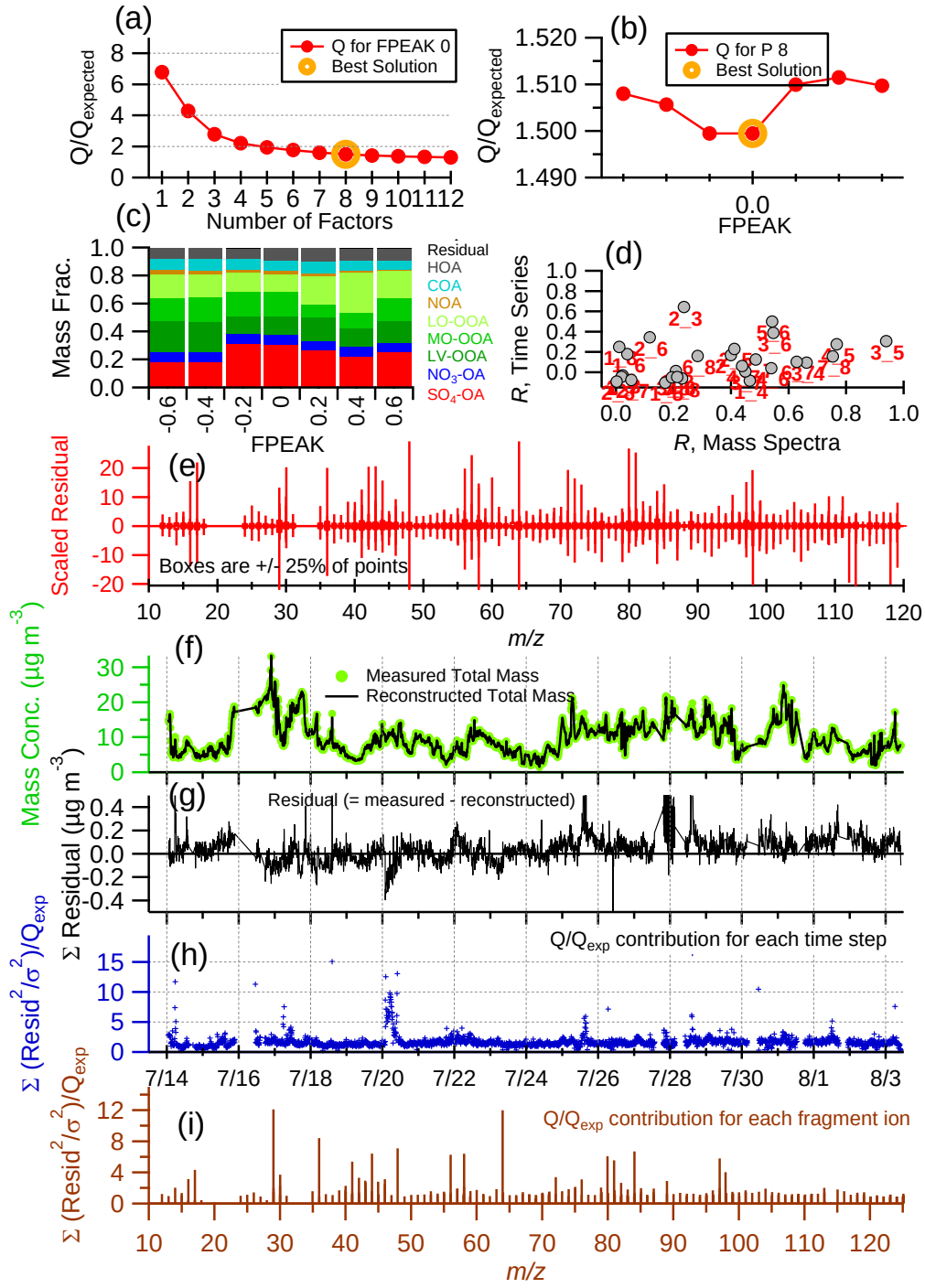

Fig. S2. Summary of the evaluation of the PMF analysis of the unified organic and inorganic aerosols dataset. a) $Q/Q_{expected}$ as a function of number of factors (p) selected for PMF modeling; b) fraction of each factor vs. fPeak values for the 8-factor solution; (c) time series of the measured mass concentration and the reconstructed mass; (d) variations of the residual of the fit; e) the $Q/Q_{expected}$ values for each point in time; and f) the $Q/Q_{expected}$ values for each m/z.

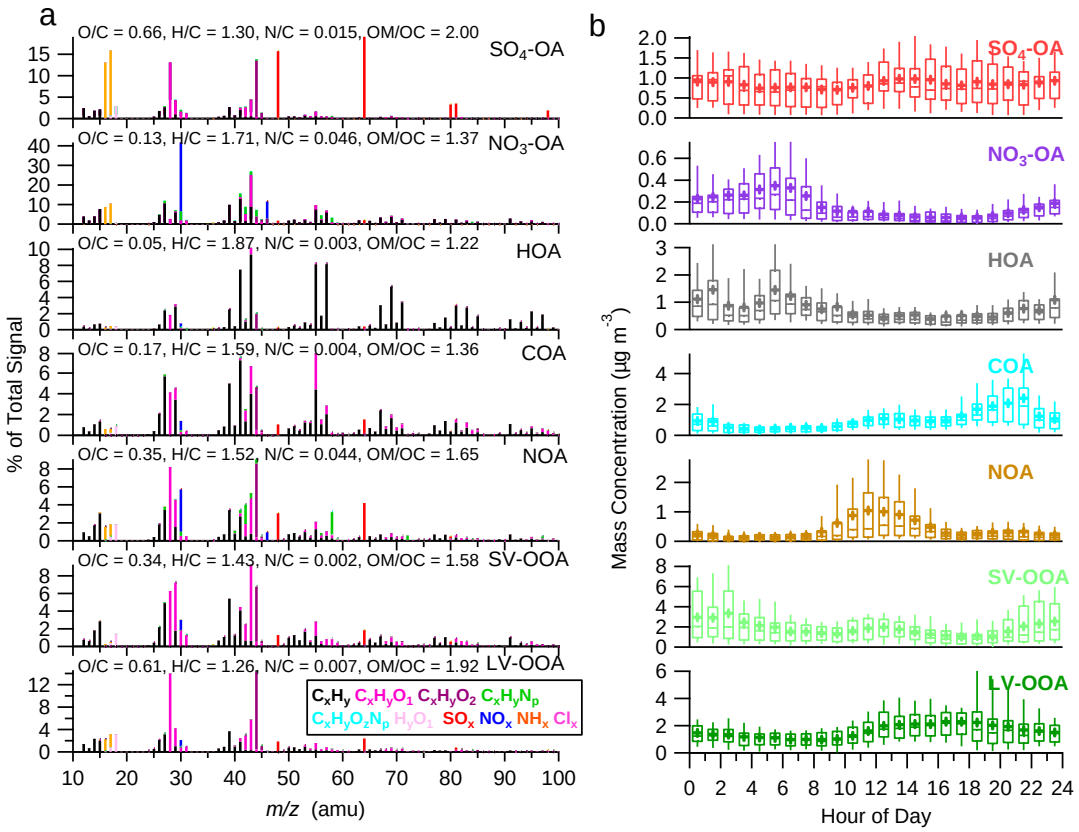

Fig. S3. (a) High resolution mass spectra of seven factors. The signals of OA in SO_4-OA and NO_3-OA were enhanced by a factor of 3 and 10, respectively, for clarity. (b) The diurnal profiles of OA in each factor.

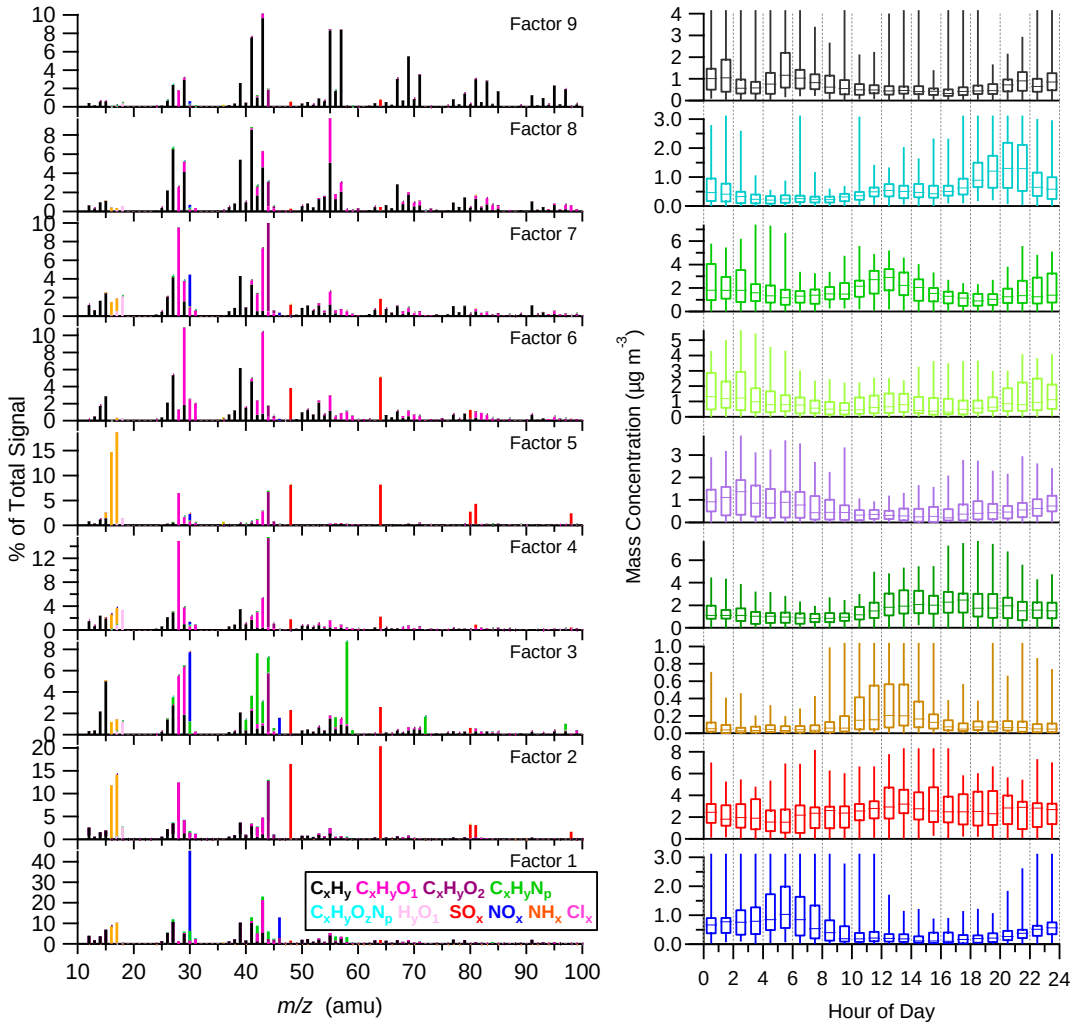

Fig. S4. (a) High resolution mass spectra of nine factors. The signals of OA in factor 2 and factor 1 were enhanced by a factor of 3 and 10, respectively, for clarity. (b) The diurnal profiles of PMF factors.

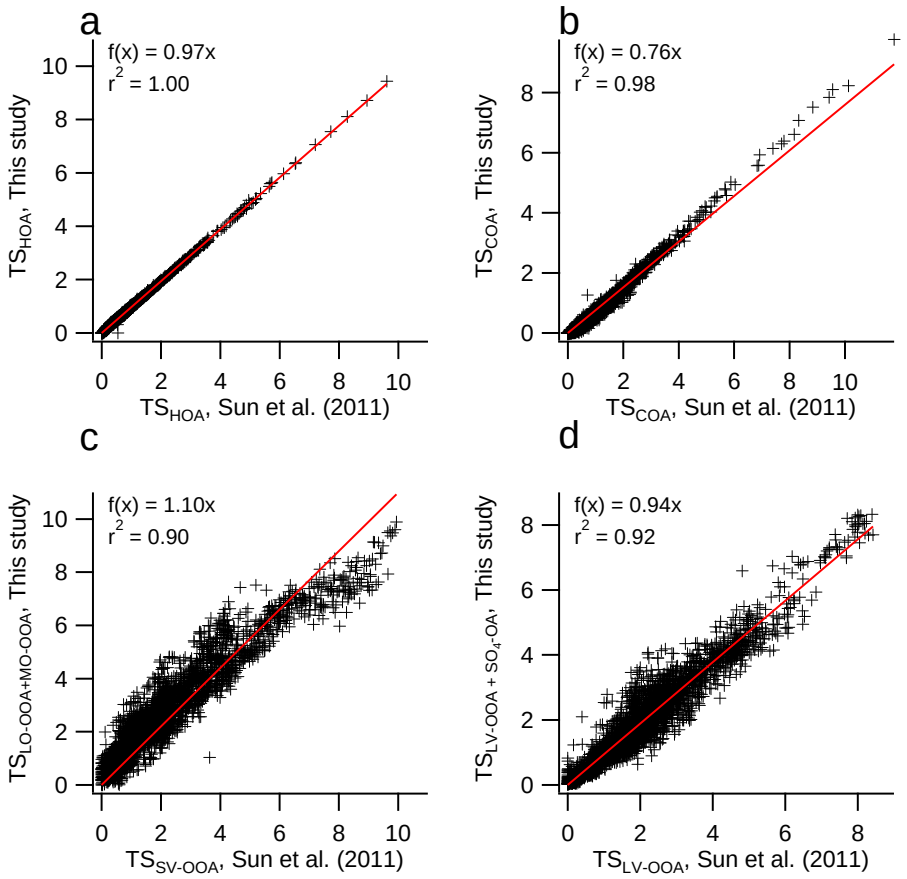

Fig. S5. Time series (TS) comparison of (a) HOA, (b) COA, (c) LO-OOA + MO-OOA vs. SV-OOA, and (d) LV-OOA + SO_4-OA vs. LV-OOA from 8-factor solution of PMF analysis of the combined organic and inorganic aerosols in this study and 5-factor solution of PMF analysis of OA in Sun et al. (2011).

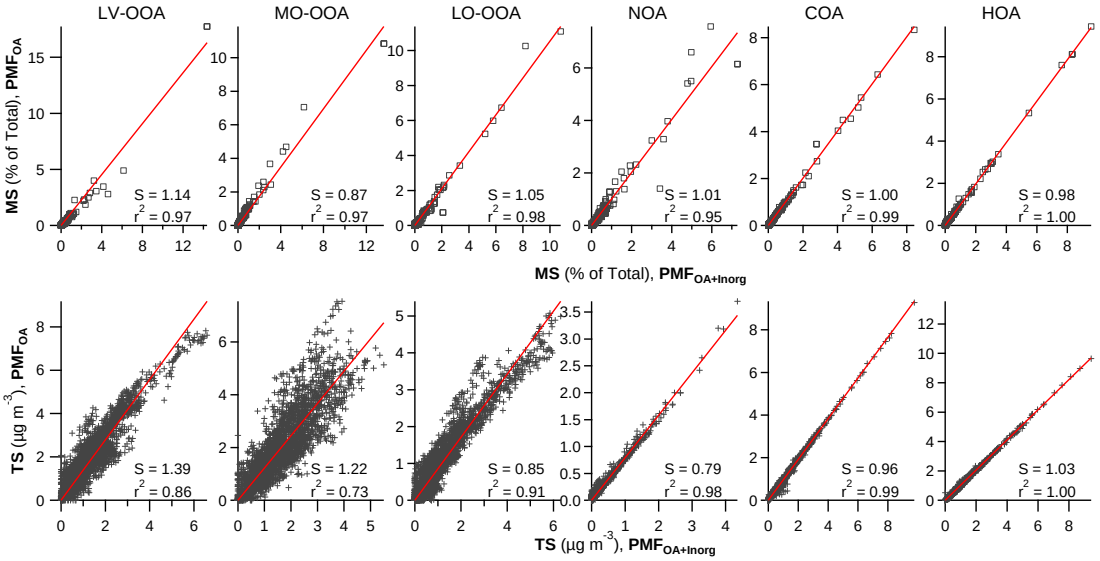

Fig. S6. Mass spectra (MS) and time series (TS) comparison of six OA factors from PMF analysis of the combined organic and inorganic aerosols, and OA only.

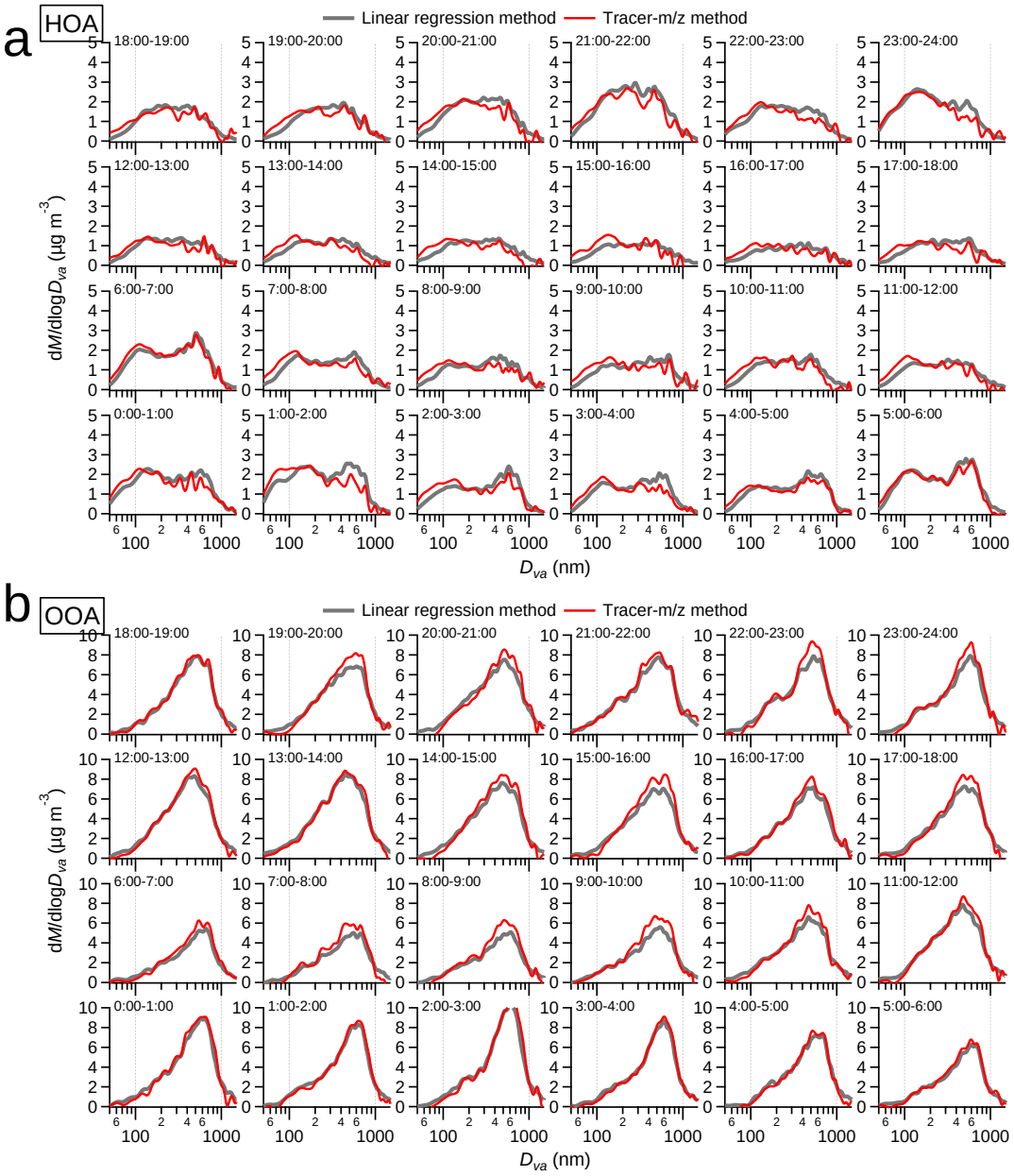

Fig. S7. Comparisons of size distributions of (a) HOA and (b) OOA from linear regression method and tracer-*m/z* method for each hour in the day.

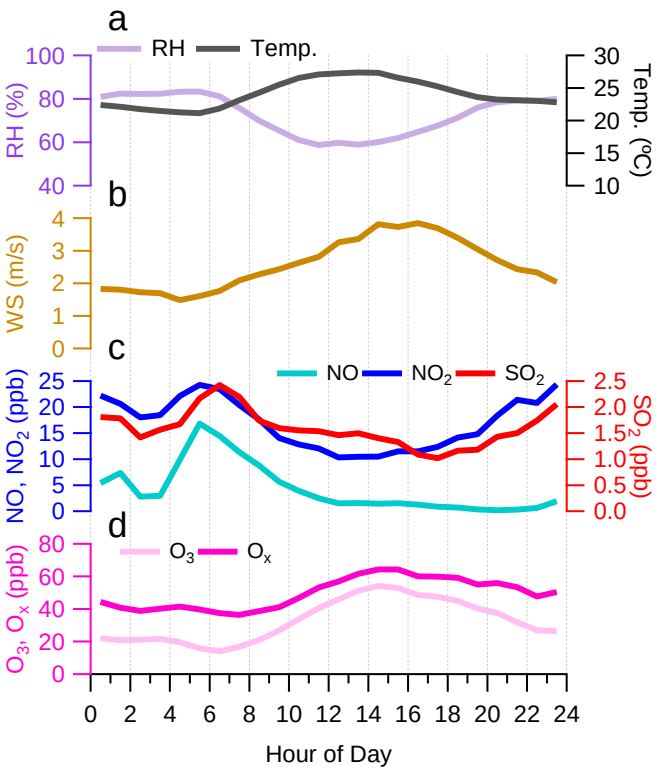

Fig. S8. Diurnal profiles of (a) relative humidity (RH) and temperature, (b) wind speed (WS), (c) NO, NO_2, and SO_2, and (d) O_3 and O_x for the entire study.

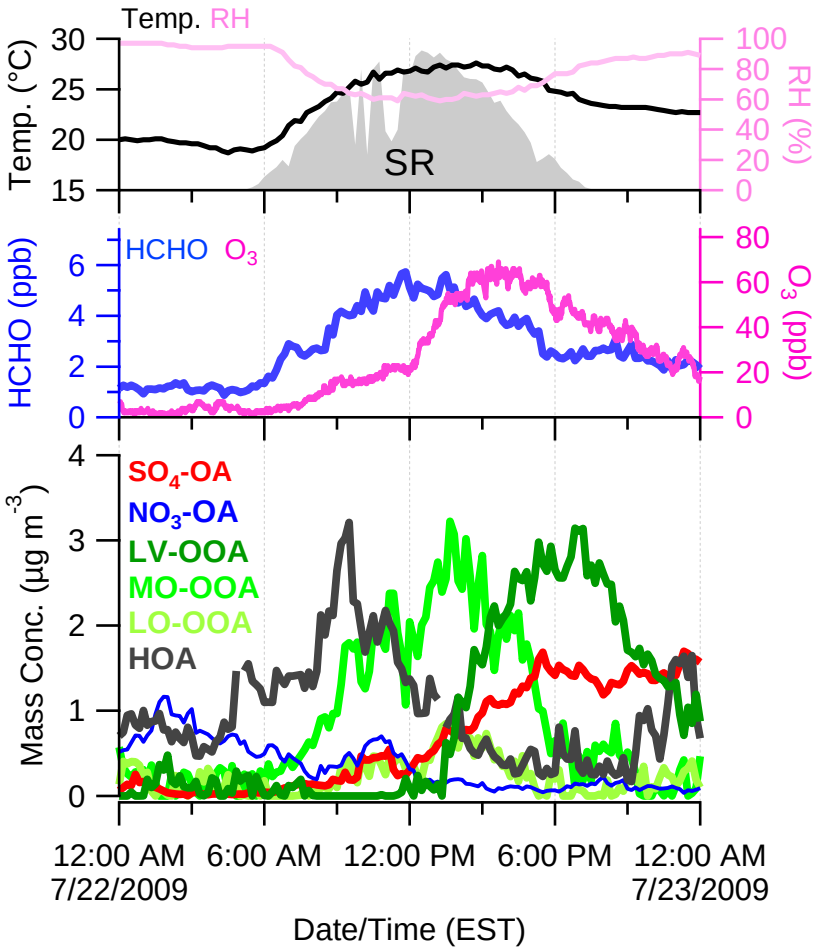

Fig. S9. Time series of meteorology (temperature, relative humidity and solar radiation), HCHO and O_3, and OA concentrations in PMF factors of SO_4-OA, LV-OOA, MO-OOA, LO-OOA, HOA, and NOA.

Sun, Y. L., Zhang, Q., Schwab, J. J., Demerjian, K. L., Chen, W. N., Bae, M. S., Hung, H. M., Hogrefe, O., Frank, B., Rattigan, O. V., and Lin, Y. C.: Characterization of the sources and processes of organic and inorganic aerosols in New York City with a high-resolution time-of-flight aerosol mass spectrometer, Atmos. Chem. Phys., 11, 1581-1602, 10.5194/acp-11-1581-2011, 2011.