

Supporting Information:

Multi-year, high-time resolution aerosol chemical composition and mass measurements from Fairbanks, Alaska

Ellis S. Robinson,[†] Michael Battaglia,[‡] James Campbell,[¶] Meeta
Cesler-Maloney,[¶] William Simpson,[¶] Jingqiu Mao,[¶] Rodney Weber,[‡] and Peter
F. DeCarlo^{*,†}

[†]*Dept. of Environmental Health & Engineering, Johns Hopkins University, Baltimore, MD*

[‡]*School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA*

[¶]*Dept. of Chemistry & Biochemistry, Geophysical Institute, University of Alaska
Fairbanks, Fairbanks, AK*

E-mail: pdecarl1@jhu.edu

Supporting Information (SI) figure list:

- Figure S1: Aerosol species and PMF factor correlations with OOA during wintertime.
- Figure S2: Correlations between aerosol species and PMF factors and CO, O₃, and SO₂ for winter and summer..
- Figure S3: Mass spectra of PMF 4-factor solution.
- Figure S4: Wintertime diurnal patterns of aerosol species and PMF factors by year (2020, 2021, 2022).

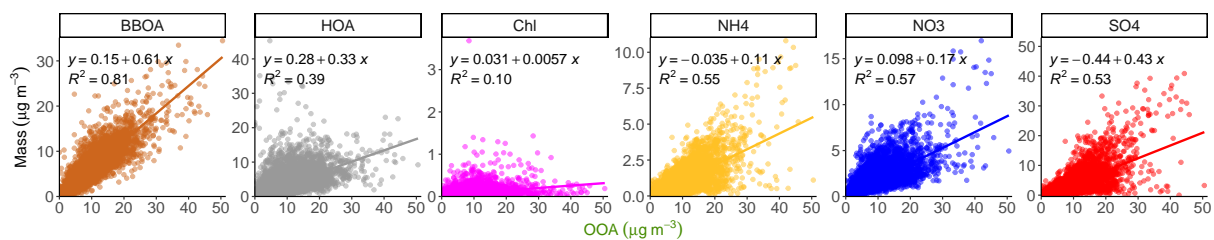


Figure S1: Wintertime correlations of 30-minute ACSM data between all aerosol species and OOA PMF factors with the OOA PMF factor. The high degree of correlation between BBOA and OOA (as indicated by a high $R^2 = 0.82$) supports the two factors sharing a common source.

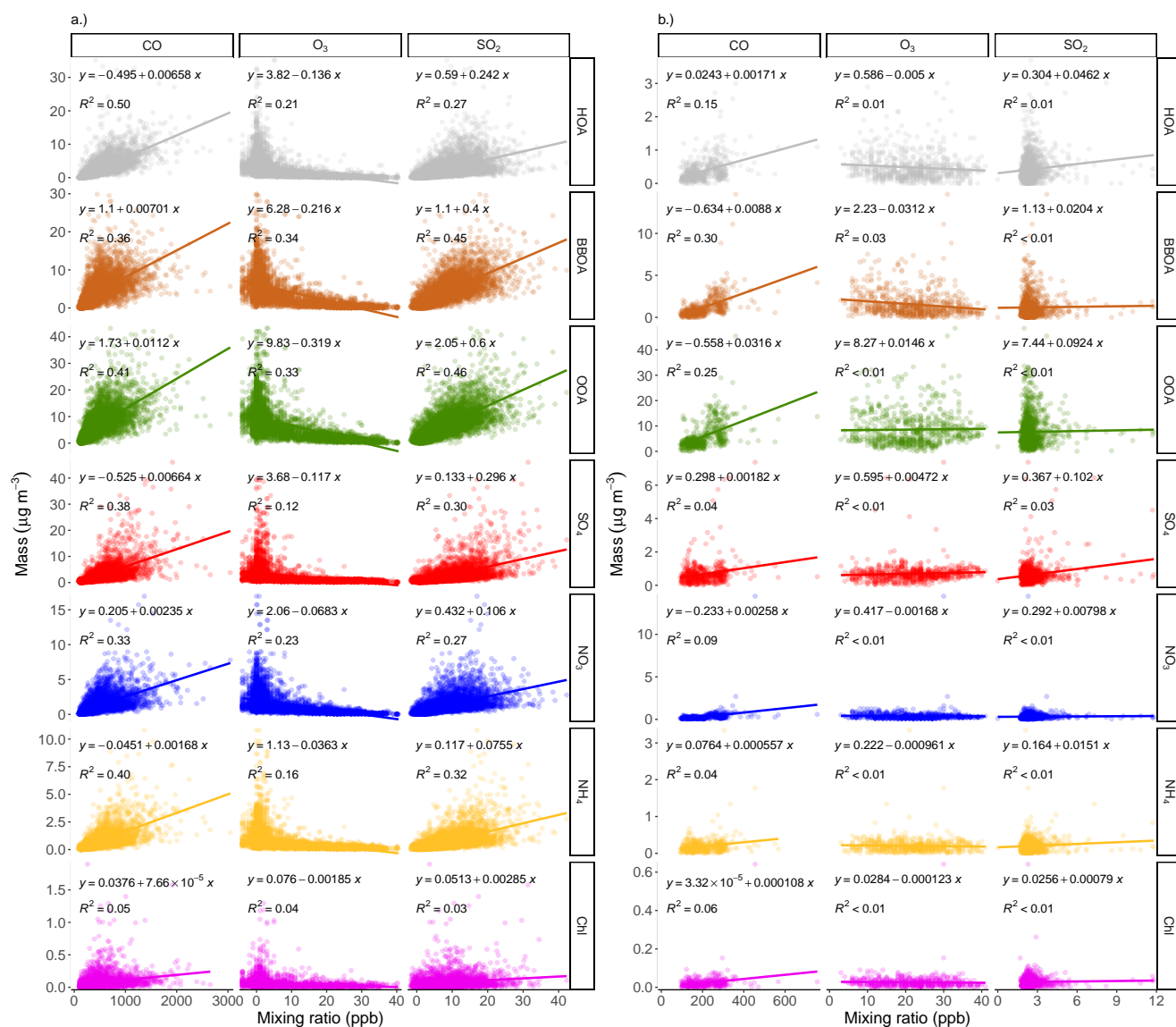


Figure S2: Correlations between ACSM NR-PM_{2.5} species, averaged to hourly, and CO, O₃, and SO₂ during a.) winter, and b.) summer.

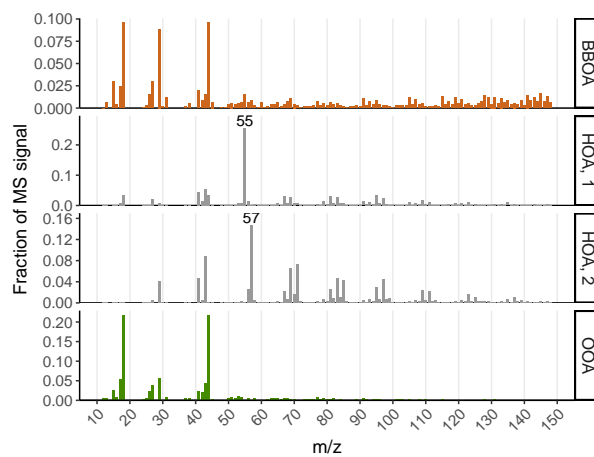


Figure S3: OA PMF factor profiles for the four-factor solution mentioned in the main text. Two factors, labeled “HOA, 1” and “HOA, 2” show clear evidence of factor-splitting: “HOA, 1” contains no m/z 57, while “HOA, 2” contains no m/z 55, with an otherwise similar mass spectrum. Given that such mass spectra are unlikely to exist, we rule out the four-or-higher factor PMF solutions as being able to describe the OA in Fairbanks.

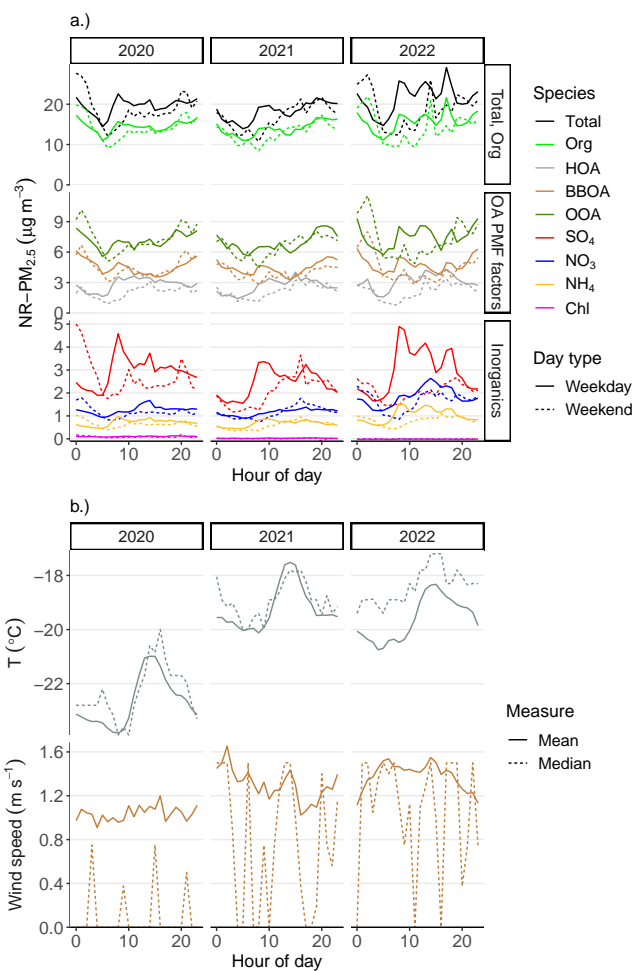


Figure S4: Wintertime diurnal plots by year of hourly a.) mean aerosol species and OA PMF factor concentrations, and b.) mean and median temperature and wind speed. Each diurnal pattern is calculated using only winter data.