Supplement of

Measurement report: Insights into seasonal dynamics and planetary boundary layer influences on aerosol chemical components in suburban Nanjing from a long-term observation

Jialu Xu[1,*], Yingjie Zhang[1,2,*], Yuying Wang[1], Xing Yan[3], Bin Zhu[1], Chunsong Lu[1], Yuanjian Yang[1], Yele Sun[4], Junhui Zhang[1], Xiaofan Zuo[1], Zhanghanshu Han[1], Rui Zhang[5]

[1]State Key Laboratory of Climate System Prediction and Risk Management/Key Laboratory for Aerosol-Cloud Precipitation of China Meteorological Administration/Special Test Field of National Integrated Meteorological Observation, Nanjing University of Information Science & Technology, Nanjing 210044, China

[2]School of Ecology and Nature Conservation, Beijing Forestry University, Beijing 100083, China

[3]Faculty of Geographical Science, Beijing Normal University, Beijing 100875, China

[4]State Key Laboratory of Atmospheric Environment and Extreme Meteorology, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029, China

[5]Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai), Guangdong Province Key Laboratory for Climate Change and Natural Disaster Studies, School of Atmospheric Sciences, Sun Yat-sen University, Guangzhou 519082, China

*These authors contributed equally to this work.

Correspondence to: Yuying Wang (yuyingwang@nuist.edu.cn)
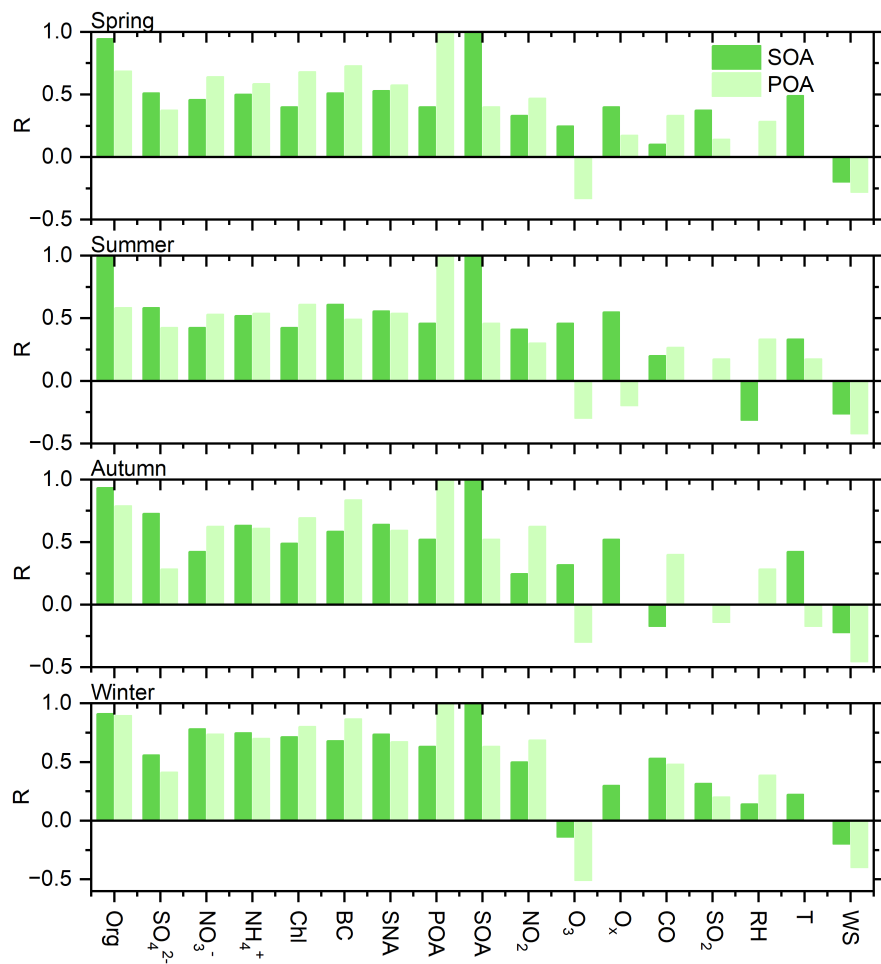
Figure S1: Correlation coefficients between POA, SOA and different tracers during four seasons.
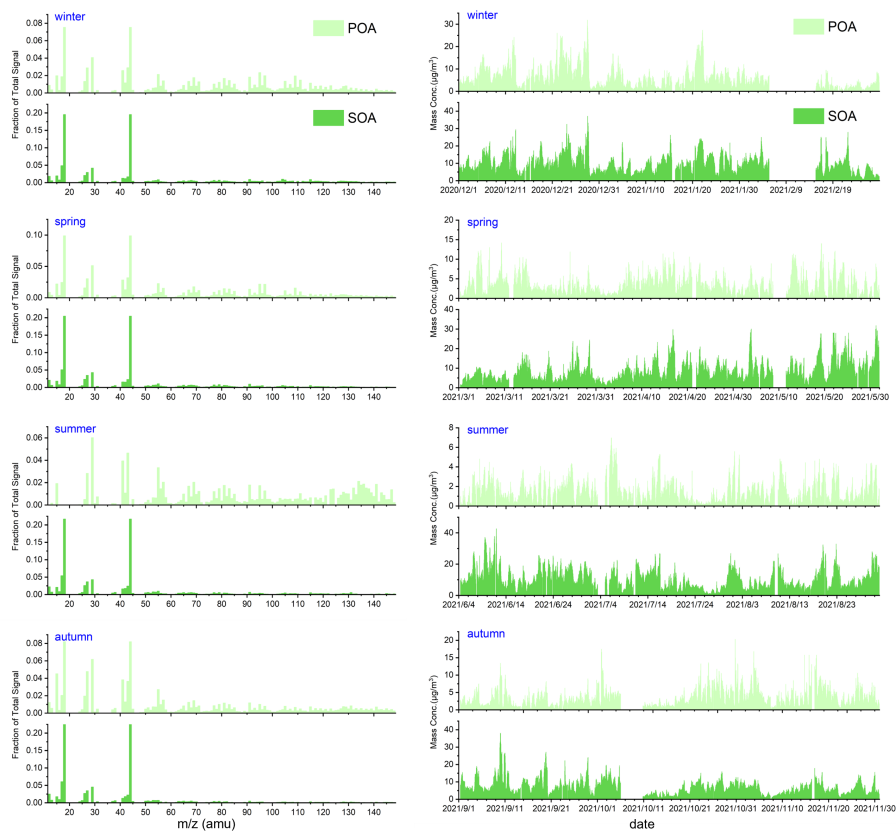
Figure S2: Mass spectral profiles and time series of POA and SOA in different seasons.
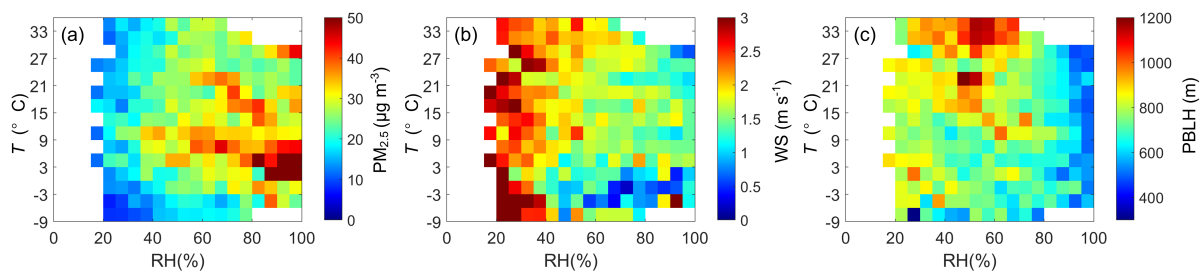
Figure S3: RH/T dependence of (a) PM2.5 mass concentrations, (b) wind speed and (c) PBLH for the entire period. The data are grouped into grids with increments of RH and T being 5 % and 3 °C, respectively. Grid cells with the number of data points fewer than 10 are excluded.
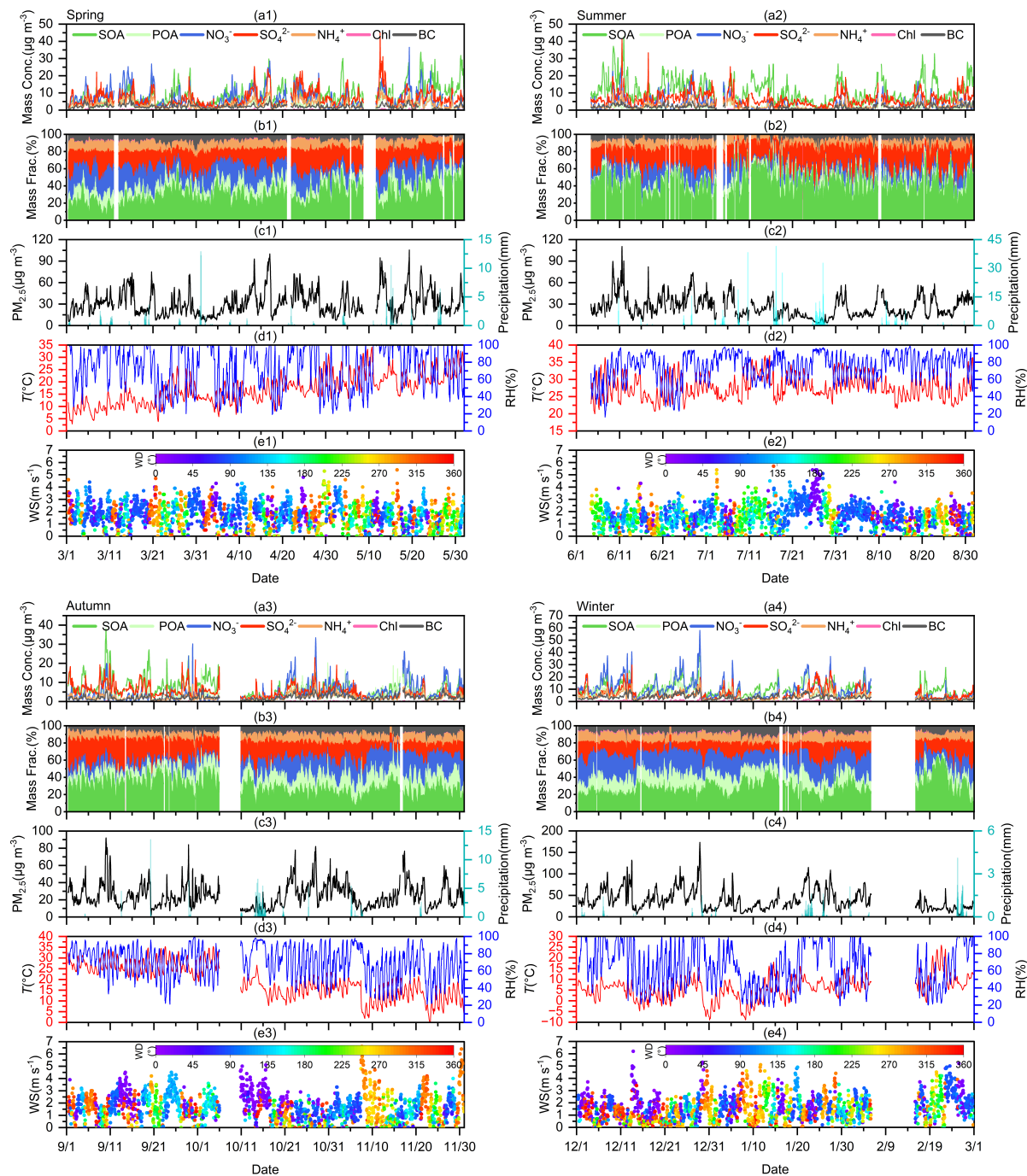
Figure S4: Time series of (a) mass concentration of diverse chemical components of PM$_{2.5}$, (b) mass faction of diverse chemical components of PM$_{2.5}$, (c) mass concentration of PM$_{2.5}$ (left y axis, black lines) and precipitation (right y axis, cyan columns), (d)

temperature (*T*, left y axis, blue lines) and relative humidity (RH, right y axis, red lines), (e) wind direction and wind speed (color scale) during four seasons
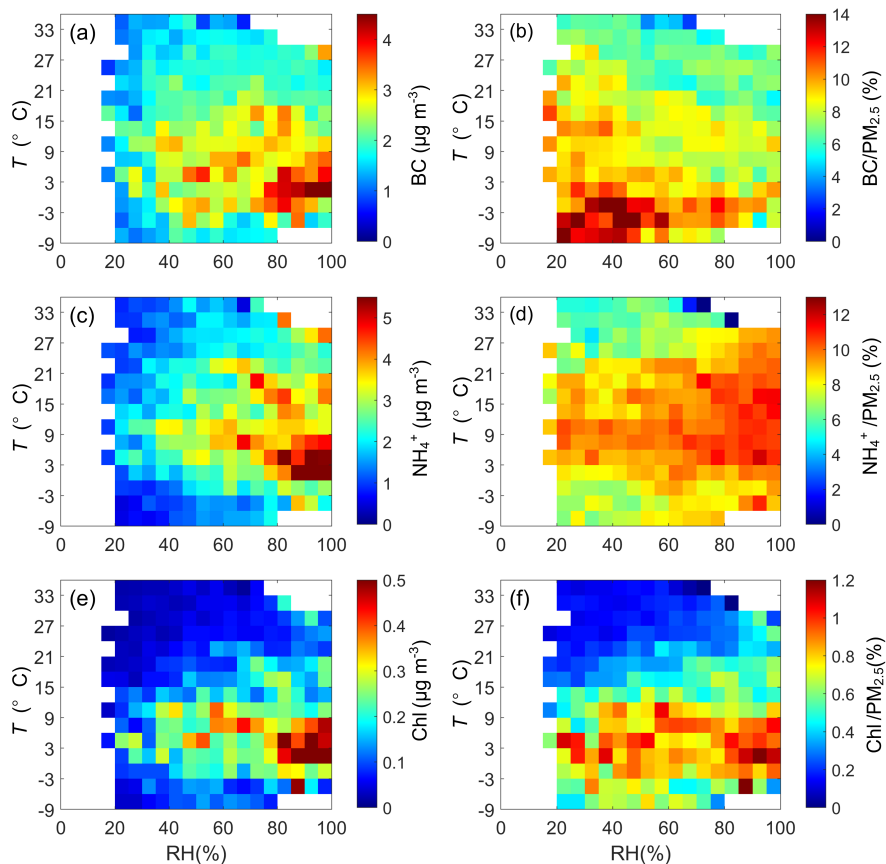
Figure S5: RH /T dependence of mass concentrations and mass fractions of BC, ammonium, and chloride for the entire period. The data are grouped into grids with increments of RH and *T* being 5 % and 3 °C, respectively. Grid cells with the number of data points fewer than 10 are excluded.
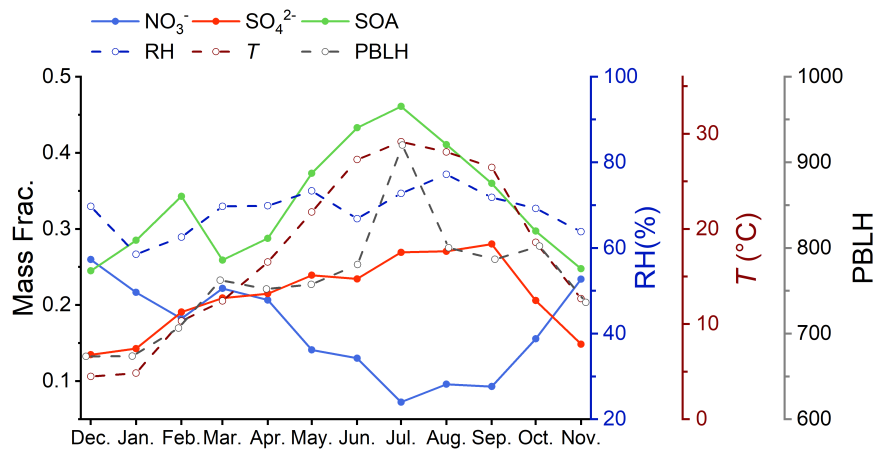
Figure S6: Monthly average mass fractions of SOA, sulfate and nitrate, temperature(*T*), relative humidity (RH), and PBLH.
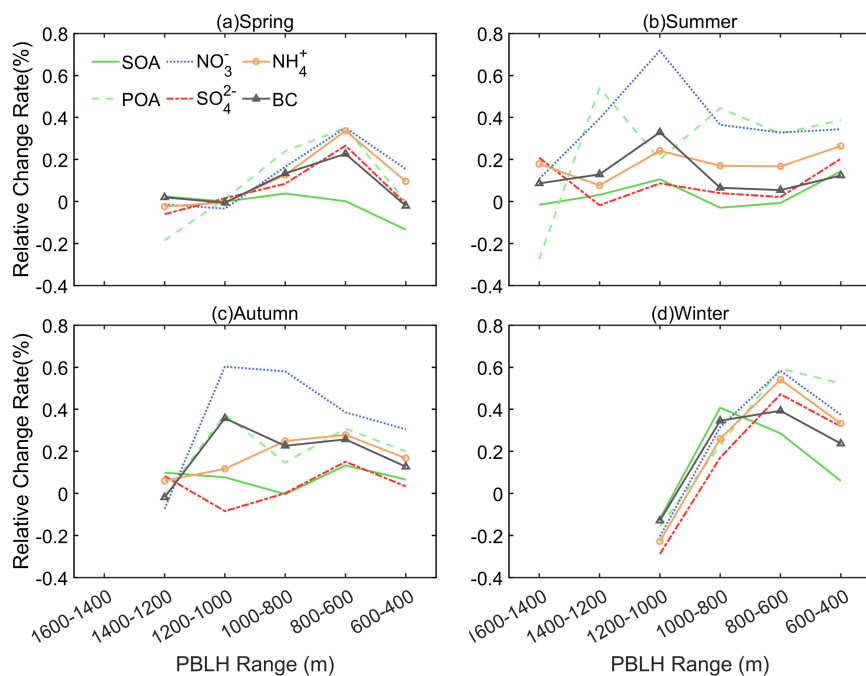
Figure S7: The relative change rate of PM2.5 chemical components with the decrease of PBLH. The data are grouped in PBLH bins with 200 m increments. Bins with the number of data points fewer than 10 are excluded.