

1 **SUPPORTING INFORMATION**

2 **S1 Emission control measures during APEC**

3 In Beijing, production of three largest thermal power plants and 141 industrial plants were restricted
4 or stopped. Meanwhile, the number of private cars on road was reduced through odd/even license-
5 plate rules and 70% of buses were off the road. Building constructions, municipal constructions and
6 open burning were forbidden. Road sweeping and cleaning was conducted much more frequently to
7 remove the road dust. The governmental staff had six days off from November 7th to November 12th
8 to reduce the emissions from commuting. Moreover, neighbouring provinces including Hebei,
9 Tianjin, Shanxi, Inner Mongolia and Shandong implemented emission control plan. Furthermore,
10 steady weather condition was forecast on November 4th and November 5th. Therefore, eighteen cities
11 including Beijing, Tianjin, Langfang, Baoding and Shijiazhuang carried out emergency plans of
12 emission control, to combat poor dispersion due to stable weather condition forecasted on November
13 4th and November 5th.)

14 **S2 ACSM data analysis**

15 Although default collection efficiency (CE) of 0.5 is widely used, it varies based on aerosol composition,
16 RH and aerosol acidity (Middlebrook et al., 2012). Considering aerosol was dried before ACSM
17 sampling, the influence of RH can be ignored. What's more, NR-PM₁ chemical components measured
18 in this study showed no acidity (cation/anion = 1.2). As a result, aerosol composition impact was
19 considered in this study. $CE = \max(0.45, 0.0833 + 0.9167 \times ANMF)$ was used (Middlebrook et al., 2012).
20 ANMF is characterized by the ammonium nitrated mass fraction (ANMF). CE was calculated to be 0.45.
21 This value was also used in the previous study in Beijing (Sun et al., 2013).

Table S1. Instruments information at Liulihe site.

Measurement index	Instruments	Time resolution
PM _{2.5} /PM ₁₀	TEOM1405/1400a (Thermo Scientific, USA)	1 hour
SO ₂	API100E (Teledyne, USA)	1 hour
NO ₂	API200E (Teledyne, USA)	1 hour
O ₃	API400E (Teledyne, USA)	1 hour
Off-line PM _{2.5}	Partisol 2300 (Thermo Scientific, USA)	23.5 hour
NR-PM ₁ chemical composition (SO ₄ ²⁻ , NO ₃ ⁻ , NH ₄ ⁺ , Cl ⁻ , Organic Matter)	ACSM (Aerodyne Research Inc. USA)	8min
Particle size distribution	Nano SMPS&SMPS&APS 3321 (TSI Inc, USA)	5min
Absorption coefficient/black carbon	Aethalometer AE42 (Margee Scientific, USA)	1 min
Meteorological data (RH, wind speed/direction, temperature, atmospheric press)	WXT520 (VAISALA, Finland)	1 hour
Wind profile	CFL-03 (23 rd Institute of China Aerospace Science and Industry Corporation)	6min
Temperature and humidity profile	QFW-6000 (22 nd Institute of China Electronic Technology Group Corporation)	2min

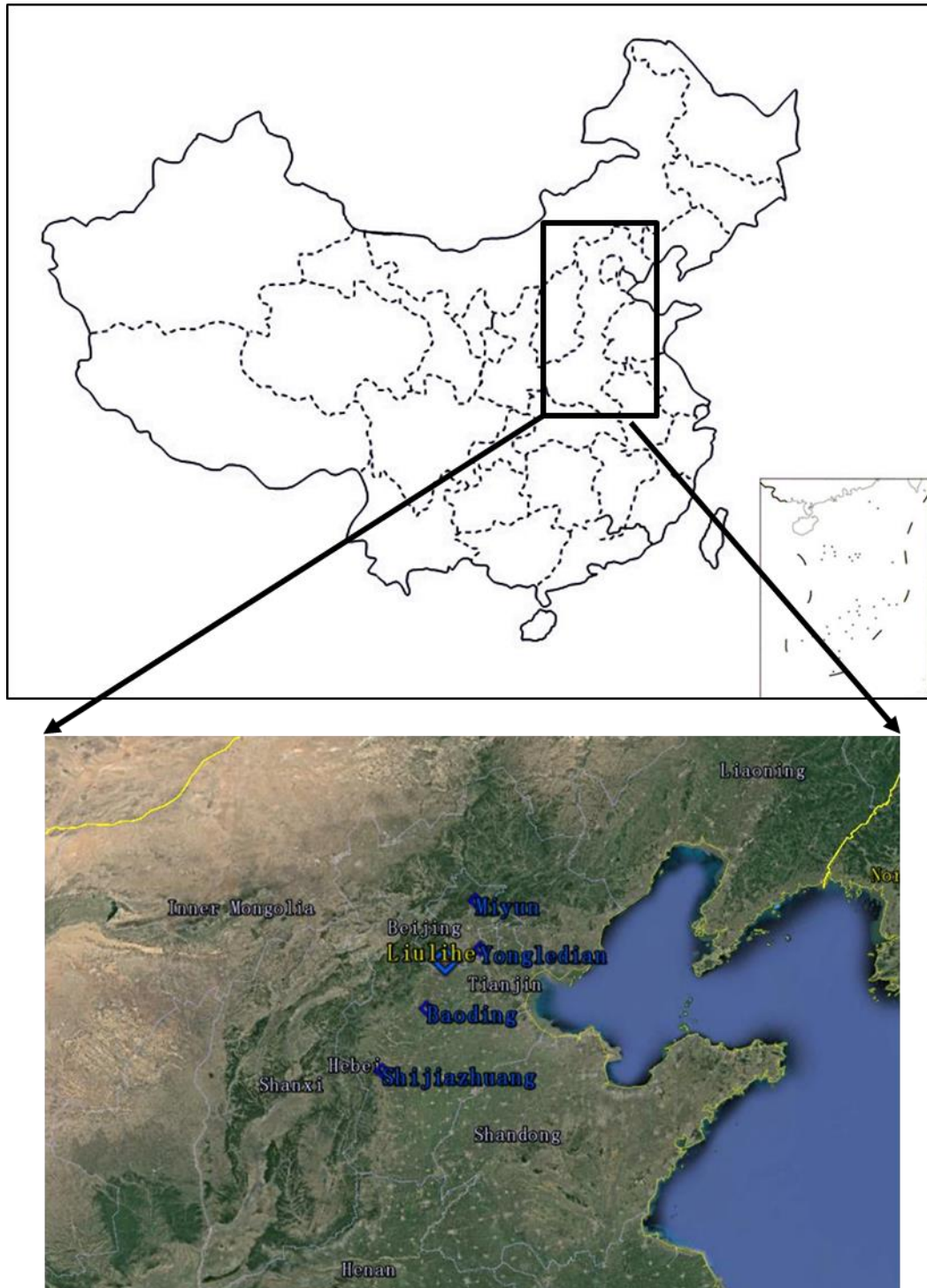


Figure S1. Field observation site location

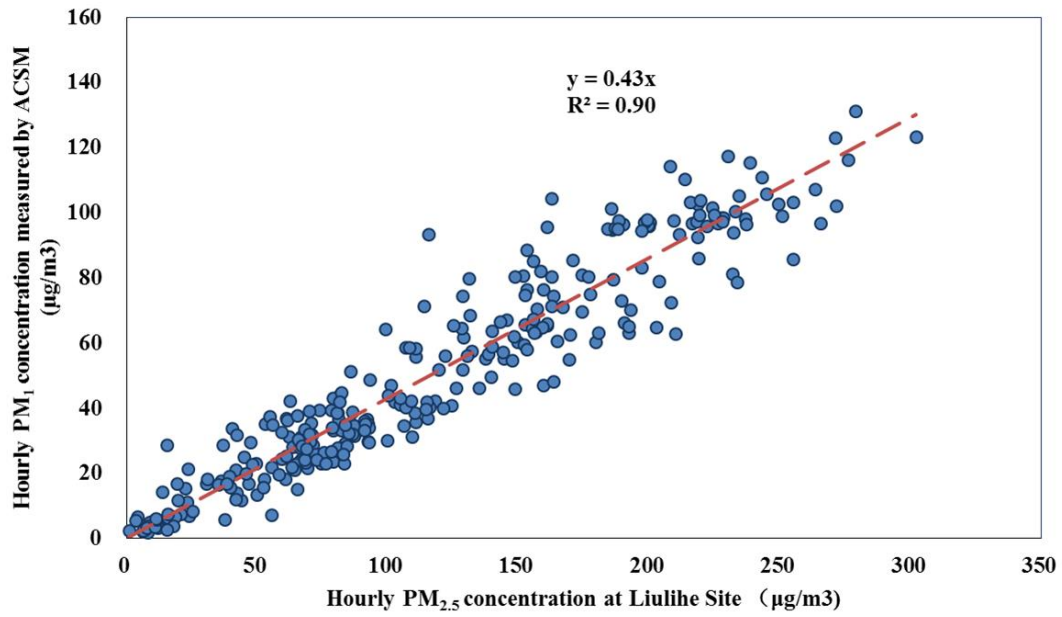


Figure S2. Correlation between NR- PM_1 (= Organic matter + SO_4^{2-} + NO_3^- + NH_4^+ + Cl $^-$) measured by the ACSM and $PM_{2.5}$ by the TEOM

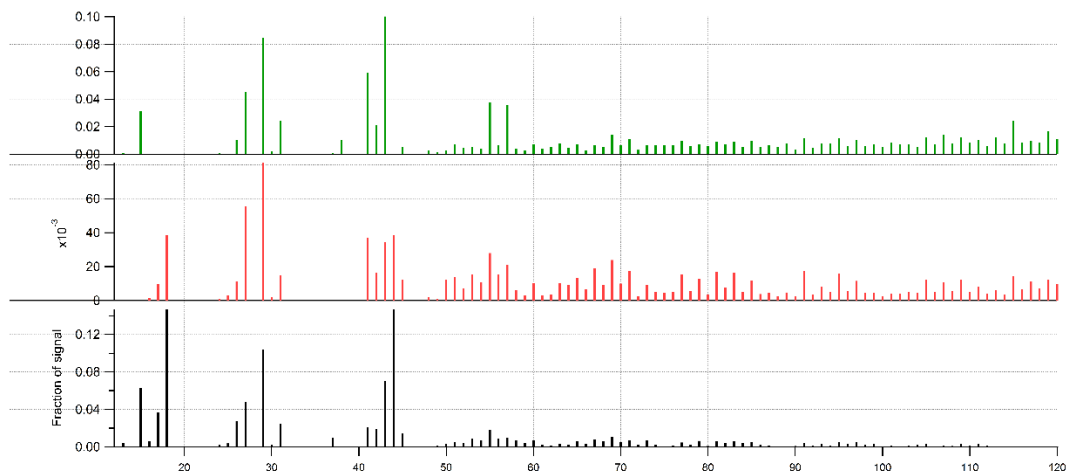


Figure S3. Factor profile performed by PMF

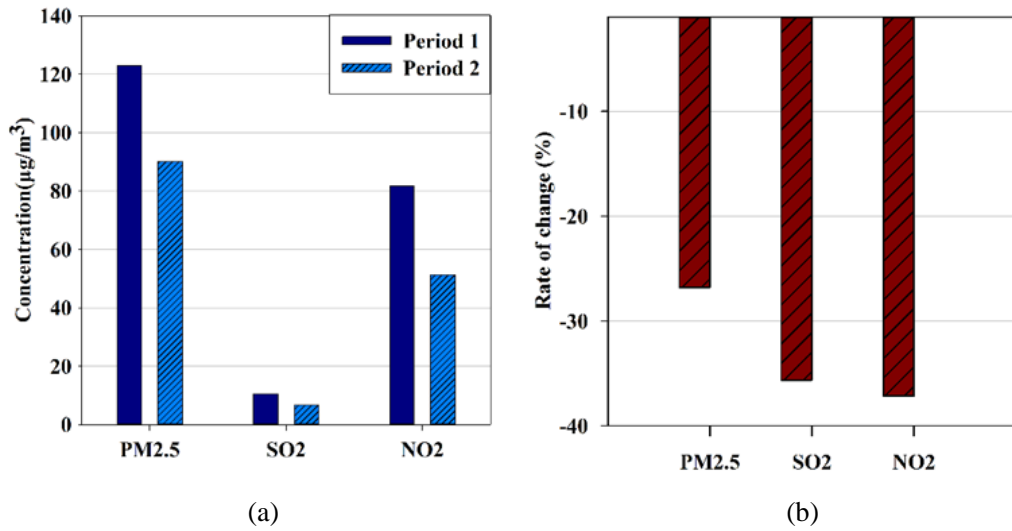


Figure S4. Average concentration and change rate of pollutants during the observation. (a) Average concentration of pollutants; (b) Change rate of pollutants

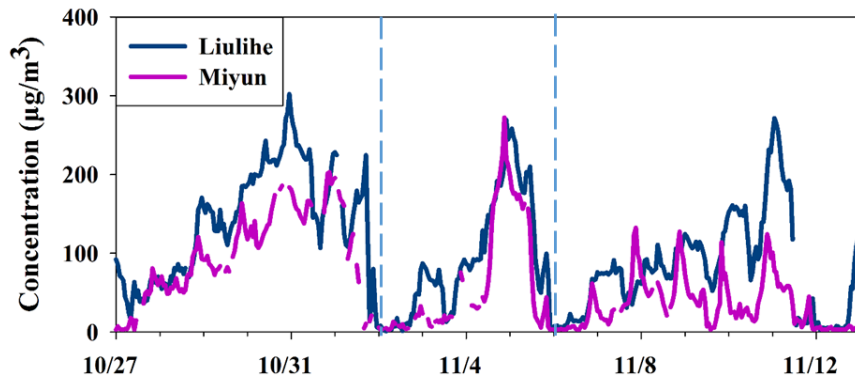


Figure S5. Hourly PM_{2.5} concentrations at Liulihe and Miyun during the observation

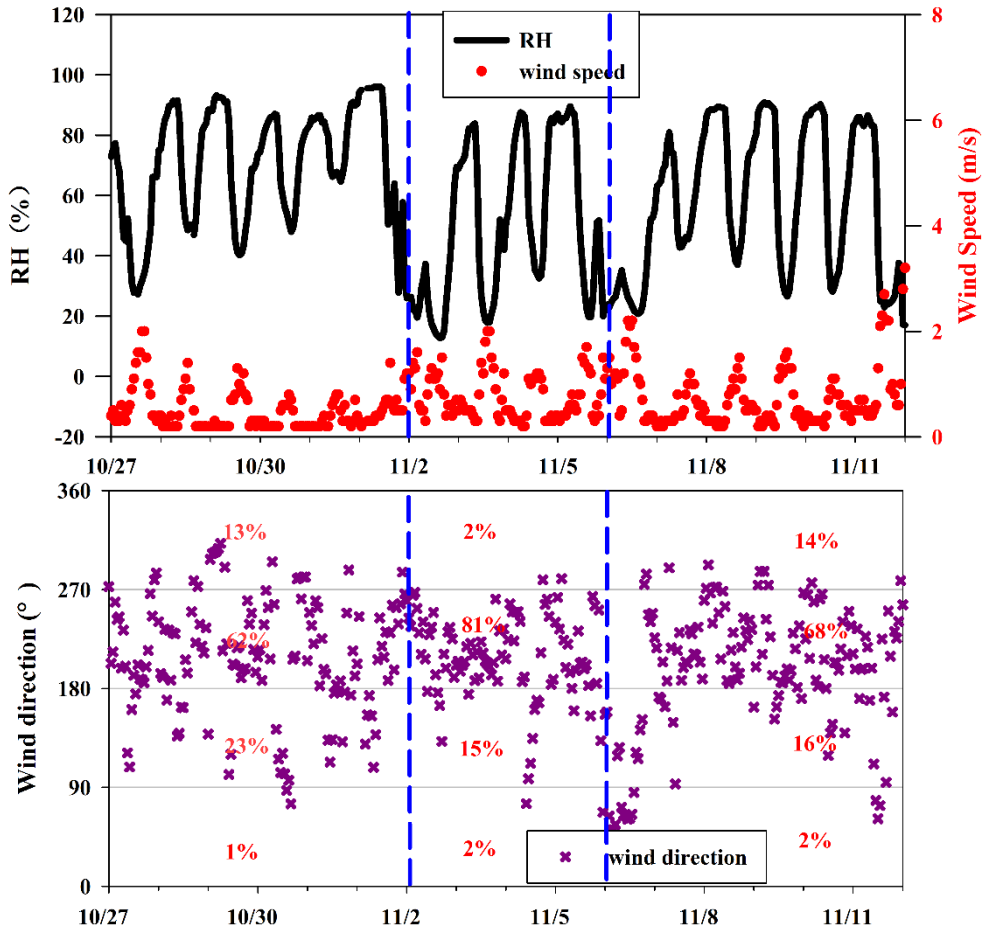


Figure S6. Meteorology conditions on the ground during the observation at Liulihe site

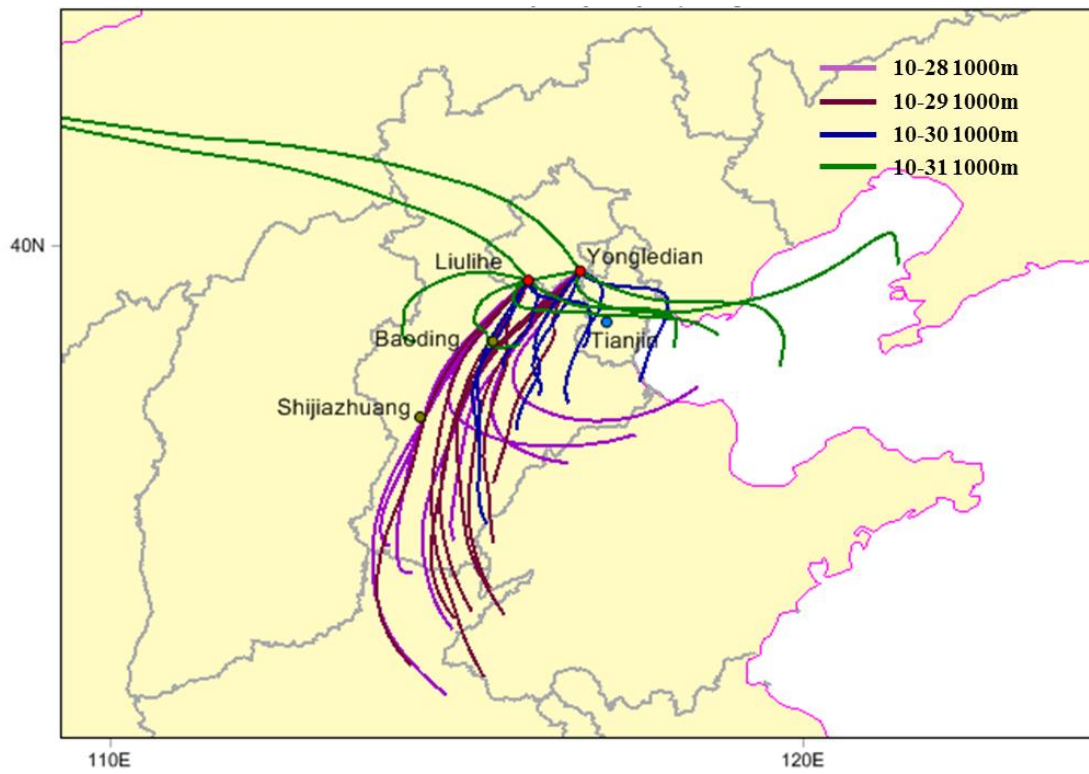


Figure S7. Air mass trajectory analysis during episode 1

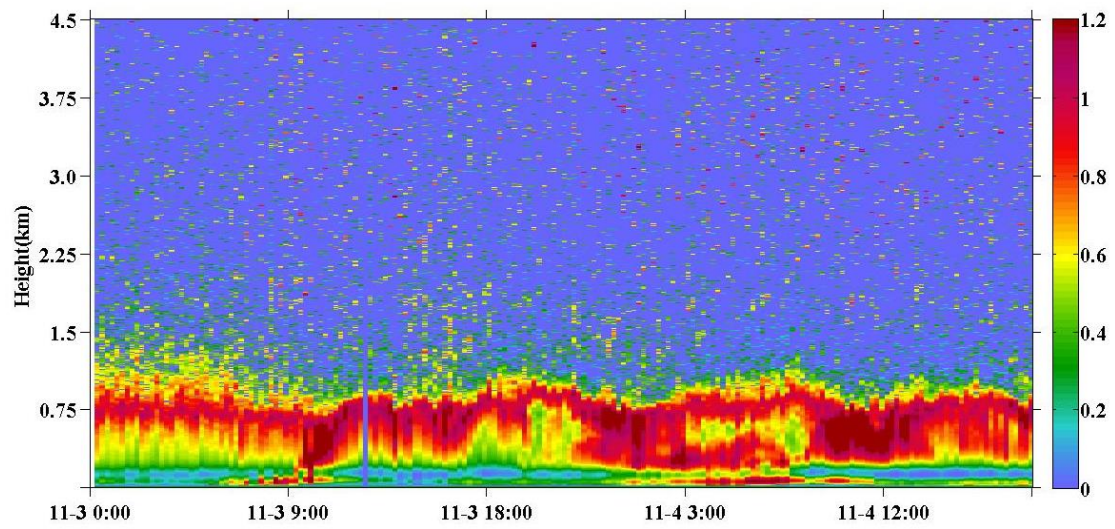


Figure S8. Vertical profile of extinction coefficient at Baoding site during episode 2 (km^{-1})

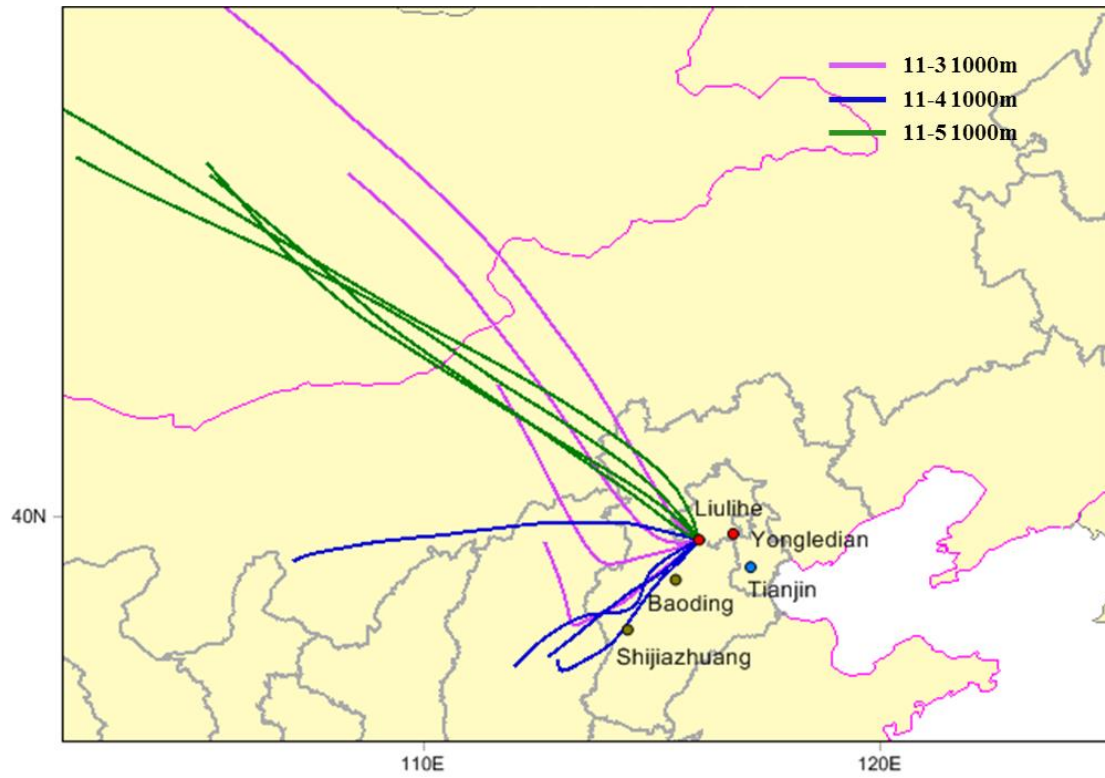


Figure S9. Air mass trajectory analysis during episode 2

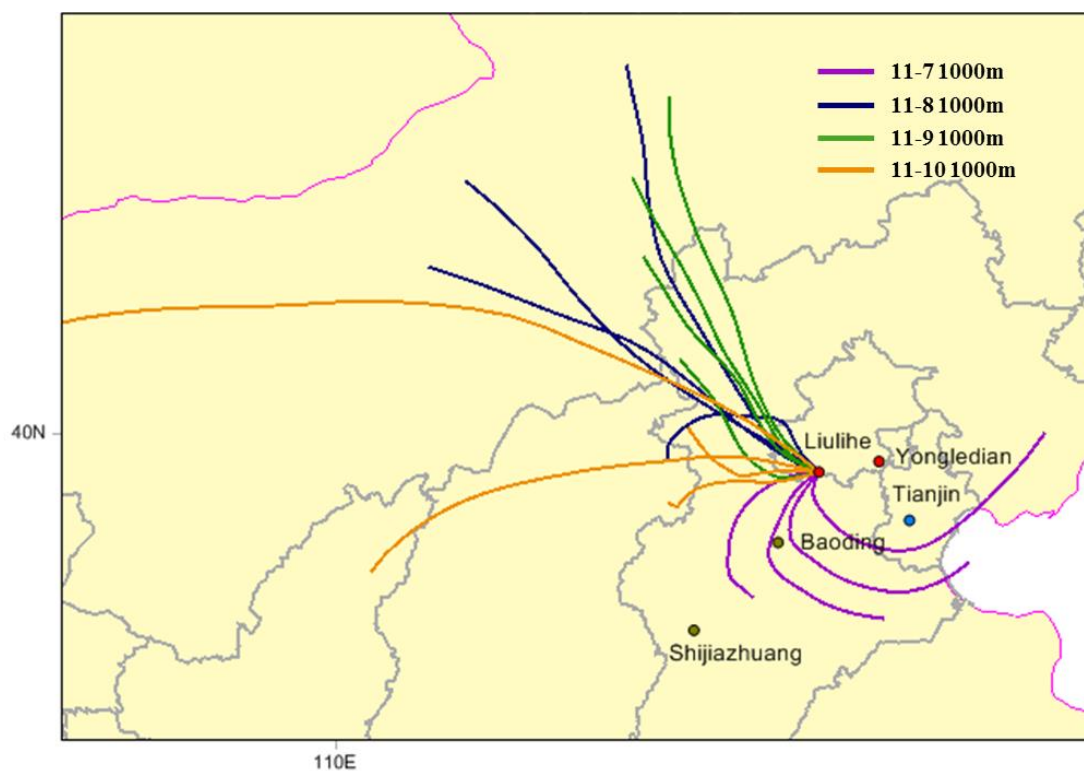


Figure S10. Air mass trajectory analysis during episode 3

References

- Middlebrook, A.M., Bahreini, R., Jimenez, J.L. and Canagaratna, M.R. (2012) Evaluation of composition-dependent collection efficiencies for the aerodyne aerosol mass spectrometer using field data. *Aerosol Science and Technology* 46(3), 258-271.
- Sun, Y.L., Wang, Z.F., Fu, P.Q., Yang, T., Jiang, Q., Dong, H.B., Li, J. and Jia, J.J. (2013) Aerosol composition, sources and processes during wintertime in Beijing, China. *Atmospheric Chemistry and Physics* 13(9), 4577-4592.