Table S1. Statistics of aerosol acidity (Aero-pH), PLWC, NOR, SOR, CCN, CCN/CN and WSIM/PM in daytime and nighttime.

Period	Aero-pH	PLWC	NOR	SOR	CCN	CCN/CN	WSIM/PM
Units	-	$\mu g\ m^{-3}$	-	-	cm^{-3}	-	-
daytime	3.06 ±0.56	21.14 ±24.4	0.05 ±0.04	0.34 ±0.18	2352 ±116	0.28 ±0.05	0.66 ±0.23
nighttime	3.09 ±0.58	27.34 ±34.0	0.05 ±0.04	0.34 ±0.17	2721 ±125	0.31 ±0.15	0.62 ±0.22

Table S2. Similar as Table S1, but for weekday and weekend.

Period	Aero-pH	PLWC	NOR	SOR	CCN	CCN/CN	WSIM/PM
Untis	-	$\mu g\ m^{-3}$	-	-	cm^{-3}	-	-
Weekday	2.95 ±0.57	19.87 ±27.36	0.04 ±0.03	0.33 ±0.16	2291 ±1039	0.30 ±0.08	0.62 ±0.22
Weekend	3.36 ±0.39	37.37 ±33.13	0.07 ±0.04	0.36 ±0.21	3490 ±1301	0.28 ±0.06	0.68 ±0.22

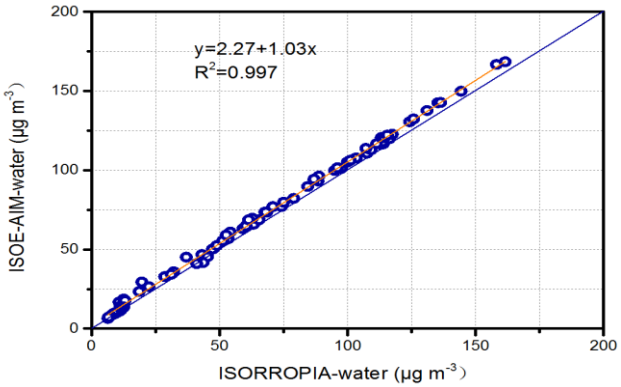

Figure S1. Comparison between calculated liquid water contents (LWC) from E-AIM and ISORROPIA-II models.

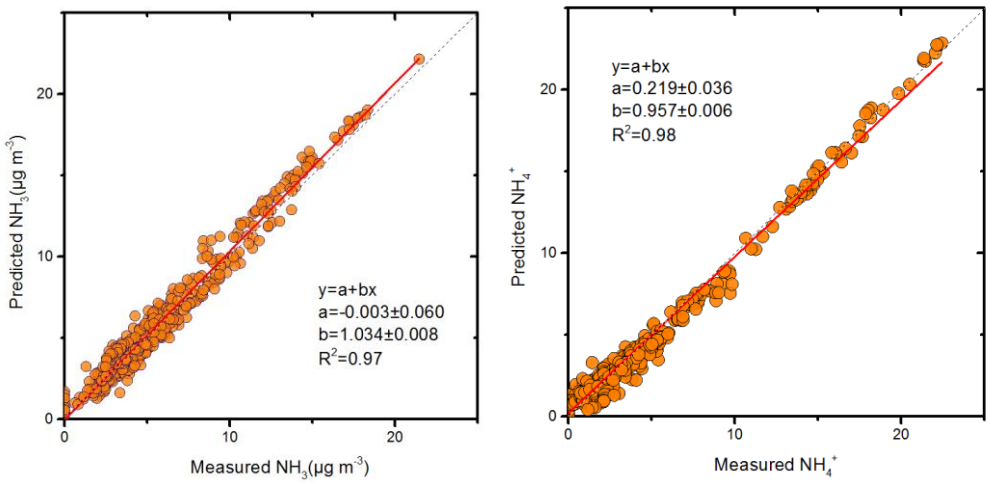

Figure S2. Comparisons of predicted and measured NH_3 and NH_4^+.

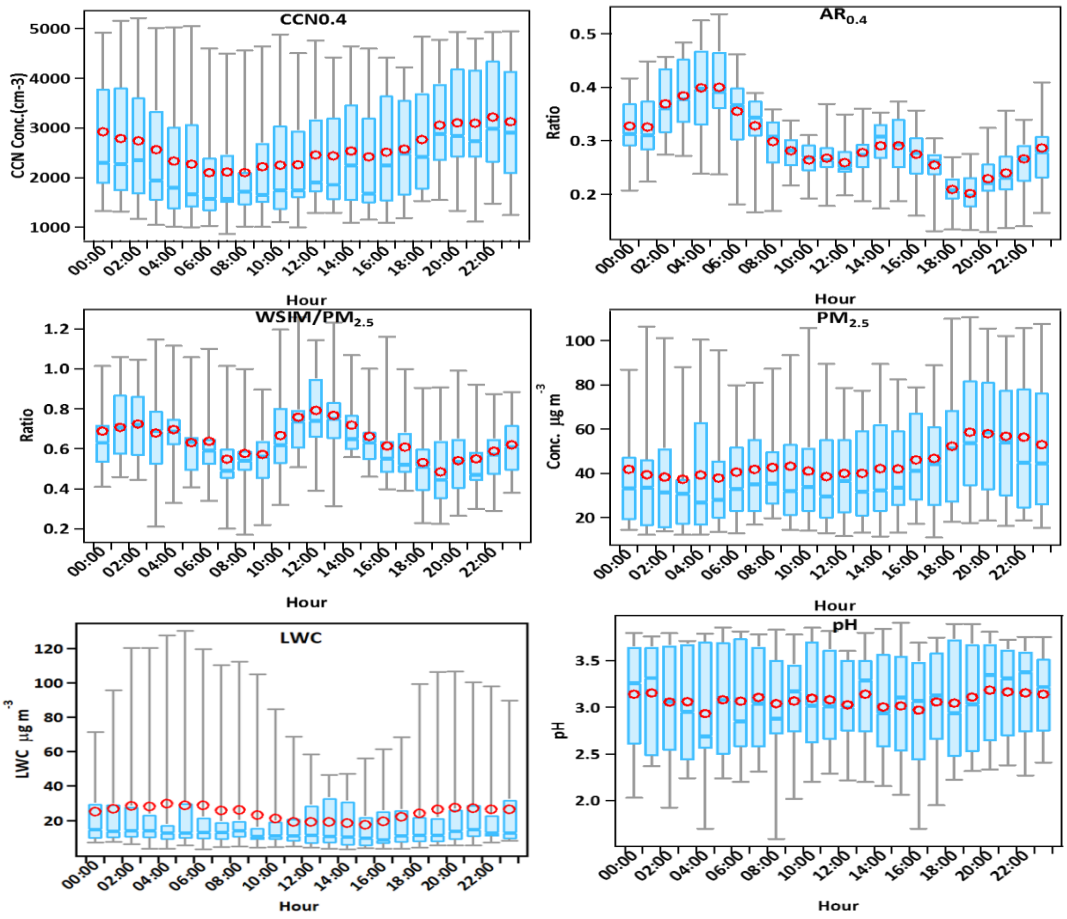

Figure S3. Diurnal variations of hourly-averaged $CCN_{0.4}$, $AR_{0.4}$, WSIM/$PM_{2.5}$, $PM_{2.5}$, aerosol LWC and pH values from 2 to 10 Jan. 2016. $CCN_{0.4}$ is cloud condensation nuclei concentration at super-saturation (SS) 0.4. $AR_{0.4}$ is activation ratio (CCN/CN) at SS=0.4. WSIM is water-soluble inorganic matter.

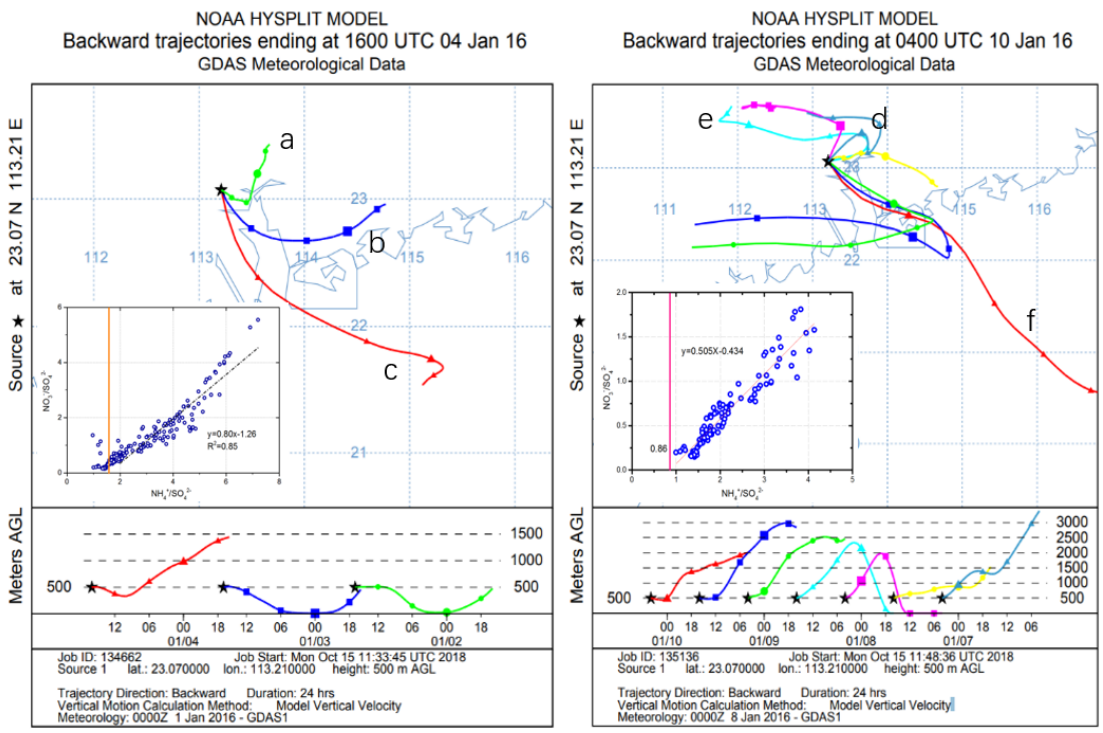

Figure S4. Air mass 24-hr backward trajectories starting at 500m height (AGL) for Guangzhou at 16:00 (UTC) on 2, 3, 4 Jan. (a-c), 4:00 on 7, 10 Jan. (d, f) and at 16:00 on 8 Jan. (e). All backward trajectories were calculated by the HYSPLIT model using NOAA meteorological data.