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Supplement of

The importance of vehicle emissions as a source of atmospheric ammonia in the megacity of Shanghai

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This file includes:

Figures

Table

Figures

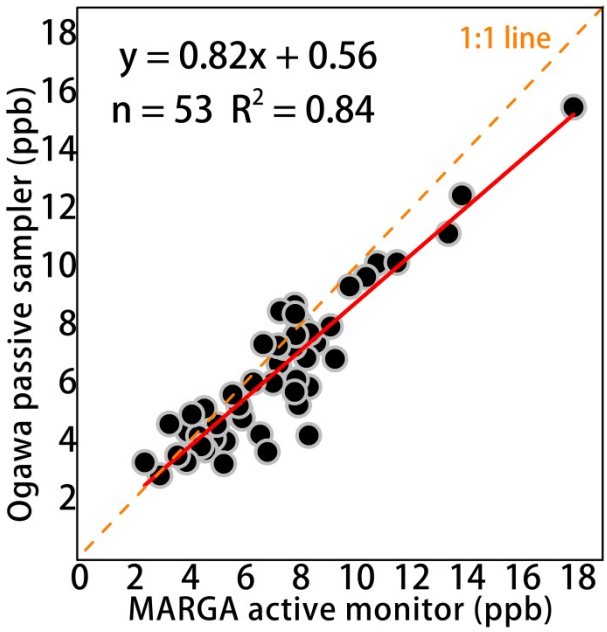

Figure S1. Comparison of results obtained with the Ogawa NH_3 PSDs and an active monitor (MARGA) at Pudong supersite from May 2014 to June 2015.

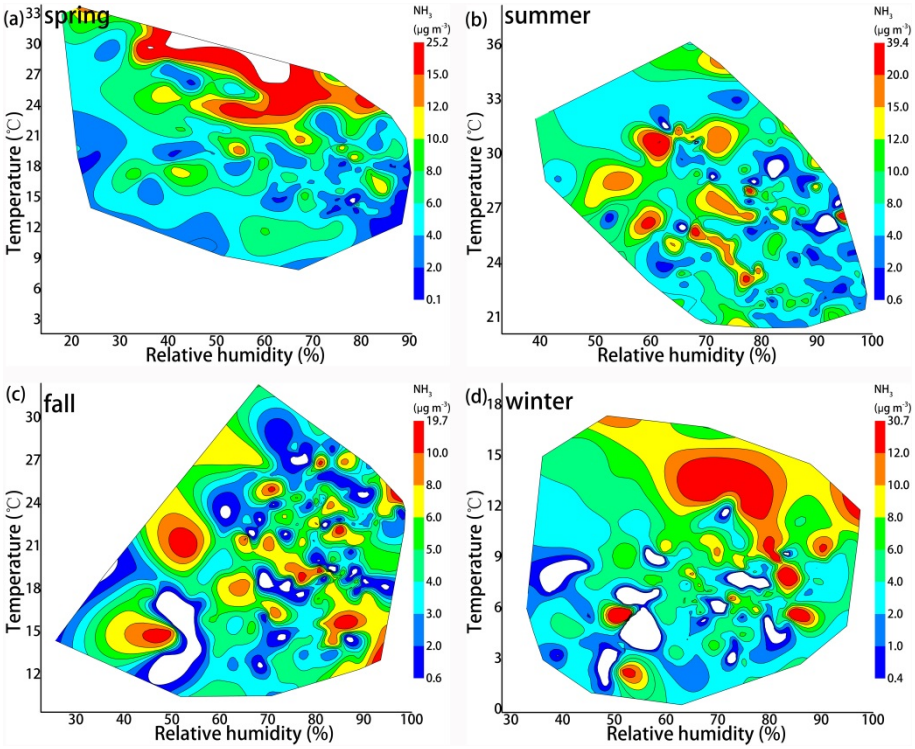

Figure S2. RH/*T* dependence of NH_3 concentration in spring (**a**), summer (**b**), fall (**c**), and winter (**d**) at Pudong supersite during April 2, 2014-April 3, 2015.

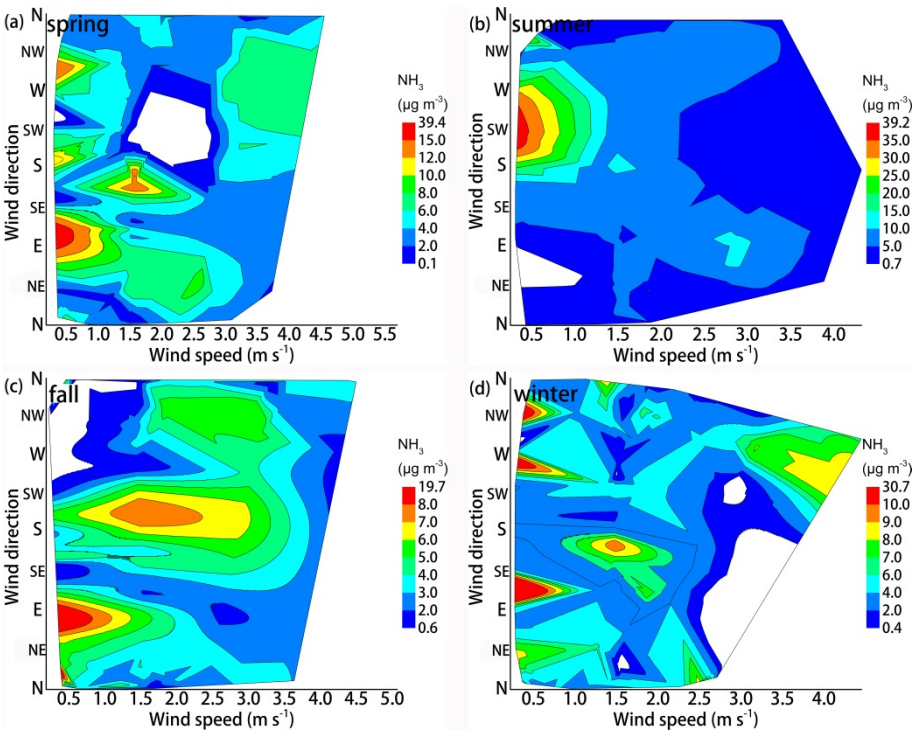

Figure S3. WS/WD dependence of NH_3 concentrations in spring (**a**), summer (**b**), fall (**c**), and winter (**d**) at Pudong supersite during April 2, 2014-April 3, 2015.

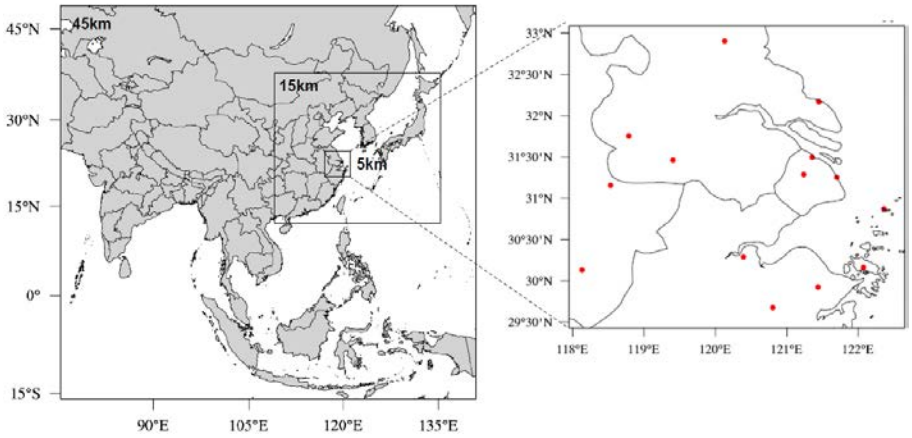

Fig. S4 WRF model domain and location of the NCDC surface meteorological network.

Table

Table S1. Descriptive statistics of the NH_3 concentration (μg m^{-3}) at different sampling sites in and out of the Handan Tunnel during the spring campaign in 2014. See Figure 7a and the method section for the information on the sampling points.

	Sampling point	N	Mean	SD	Minimum	Median	Maximum
Handan Tunnel	T-a	6	12.6	3.3	8.8	12.3	18.1
	T-b	6	29.2	6.6	20.1	28.6	38.7
	T-c	6	31.5	5.9	21.4	33.3	37.6
	T-d	19	64.9	11.5	47.0	65.4	82.9
Open environment	O_{0m}	19	11.7	4.2	7.5	10.7	25.0
	O_{20m}	19	6.5	2.8	2.8	5.8	13.2
	O_{150m}	19	5.9	2.5	2.1	5.1	10.7
	O_{310m}	19	5.6	2.5	1.9	4.9	10.1

Table S2. Evaluation of WRF simulations and NCDC measured results of surface wind speed, temperature, and humidity.

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Wind Speed (m/s)	Mean Obs	2.56	2.87	2.98	3.18	3.65	3.22	3.86	3.37	3.34	2.81	2.51	2.43
Benchmark	Mean Sim	3.08	3.38	2.88	3.23	3.92	2.94	3.5	3.45	3.38	2.94	2.84	2.62
$\leq \pm 0.5$	Mean Bias	0.52	0.51	-0.1	0.05	0.27	-0.28	-0.36	0.08	0.04	0.13	0.33	0.19
≤ 2	Gross Error	1.3	1.29	1.19	1.36	1.53	1.16	1.22	1.21	1.14	1.11	1.33	1.22
	RMSE	1.72	1.72	1.65	1.79	1.94	1.51	1.59	1.54	1.44	1.4	1.74	1.6
≥ 0.6	IOA	0.77	0.77	0.81	0.78	0.66	0.73	0.74	0.72	0.79	0.74	0.79	0.78
Temperature (K)	Mean Obs	272.95	278.54	281.18	287.25	293.62	298.5	301.93	302.64	296.17	294.34	281.42	274.53
Benchmark	Mean Sim	273.63	278.3	281.16	287.09	293.8	298.84	301.89	302.27	296.57	294.68	282.45	275.72
$\leq \pm 0.5$	Mean Bias	0.68	-0.24	-0.02	-0.16	0.18	0.34	-0.04	-0.37	0.4	0.34	1.03	1.19
≤ 2	Gross Error	1.29	1.32	1.41	1.47	1.68	1.71	1.39	1.26	1.28	1.23	1.51	1.69
	RMSE	1.61	1.75	1.83	1.89	2.09	2.19	1.8	1.61	1.59	1.57	1.86	2.06
≥ 0.8	IOA	0.98	0.97	0.96	0.94	0.86	0.87	0.85	0.9	0.89	0.91	0.98	0.97
Humidity (g/kg)	Mean Obs	3.61	4.15	4.84	6.93	11.18	16.35	20.4	19.98	13.97	12.22	5.72	3.72
Benchmark	Mean Sim	4.26	3.67	4.9	7.36	10.2	14.92	19.28	19.21	13.24	11.36	6.68	4.36
$\leq \pm 1$	Mean Bias	0.65	-0.48	0.06	0.43	-0.98	-1.43	-1.12	-0.77	-0.73	-0.86	0.96	0.64
≤ 2	Gross Error	0.51	0.92	0.92	1.45	1.54	1.7	1.06	1.02	0.98	1.34	1.15	0.72
	RMSE	0.63	1.13	1.13	1.76	1.93	2.41	1.56	2.14	1.43	1.7	1.38	0.87
≥ 0.6	IOA	0.86	0.78	0.78	0.73	0.59	0.6	0.71	0.72	0.69	0.58	0.87	0.87

$$\text{Mean Bias} = \frac{1}{N}\sum_{i=1}^{N} C_m - C_o \text{, GE} = \frac{1}{N}\sum_{i=1}^{N} \left|C_m - C_o\right| \text{, RMSE} = \sqrt{\frac{1}{N}\sum_{i=1}^{N} (C_m - C_o)^2} \text{, IOA} = 1 - \frac{\sum_{i=1}^{N} (C_m - C_o)^2}{\sum_{i=1}^{N} (|C_m - \overline{C_o}| + |C_o - \overline{C_o}|)^2}$$