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A two-way coupled regional urban–street network air quality model system for Beijing, China

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Table S1. Statistical analysis of simulation and observation O_3, NO, and NO_2 concentration at stations during the study period using the two-way coupled model (S1: IAQMS-street v2.0), one-way coupled model (S2: IAQMS-street v1.0), and regional model (S3: NAQPMS).

Station	Model	observation ($\mu g/m^3$)	simulation ($\mu g/m^3$)	R	FAC2	NMB	RMSE ($\mu g/m^3$)
DC O_3	IAQMS-street v2.0	90.85	91.56	0.77	0.81	0.01	33.42
	IAQMS-street v1.0		82.74	0.76	0.84	-0.09	36.91
	NAQPMS		61.81	0.52	0.59	-0.32	54.20
NO	IAQMS-street v2.0	0.57	0.80	0.36	0.13	0.41	1.71
	IAQMS-street v1.0		0.22	0.24	0.04	-0.61	1.59
	NAQPMS		3.73	0.33	0.02	5.56	5.96
NO_2	IAQMS-street v2.0	18.53	23.16	0.32	0.75	0.25	14.21
	IAQMS-street v1.0		27.07	0.43	0.75	0.47	15.69
	NAQPMS		36.53	0.16	0.41	0.98	27.00
XC O_3	IAQMS-street v2.0	86.11	93.27	0.79	0.85	0.08	30.18
	IAQMS-street v1.0		81.30	0.79	0.87	-0.06	29.56
	NAQPMS		64.95	0.58	0.68	-0.25	45.64
NO	IAQMS-street v2.0	0.64	0.77	0.33	0.21	0.21	1.53
	IAQMS-street v1.0		0.24	0.33	0.05	-0.63	1.26
	NAQPMS		4.12	0.41	0.06	5.48	6.60
NO_2	IAQMS-street v2.0	18.73	23.07	0.33	0.64	0.23	14.82
	IAQMS-street v1.0		28.89	0.46	0.66	0.55	17.64
	NAQPMS		36.34	0.18	0.43	0.94	27.31

Table S2. The population-weighted average concentration of O_3, NO, and NO_2 simulated by the tow-way coupled model (IAQMS-street v2.0), one-way coupled model (IAQMS-street v1.0), and regional model (NAQPMS) during August, 2021 in Beijing.

Model	O_3 ($\mu g/m^3$)	NO ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
IAQMS-street v2.0	99.08	0.79	16.64
IAQMS-street v1.0	109.74	0.12	3.75
NAQPMS	100.78	1.50	20.13

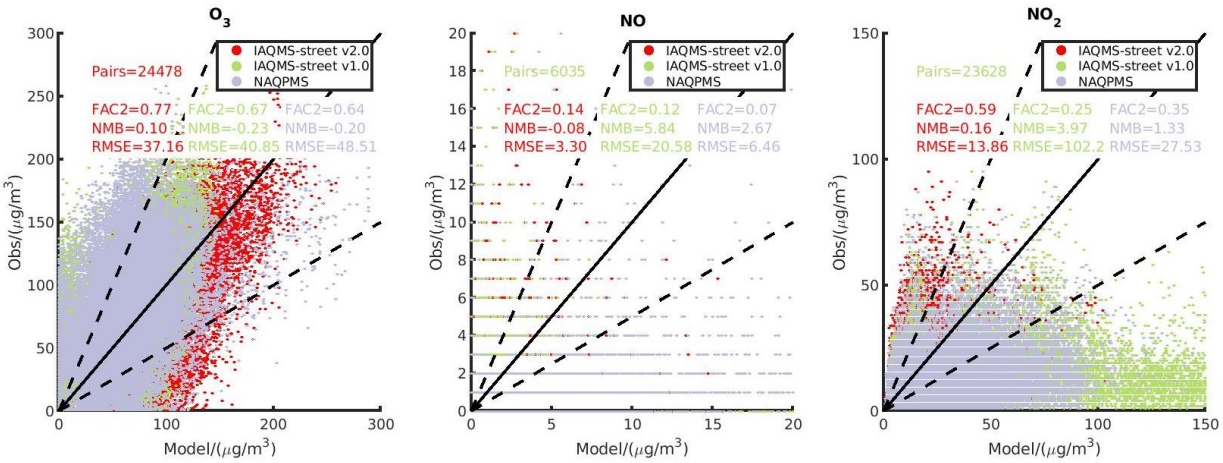

Figure S1. Observed and simulated hourly O_3, NO, and NO_2 concentrations during August 2021 from different models (IAQMS-street v2.0: red points; IAQMS-street v1.0: green points; NAQPMS: blue points) at all pollutant monitoring stations in Beijing.

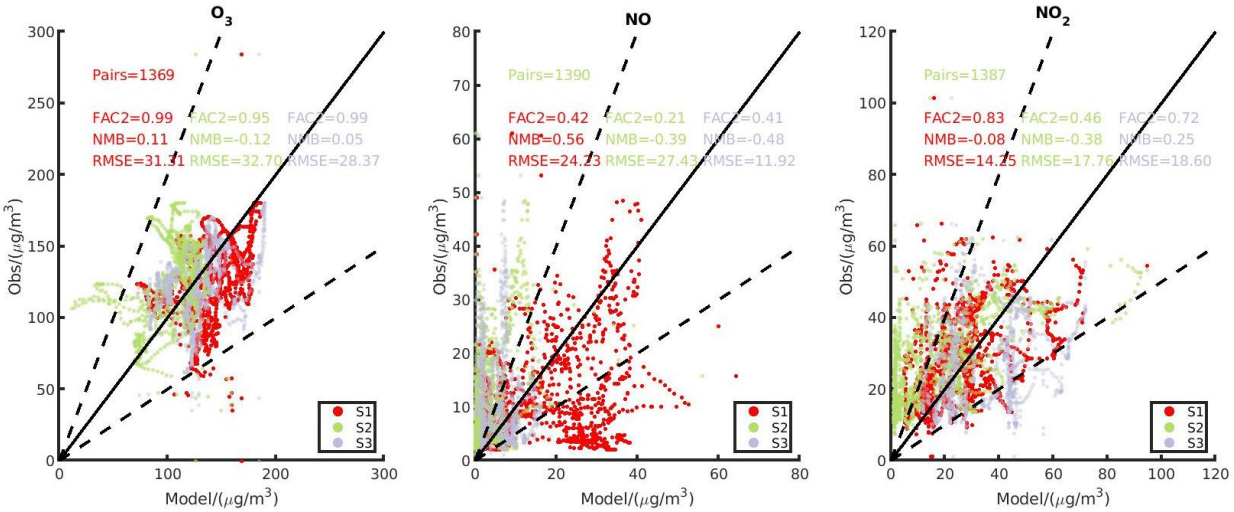

Figure S2. The simulated and observed concentration of O_3, NO, and NO_2 on the street scale in two-way coupled model (S1: IAQMS-street v2.0), one-way coupled model (S2: IAQMS-street v1.0), and regional model (S3: NAQPMS).

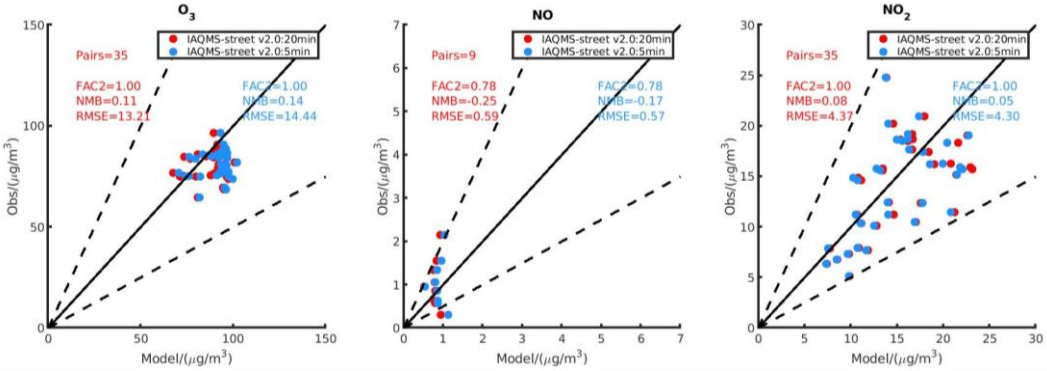

Figure S3. Observed and simulated average O_3, NO, and NO_2 concentrations during August 2021 from IAQMS-street v 2.0 with different time step (20 min: red points; 5min: blue points) at all pollutant monitoring stations in Beijing.

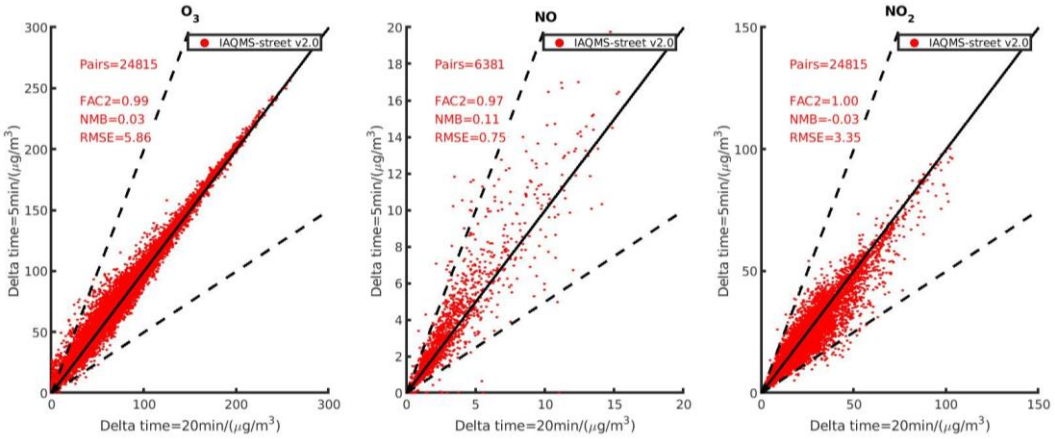

Figure S4. The comparison of simulated hourly O_3, NO, and NO_2 concentrations during August 2021 from IAQMS-street v 2.0 with different time step (20 min and 5 min) at all pollutant monitoring stations in Beijing.