

Supplementary Materials:

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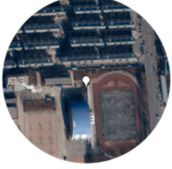
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Table S1. The variables of different local climate zones in Shenyang, China.

NO.	Image	Aspect ratio	Building surface fraction (%)	Impervious surface fraction (%)	Pervious surface fraction (%)	Height of roughness elements (m)	Terrain roughness class	LCZ
1		0.1	10	15	73	10	5	LCZ 9 Sparsely built
2		0.4	24	35	36	15	6	LCZ 5 Open midrise
3		0.7	30	30	42	4	6	LCZ 6 Open low-rise
4		0.5	30	31	37	14	6	LCZ 5 Open midrise
5		1	32	30	42	30	8	LCZ 4,G Open high-rise Water
6		1.2	35	43	19	20	6	LCZ 2,E Compact midrise Bare rock or paved
7		0.4	23	33	40	19	6	LCZ 5 Open midrise

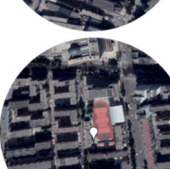
8		0.6	37	35	37	20	6	LCZ 5 Open midrise
9		1.2	42	35	28	16	7	LCZ 2,G Compact midrise Water
10		1.2	40	30	30	38	7	LCZ 4 Open high-rise
11		0.9	48	40	16	16	6	LCZ 2 Compact midrise
12		1.2	37	31	32	29	7	LCZ 4 Open high-rise
13		1.5	44	35	15	18	7	LCZ 2 Compact midrise
14		1.7	48	46	8	23	7	LCZ 2 Compact midrise
15		2.6	47	40	10	40	8	LCZ 1 Compact high-rise
16		2.4	49	43	5	27	8	LCZ 1 Compact high-rise

Table S2. Annual and Seasonal mean wind speed and standard deviations of 16 stations (m/s).

	Annual	Spring	Summer	Autumn	Winter
No.1	2.07	2.84	1.94	1.63	1.87
No.2	1.99	2.77	2.03	1.51	1.64
No.3	1.92	2.56	1.89	1.51	1.70
No.4	1.78	2.32	1.64	1.42	1.71
No.5	1.60	1.94	1.58	1.31	1.52
No.6	1.43	1.64	1.45	1.25	1.38
No.7	1.36	1.80	1.05	1.02	1.40
No.8	1.35	1.71	1.29	1.06	1.34
No.9	1.35	1.69	1.33	1.08	1.26
No.10	1.31	1.66	1.22	1.07	1.27
No.11	1.30	1.64	1.05	0.92	1.28
No.12	1.27	1.56	1.29	1.06	1.13
No.13	1.21	1.48	0.99	1.01	1.35
No.14	1.15	1.35	1.08	1.04	1.15
No.15	1.05	1.42	0.89	0.78	1.10
No.16	0.98	1.15	1.01	0.86	0.88
Std	0.33	0.51	0.36	0.25	0.26

Table S3. *P*-values of Mann-Whitney U-test of wind speeds between Station No.1 and other stations for a year and four seasons.

	Annual	Spring	Summer	Autumn	Winter
No.2	7.9E-18	7.6E-04	2.7E-01	6.7E-09	1.5E-14
No.3	2.9E-07	3.4E-07	6.8E-01	1.2E-01	3.0E-04
No.4	6.8E-44	8.1E-27	1.2E-17	2.8E-15	2.0E-03
No.5	6.7E-58	5.7E-68	5.1E-12	7.0E-07	9.9E-08
No.6	2.1E-148	1.2E-135	3.3E-28	6.2E-13	6.6E-26
No.7	1.9E-232	1.8E-95	1.6E-141	1.6E-57	1.6E-28
No.8	9.5E-231	5.2E-116	9.3E-72	6.6E-51	2.4E-35
No.9	4.1E-257	5.4E-123	1.5E-67	2.5E-59	1.4E-53
No.10	4.6E-269	4.4E-122	3.3E-96	7.3E-63	2.7E-26
No.11	1.5E-235	4.1E-136	3.7E-151	7.9E-30	3.4E-44
No.12	1.8E-297	9.7E-153	4.0E-67	9.9E-48	1.7E-83
No.13	3.5E-94	1.4E-179	1.7E-183	1.0E-74	1.7E-35
No.14	1.1E-173	8.9E-213	1.1E-143	1.0E-50	2.3E-77
No.15	2.4E-172	2.9E-189	3.9E-237	1.1E-152	3.5E-94
No.16	1.3E-183	1.3E-283	1.1E-173	2.5E-136	2.4E-172

Table S4. P-values of Mann-Whitney U-test of wind speeds between Station No.1 and other stations for daytime of four seasons.

	Spring	Summer	Autumn	Winter
No.2	3.4E-04	4.9E-04	1.2E-05	2.3E-04
No.3	1.6E-12	4.0E-04	2.0E-09	4.9E-07
No.4	3.6E-28	2.5E-16	2.3E-20	1.4E-03
No.5	1.2E-78	2.4E-29	6.7E-42	1.5E-18
No.6	2.5E-137	1.7E-50	6.6E-51	2.7E-43
No.7	9.3E-86	1.5E-113	1.9E-70	3.0E-28
No.8	1.9E-108	2.9E-76	1.4E-85	3.0E-54
No.9	7.6E-115	3.9E-62	3.8E-68	2.4E-55
No.10	2.8E-107	1.2E-87	1.2E-79	5.1E-25
No.11	2.4E-125	4.3E-127	4.9E-37	7.0E-38
No.12	3.6E-149	4.3E-79	2.4E-85	2.5E-82
No.13	2.1E-157	2.2E-156	2.7E-105	7.4E-43
No.14	3.5E-186	4.1E-136	6.1E-98	2.7E-86
No.15	3.8E-162	5.9E-191	8.1E-168	1.9E-86
No.16	3.5E-235	2.9E-160	3.8E-159	2.7E-153

Table S5. P-values of Mann-Whitney U-test of wind speeds between Station No.1 and other stations for nighttime of four seasons.

	Spring	Summer	Autumn	Winter
No.2	4.5E-05	1.5E-05	4.1E-03	3.5E-08
No.3	6.9E-06	5.1E-06	1.1E-02	9.6E-04
No.4	5.0E-05	1.8E-04	6.1E-03	7.5E-04
No.5	1.6E-07	5.4E-06	9.0E-06	3.8E-05
No.6	1.4E-20	1.8E-10	1.6E-02	3.7E-03
No.7	3.0E-19	1.9E-23	9.7E-04	5.2E-03
No.8	1.6E-20	4.5E-10	2.0E-03	4.8E-04
No.9	3.5E-22	2.4E-12	5.9E-10	5.8E-08
No.10	9.2E-21	5.4E-17	4.4E-08	3.1E-07
No.11	2.8E-24	8.4E-28	1.9E-04	5.0E-12
No.12	9.7E-24	6.1E-08	1.0E-02	2.4E-10
No.13	1.6E-34	3.2E-33	6.1E-07	4.7E-04
No.14	8.4E-38	1.2E-21	7.6E-02	3.7E-09
No.15	4.6E-36	4.1E-44	4.3E-19	1.6E-16
No.16	3.6E-54	1.8E-28	3.9E-21	2.4E-31

