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Supplement of

Evaluation of the contribution of new particle formation to cloud droplet number concentration in the urban atmosphere

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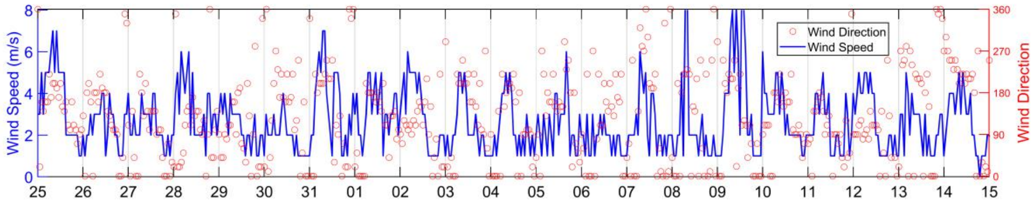

Figure S1. Time series of the wind speed and wind direction from 25 May to 15 June 2017

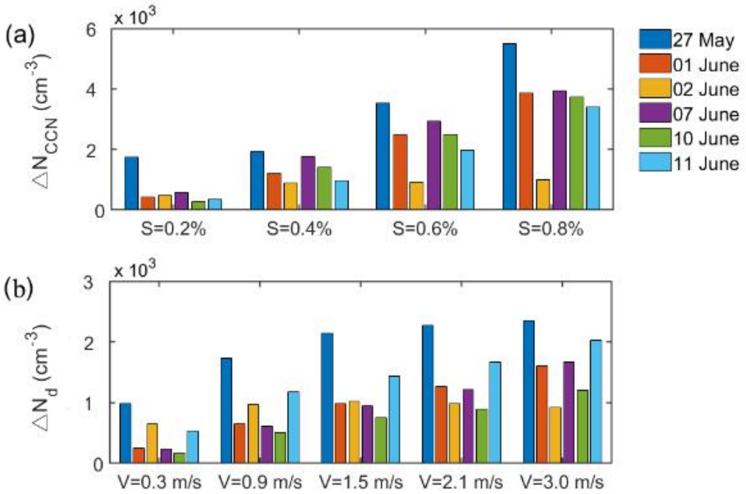

Figure S2. The average enhancement of CCN number concentration in all typical NPF days under different supersaturation

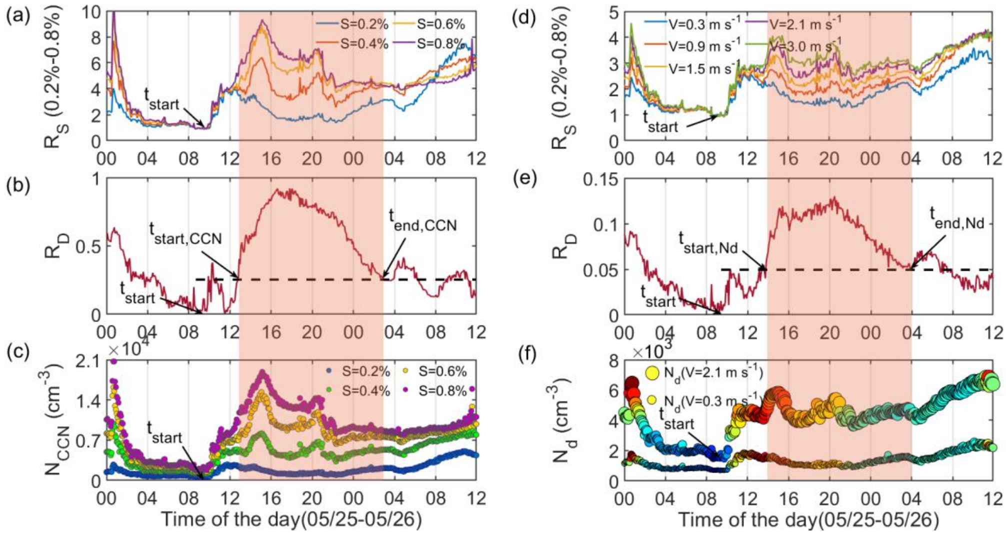

Figure S3. The diurnal evolution of (a) the R_S of N_{CCN} at different supersaturations, (b) the relative dispersion of R_S, R_D, for N_{CCN} at different supersaturations, (c) the calculated N_{CCN} under different supersaturations, (d) the R_S of N_d under updraft velocities from 0.3 to 3.0 m/s, (e) the R_D for N_d, and (f) the calculated N_d at updraft velocities of 0.3 and 2.1 m/s on 25 May, 2017.

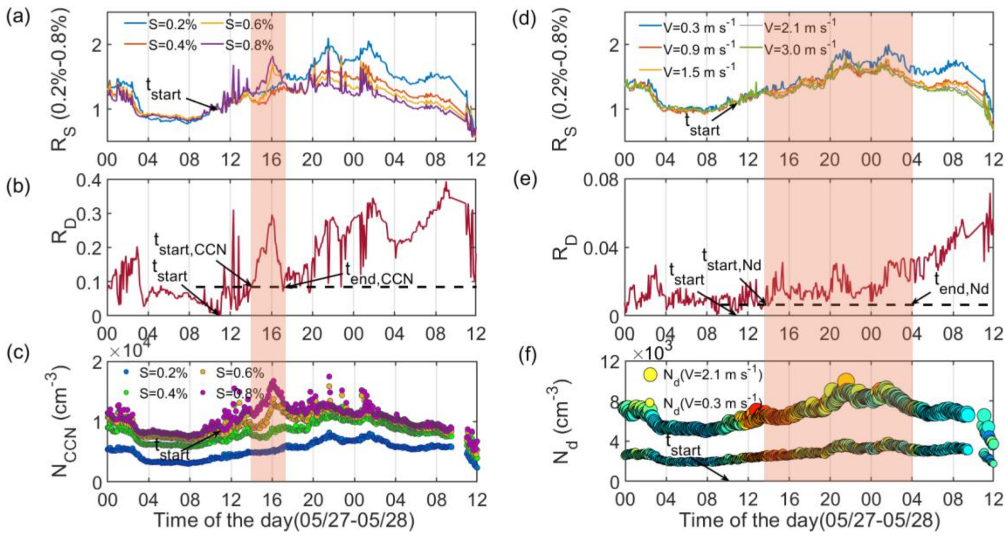

Figure S4. The diurnal evolution of (a) the R_S of N_{CCN} at different supersaturations, (b) the relative dispersion of R_S, R_D, for N_{CCN} at different supersaturations, (c) the calculated N_{CCN} under different supersaturations, (d) the R_S of N_d under updraft velocities from 0.3 to 3.0 m/s, (e) the R_D for N_d, and (f) the calculated N_d at updraft velocities of 0.3 and 2.1 m/s on 27 May, 2017.

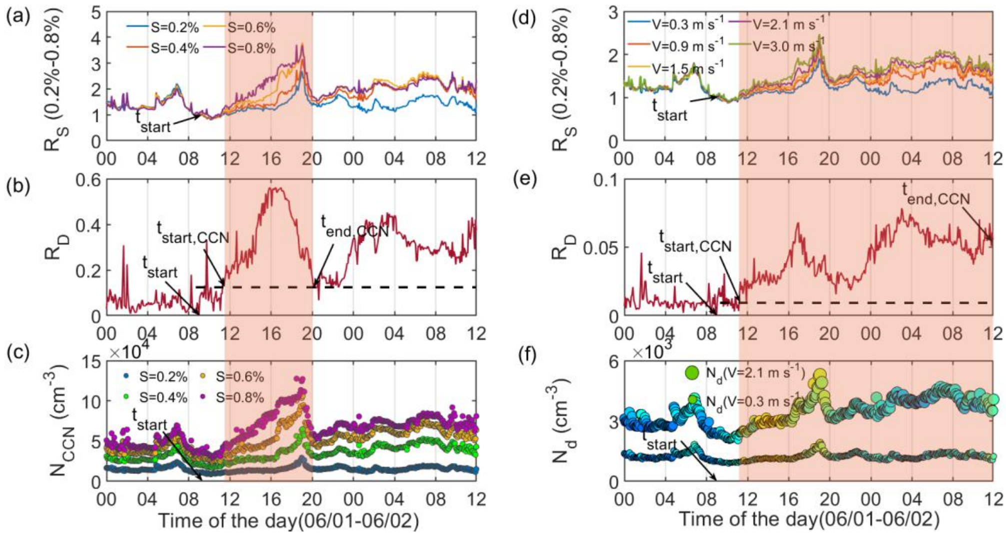

Figure S5. The diurnal evolution of (a) the R_S of N_{CCN} at different supersaturations, (b) the relative dispersion of R_S, R_D, for N_{CCN} at different supersaturations, (c) the calculated N_{CCN} under different supersaturations, (d) the R_S of N_d under updraft velocities from 0.3 to 3.0 m/s, (e) the R_D for N_d, and (f) the calculated N_d at updraft velocities of 0.3 and 2.1 m/s on 1 June, 2017.

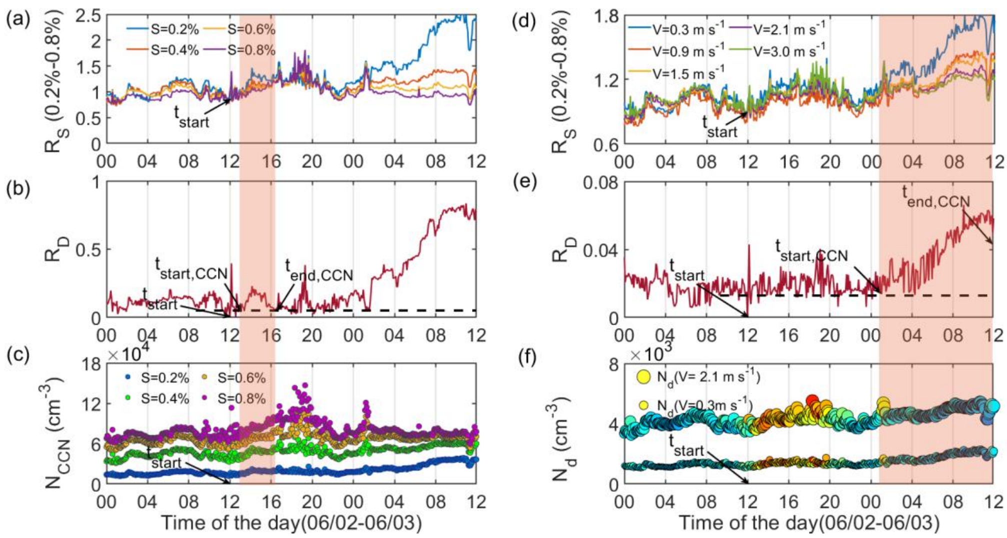

Figure S6. The diurnal evolution of (a) the R_S of N_{CCN} at different supersaturations, (b) the relative dispersion of R_S, R_D, for N_{CCN} at different supersaturations, (c) the calculated N_{CCN} under different supersaturations, (d) the R_S of N_d under updraft velocities from 0.3 to 3.0 m/s, (e) the R_D for N_d, and (f) the calculated N_d at updraft velocities of 0.3 and 2.1 m/s on 2 June, 2017.

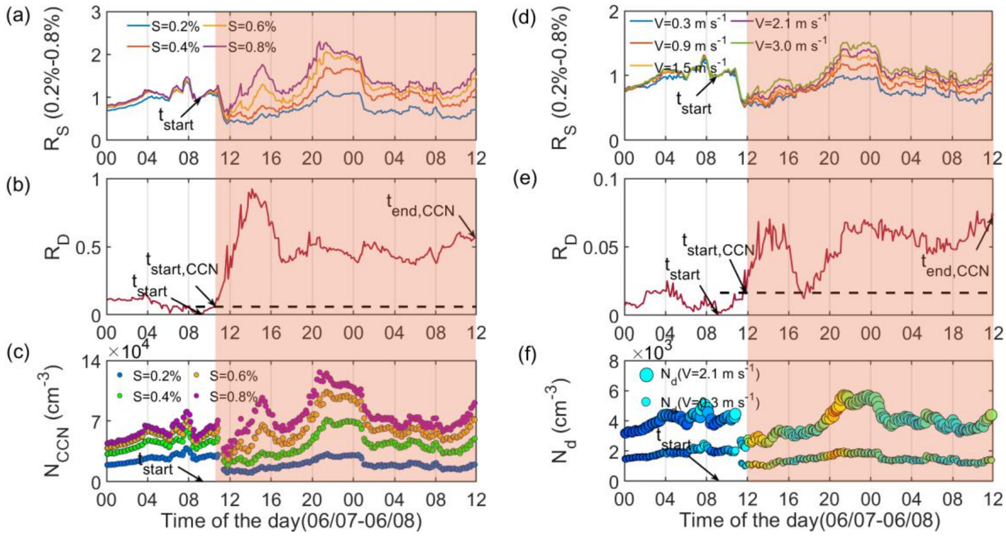

Figure S7. The diurnal evolution of (a) the R_S of N_{CCN} at different supersaturations, (b) the relative dispersion of R_S, R_D, for N_{CCN} at different supersaturations, (c) the calculated N_{CCN} under different supersaturations, (d) the R_S of N_d under updraft velocities from 0.3 to 3.0 m/s, (e) the R_D for N_d, and (f) the calculated N_d at updraft velocities of 0.3 and 2.1 m/s on 7 June, 2017.

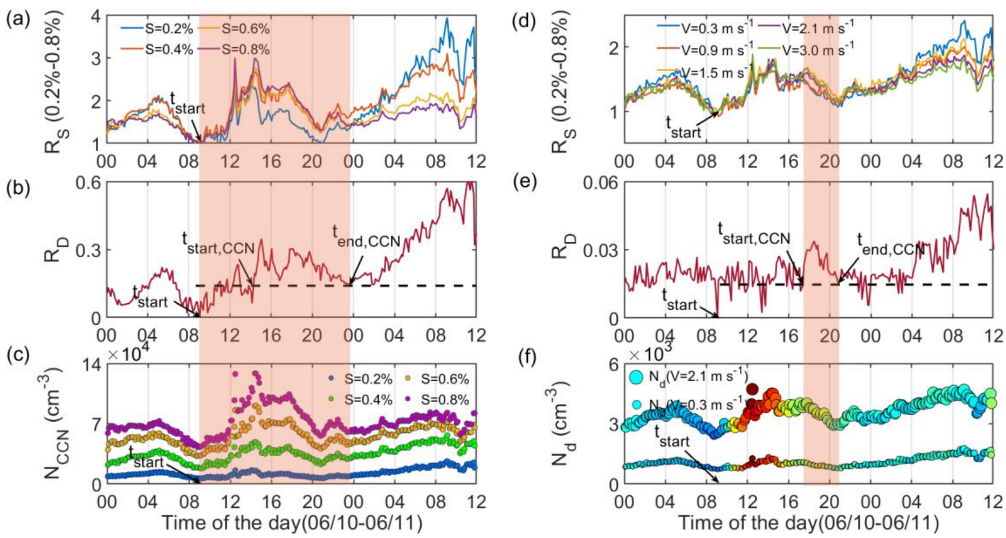

Figure S8. The diurnal evolution of (a) the R_S of N_{CCN} at different supersaturations, (b) the relative dispersion of R_S, R_D, for N_{CCN} at different supersaturations, (c) the calculated N_{CCN} under different supersaturations, (d) the R_S of N_d under updraft velocities from 0.3 to 3.0 m/s, (e) the R_D for N_d, and (f) the calculated N_d at updraft velocities of 0.3 and 2.1 m/s on 10 June, 2017.

Table S1. The critical time node in evaluating CCN enhancements on seven NPF days

NPF case	t_{start}	$t_{start,CCN}$	$t_{end,CCN}$
25 May	09:00	12:40	$03:00^{+1}$
27 May	11:00	14:00	17:10
01 June	09:00	11:20	20:10
02 June	12:00	13:30	16:20
07 June	09:00	10:30	$12:00^{+1}$
10 June	09:00	14:10	23:30
11 June	11:00	11:50	18:00

Table S2. The critical time node in evaluating N_d enhancements on seven NPF days

NPF case	t_{start}	$t_{start,Nd}$	$t_{end,Nd}$
25 May	09:00	13:40	$04:00^{+1}$
27 May	11:00	14:00	00:00
01 June	09:00	11:10	$12:00^{+1}$
02 June	12:00	$01:30^{+1}$	$12:00^{+1}$
07 June	09:00	11:25	$12:00^{+1}$
10 June	09:00	13:50	23:50
11 June	11:00	16:30	21:00

$^{+1}$ means the next day

Table S3. The enhancement of CCN under different supersaturation (from 0.2% to 0.8%)

		25 May	27 May	1 June	2 June	7 June	10 June	11 June
S=0.2%	N_{CCN}(cm^{-3}) (bef)	673	4078	1098	1423	1407	721	2007
	N_{CCN}(cm^{-3}) (aft)	2201	5083	1514	1896	1981	988	2366
	Enhancement of CCN(cm^{-3})	1528	1005	416	473	574	267	359
	Enhancement of CCN(%)	227	25	38	33	41	37	18
S=0.4%	N_{CCN}(cm^{-3}) (bef)	1318	7002	2093	3941	2467	2067	4307
	N_{CCN}(cm^{-3}) (aft)	6098	8071	3291	4828	4233	3475	5280
	Enhancement of CCN(cm^{-3})	4780	1069	1198	887	1766	1408	973
	Enhancement of CCN(%)	363	15	57	23	72	68	23
S=0.6%	N_{CCN}(cm^{-3}) (bef)	1767	8508	3009	6011	3252	3599	5814
	N_{CCN}(cm^{-3}) (aft)	10439	10844	5492	6939	6187	6100	7793
	Enhancement of CCN(cm^{-3})	8672	2337	2483	928	2935	2501	1979
	Enhancement of CCN(%)	491	27	83	15	90	69	34
S=0.8%	N_{CCN}(cm^{-3}) (bef)	2128	9690	3776	7547	3836	4691	6830
	N_{CCN}(cm^{-3}) (aft)	14123	13638	7654	8547	7777	8422	10227
	Enhancement of CCN(cm^{-3})	11995	3948	3878	1000	3941	3731	3397
	Enhancement of CCN(%)	564	41	103	13	103	80	50

bef, the time period within 2 hour before t_{start};

during, the time period from $t_{start,CCN}$ (t_{Nd}) to $t_{end,CCN}$ ($t_{Nd,end}$)

Table S4. The enhancement of N_d and variance of S_{max} under different updraft velocity (from 0.3m s^{-1} to 3m s^{-1})

		25 May	27 May	1 June	2 June	7 June	10 June	11 June
V=0.3 m s^{-1}	*Nd*(cm^{-3}) (bef)	728	2231	994	1171	1209	791	1444
	N_d(cm^{-3}) (aft)	1478	2980	1239	1823	1445	968	1982
	Enhancement of N_d(cm^{-3})	750	748	245	652	236	177	538
	Enhancement of N_d(%)	103	34	25	56	20	22	37
	S_{max}(%) (bef)	0.220	0.140	0.190	0.180	0.130	0.210	0.160
	S_{max}(%) (aft)	0.169	0.111	0.177	0.148	0.096	0.195	0.138
	Variance of S_{max}(%)	-23.52	-20.65	-7.08	-17.77	-26.9	-7.17	-13.53
V=0.9 m s^{-1}	N_d(cm^{-3}) (bef)	1185	4204	1646	2319	1929	1547	2664
	N_d(cm^{-3}) (aft)	2915	5413	2290	3292	2541	2052	3846
	Enhancement of N_d(cm^{-3})	1730	1209	644	973	612	505	1182
	Enhancement of N_d(%)	146	29	39	42	32	33	44
	S_{max}(%) (bef)	0.360	0.220	0.310	0.270	0.220	0.330	0.250
	S_{max}(%) (aft)	0.250	0.182	0.275	0.225	0.182	0.294	0.215
	Variance of S_{max}(%)	-29.64	-17.62	-11.56	-16.55	-17.7	-10.73	-14.09
V=1.5	N_d(cm^{-3}) (bef)	1462	5179	2055	3140	2334	2158	3432
	N_d(cm^{-3}) (aft)	3954	6732	3040	4170	3279	2907	4874
	Enhancement of N_d(cm^{-3})	2492	1553	985	1030	945	749	1442

m s^{-1}	Enhancement of N_d(%)	171	30	48	33	41	35	42
	S_{max}(%) (bef)	0.460	0.270	0.390	0.340	0.280	0.410	0.320
	S_{max}(%) (aft)	0.300	0.228	0.335	0.289	0.238	0.360	0.272
	Variance of S_{max}(%)	-33.48	-15.67	-14.03	-15.33	-14.8	-12.12	-15.36
V=2.1 m s^{-1}	N_d(cm^{-3}) (bef)	1663	5874	2398	3808	2647	2672	3996
	N_d(cm^{-3}) (aft)	4810	7514	3665	4799	3867	3571	5666
	Enhancement of N_d(cm^{-3})	3147	1639	1267	991	1220	899	1670
	Enhancement of N_d(%)	189	28	53	26	46	34	42
	S_{max}(%) (bef)	0.520	0.320	0.430	0.390	0.340	0.460	0.360
	S_{max}(%) (aft)	0.350	0.264	0.393	0.338	0.300	0.390	0.308
	Variance of S_{max}(%)	-48.3	-17.2	-8.6	-13.5	-11.8	-15.0	-14.3
V=3 m s^{-1}	N_d(cm^{-3}) (bef)	1882	6577	2804	4586	2946	3230	4613
	N_d(cm^{-3}) (aft)	5850	8295	4410	5504	4619	4432	6636
	Enhancement of N_d(cm^{-3})	3968	1718	1606	918	1673	1202	2023
	Enhancement of N_d(%)	211	26	57	20	57	37	44
	S_{max}(%) (bef)	0.670	0.380	0.560	0.460	0.420	0.550	0.440
	S_{max}(%) (aft)	0.410	0.318	0.465	0.404	0.385	0.478	0.369
	Variance of S_{max}(%)	-38.43	-16.16	-16.95	-12.33	-8.3	-13.17	-16.03

Table S5. The correlation between N_{CN} and N_{CCN}, N_{CN} and N_d

Updraft velocities V	R of N_{CN} and N_d (at V)	The S_{max} corresponding to V	R of N_{CN} and N_{CCN} (for S_{max})
0.3 m/s	0.51	0.23%	0.61

0.9 m/s	0.69	0.37%	0.75
1.5 m/s	0.75	0.47%	0.79
2.1 m/s	0.77	0.59%	0.88
3.0 m/s	0.81	0.73%	0.93

Table S6. The average suppression rate of S_{max} under different updraft vertical velocities in all NPF days.

Date	0.3 m s^{-1}	0.9 m s^{-1}	1.5 m s^{-1}	2.1 m s^{-1}	3 m s^{-1}
25 May	15.0%	13.3%	15.8%	12.2%	14.3%
27 May	14.2%	9.7%	7.7%	6.5%	7.9%
1 June	11.9%	11.9%	10.8%	11.0%	7.4%
2 June	9.1%	8.2%	9.0%	7.8%	6.9%
7 June	21.3%	21.5%	20.6%	20.0%	17.3%
10 June	16.4%	14.8%	14.5%	14.3%	13.6%
11 June	13.7%	13.5%	15.2%	12.6%	14.3%
Average	14.51±3.525%	13.27±3.972%	13.37±4.152%	12.057±4.115%	11.67±3.863%

Table S7. The average suppression rate of N_d under different updraft vertical velocities in all NPF days

Date	0.3 m s^{-1}	0.9 m s^{-1}	1.5 m s^{-1}	2.1 m s^{-1}	3 m s^{-1}
25 May	21.30%	19.55%	22.85%	14.16%	15.43%
27 May	16.75%	8.32%	5.59%	4.29%	3.47%
1 June	16.38%	15.55%	13.00%	11.78%	9.97%
2 June	10.63%	10.22%	9.69%	8.22%	7.86%
7 June	21.84%	21.72%	20.82%	20.80%	20.39%
10 June	25.56%	19.64%	17.26%	15.27%	12.74%
11 June	20.69%	15.05%	14.51%	11.80%	12.79%
Average	19.02±4.48%	15.72±4.65%	14.82±5.62%	12.33±4.87%	11.80±5.03%