Supplement of

Regional New Particle Formation as Modulators of Cloud Condensation Nuclei and Cloud Droplet Number in the Eastern Mediterranean

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SM 3.3 Impact of NPF on CCN concentrations and total aerosol number

Seasonally, 24 wintertime NPF events were recorded at Finokalia between 4:50 and 14:45 LT, with subsequent growth of the newly formed particles over the rest of the day. The analysis of the air-mass back-trajectories shows that the air originated from the North for 12 events with average speeds 7.0±0.1 m s^{-1}, characterized by clean air with low pollutant concentrations. Prior to initiation of the NPF, the diurnal mean value of calculated N_{total} were 2,183±134 cm^{-3}, and 3,902±993 cm^{-3} when NPF ends, resulting in an increase of almost 79%. 9 events took place when air masses originated from the W/SW sector, coming from North Africa, and afterwards spending time over the island of Crete, with moderate speeds (5.2±1.1 m s^{-1}). The events were characterized by a strong increase in the diurnal mean value of N_{total} (156%), corresponding to 1,578±387 cm^{-3} before, and 4,037±1,120 cm^{-3} after the NPF. Only 3 events were recorded when eastern winds prevailed over the Finokalia station, with speeds above even 11 m s^{-1} (average 9.6±2.9m s^{-1}), and a diurnal mean increase of N_{total} by 286%. To identify the contribution of atmospheric NPF episodes to the production of new CCN during winter, we focus on the t_{dec} (varying from 0.42 to 8.5 h, with an average value of 2.9±2.2 h), where the R_s display a sharp increase few hours after the t_{start}.The calculated R_s was found to range between 0.62 and 3.76 (mean value 1.26±0.02) before t_{dec}, and 0.80 to 8.91 (mean value 1.88±0.03) before and after the t_{dec}, respectively, and the CCN population exhibits an increase of 47, 47, 48, 50, and 54%, respectively for each *s*. Given that smaller particles activate earlier to CCN size range particles, the t_{dec} is similar at each supersaturation level, which indicates that the size of the particles (d_c varying from 36 to 170 nm) is negligible in order to note a different t_{dec}.

In spring N_{total} was about 8% higher than in winter (average N_{total}= 3,215±807 cm^{-3}), with distinct air-mass origin during the NPF episodes (Table S2). 35 events were recorded, with the t_{start} ranging between 7:40 and 13:15 LT, ending up with high wind speeds (average 7.2±0.4m s^{-1}) from the N sector (315° to 45°), while 17 were detected between 7:15 and 13:00 LT, when air masses arriving at Finokalia with an average wind speed 3.0±0.3m s^{-1} from the

W/SW sector (270^o to 200^o), firstly spending time over Crete and thus being influenced by the island. The days where the events trigger the CCN production are characterized by moderate humidity (RH~60%), and spring temperature exhibited values larger than 17.5 ^{o}C between 10:00 and 17:00 LT. Before the t_{start}, the diurnal average estimated value of N_{total} was 2,701±102 cm^{-3}, and 2,362±142 cm^{-3} under northern and south/southwestern winds, respectively, while after the subsequent condensational growth of the freshly-formed particles the N_{total} was 4,103±500 cm^{-3}, and 3,631±580 cm^{-3} for the aforementioned air mass source regions.Therefore, it seems that higher aerosol number concentrations of new particles were observed, when air masses came from the marine boundary layer (northern directions), indicating that the sources of nucleating and condensing species are stronger over the marine environment than over the land (Tunved et al., 2006). The time evolution of the R_s in spring displays a diurnal variability. The contribution of new aerosols on CCN generally occurs between 10 minutes and 11 hours (average 2.6±1.8 h) after the beginning of the particle formation events (t_{start}), promoting the growth of the new particles. The R_s ranges from 0.38 to 2.21 for all supersaturations during the period prior to the beginning of the production CCN (see Table S2), and they are constantly similar for each supersaturation (mean value 1.12±0.31) before the t_{dec}, which suggest that at a given supersaturation level the predicted CCN values stay quite constant until the "wave" of fresh particle reaches to sufficient size to affect CCN. Via the values of the R_s we observed that NPF contributes significantly to CCN concentrations by 41, 40, 40, 39, and 41%, for each supersaturation. Since the influence is almost similar for each *s* reveals that, smaller (average d_c=35 nm at *s*=1.0%) and larger (average d_c=160 nm at *s*=0.38%) particles "feel" all the same the NPF, supporting that the enhancement of the CCN concentrations was not only atmospheric nucleation, but in addition the growth of sub-CCN-sized primary particles throughout their transportation.

Moving to the summer episodes, the average number concentrations of aerosol particles was calculated to be 4,254±372 cm^{-3}, which is the highest of all seasons. 50 daytime NPF events were recorded, occurring between 6:45 and 11:05LT. The air-mass back-trajectories in conjunction with the wind direction data indicates that out of the 50 events, the grand majority (43 events) were associated with strong northerlies over the Aegean Sea, with speeds above 8 m s^{-1} (Etesian flow), while the rest 7 episodes took place when air masses originated from the wider W/SW sector. Furthermore, apart from the strong winds, the summer temperatures vary between 18 and 31^{o}C, and this season is considered as humid, with RH values reaching up to 75 % at the Finokalia station. Regarding now the Etesian flow, NPF possibly did not initiate in the vicinity of Finokalia, but probably had been taken place a few hours before air masses arrive at the station. The freshly-formed particles were recorded at the lowest detectable sizes (~10 nm), with subsequent growth over the rest of the day, and these events are typical examples of so-called regional NPF events, in which the growth homogeneously takes place over distances of hundreds of kilometers (Kulmala et al., 2012; Kalkavouras et al., 2017). The diurnal mean value of N_{total} during summer was determined to be 3,681±174 cm^{-3} prior to the growth of the particles in the nucleation mode, and 4,392±322 cm^{-3} after the starting of NPF, exhibiting a 20% increase, which is related to regional sources of pollutants via strong transport from the main European continent and Istanbul (Gerasopoulos et al., 2005, Kalkavouras et al., 2017). The diurnal mean value of the ratio R_s calculated throughout summer was 1.02±0.01 before the starting of CCN influence, which is the lowest seasonal value. The increase in the aerosol number concentration, N_{total}, caused by nucleation, was followed by an increase in the R_s with a time lag between 40 minutes and 9.5 hours (mean duration between t_{start} and t_{dec} was calculated to be 2.75 h), due to the gradual growth of freshly-formed particles up to 25 nm during the rest of the day. The time evolution of the R_s resembled that of N_{total}, and the contribution to the CCN concentrations were 37, 37, 39, 40, and 43% (mean 39%) at each supersaturation, respectively. It can be seen that, new aerosol particles enhance the CCN concentrations to a slight extent at supersaturations above 0.73%, and therefore the similar values of the percentages likely reflect the atmospheric aging (through condensation/coagulation and cloud processing) of small ($d_c$varied between 28 and 40 nm), less CCN-active aerosol directly formed from NPF events.

In autumn the relative reduction of N_{total} compared to summer was 42% (mean value: N_{total}= 2,997±662 cm^{-3}), and the back-trajectory analysis of the air masses sampled at Finokalia indicates different source regions from the other seasons. 11 NPF events were recorded between 8:25 and 12:25 LT, arriving with low wind speed (mean 4.4±0.2 m s^{-1}) from the west and south/southwest (270° to 200°), 24 NPF episodes were observed between 5:30 and 13:00 LT, when air masses arriving at Finokalia from the north (310° to 50°) with an average wind speed 7±0.5 m s^{-1}, and a NPF event was detected when the air mass coming from east. Prior to the t_{start}, the diurnal mean calculated value of N_{total} was 2,752±96 cm^{-3}, and 1,544±104 cm^{-3} under northern and south/southwestern air masses, respectively, while after the subsequent condensational growth of the new particles the N_{total} was 3,829±585 cm^{-3}, and 2,691±603 cm^{-3} for the aforementioned air masses origin. Thus, it appears that N_{total} has a significantly similar behavior for air masses coming from the Balkans, and for air masses originating from Northern Africa. Concerning finally the fraction of the R_s in autumn, the mean value for all episodes was determined as being 1.12±0.24 concerning all supersaturations before the t_{dec}, while the average value of the R_s was calculated as being 1.73±0.98) on average 3.3 hours after the t_{start} (t_{dec}between8:45 and 17:45LT). Using the values of the R_s, we determined that NPF contributes significantly to CCN concentrations by 46, 47, 52, 55, and 69%, for each supersaturation. In autumn the largest delay in observing CCN impacts – 3.5 h after the start of the event – promote the gradually condensational growth of the new particles,which leads to a significantly increase on estimated CCN levels compared to the other seasons, mainly for higher levels of *s* (0.38 to 1.0%).

SM 3.4 Impact of NPF on droplet number and cloud formation

Considering as a fact that the above NPF episode considerably boosts the CCN concentrations could be misleading as to the impact on CDNC, since the effect of NPF on CCN and therefore on N_d should not be treated separately. The actual increase caused by the impact of NPF on N_d would be the same as the impact on CCN but at a supersaturation level equal to s_{max}, suggesting that using solely the CCN-based analysis is useless if someone really wants to quantify the influence of NPF on N_d. Throughout the NPF, the s_{max} which formed in a cloud actually slowly increases after the initiation of NPF and decreasesgradually when the "wave" of new particles influences the N_d. Moreover, the N_d does not increase but only until late in the afternoon, owing to the enhanced competition for water vapor by the ever increasing CCN. The mean value of the s_{max} was determined as being 0.11±0.03%, and 0.15±0.05% for updraft velocities of 0.3 m s^{-1}, and 0.6 m s^{-1}, respectively which could be proposed as indicative values when someoneuses parameterizations to calculate the N_d. Nevertheless, by selecting a predetermined supersaturation or a critical diameter to calculate CCN concentrations and N_d, can lead to anambiguous conclusion regarding the influence of NPF on ambient clouds, and would be preferabletoavoidthe CCN-based approach and instead refer to the new paradigm of analysis that uses only parameterizations and N_d.

During winter, all NPF events (n=24) over Finokalia trigger the production of CCN and therefore the formation of N_d between 8:05 and 17:40 LT, on average 2.6 hours after the t_{dec} (t_{Nd} was recorded from 30 min to 6 hours, after the t_{dec}). For both σ_w a slight decrease regarding the s_{max} was calculated compared to the period between t_{start} and t_{dec}, while the respective perturbation regarding the N_d from the NPF episodes exhibits on average a limited increase (see Table S6). The supersaturations developed in NPF-influenced clouds (0.13% for 0.3m s^{-1} and 0.18% for 0.6 m s^{-1}) in winter, moves the size of particles affected by cloud processing to larger particles, since the critical diameters during the NPF events varied from 86 to 190 nm (mean d_c 150 nm for supersaturation 0.1%, and 95 nm for 0.2%). Moreover, the percentage change of the variance in N_d for both updraft velocities σ_w, exhibits the highest seasonal variance regarding the N_d, which is in conjunction with the lowest variability in N_{total}. From the relative contribution of the total aerosol number and chemical composition to N_d, it can be seenthatthe larger contribution is owed to the variance of the total aerosol number to the potential CDNC, while the influence of the chemical composition being limited for both updraft velocities (Table S6).

Throughout spring, aerosol levels were much higher compared to winter and N_d exhibited also an increasing trend after the NPF episodes. All events (n=52) occurred during daytime, and the enhancement of the N_d observed from 9:25 to 21:45 LT, on average 3 hours after the t_{dec} (t_{Nd} was varied between 40 min and 8.5 hours, after the t_{dec}). Overall, the contribution of the NPF episodes concerning the cloud droplet number concentrations increased as expected for σ_w=0.3 and 0.6 m s^{-1}, respectively compared to pre-t_{Nd} values (Table S6). This augmentation is related with the decrease in s_{max}, for the aforementioned updraft velocities, which indicates that the increase of competition of CCN for water vapor with d_c varying from 29 to 200 nm, can reduce cloud supersaturation. The variance in the N_d caused by the NPF corresponds to a variability in N_{total} of more than 1,600 particles (cm^{-3}). On average, in spring almost the same values are calculated as during winter regarding the percentage contribution of the total aerosol numberand hygroscopicity tothe daily droplet number variance calculated for both σ_w (Table S6). This further supports the above finding that the droplet number variability mostly reflects the intensity of the total aerosol number over Finokalia during NPF events.

The relative contribution of NPF into CDNC during summer was observed on average 3.1 hours after the initiation of potential CCN production. Particularly, t_{Nd} occurred mainly after 12:00 LT (47 days), apart from 3 days when t_{Nd} was specified between 10:45 to 11:50 LT. Concerning now the s_{max}, it decreases for both updraft velocities, compared to the period between t_{start} and t_{dec}, once again, and it should be mentioned that, the doubling in the σ causes s_{max} to increase by 43%. The decrease caused by the NPF was on average all the same, when σ_w is equal to 0.3 and 0.6 m s^{-1}, which indicates that the fluctuation of s_{max} is independent from the larger updraft velocity, allowing the newly formed particles, which in the meanwhile grow to larger particles (155 nm; accumulation mode) to activate into cloud droplets. As expected, the reduction of s_{max} goes with a respective increase of N_d during the NPF days. For all events in summer, the NPF is followed by a limited augmentation regarding the N_d (Table S6), regardless of the highest seasonal aerosol concentrations (mean 4,254±372 cm^{-3}), and by extension the highest estimated CCN concentrations for each supersaturation observed during this season, confirming once again that larger and more aged aerosol particles are mostly affected and may activate into cloud droplets. The variance of CDNC due to NPF was determined to be merely 36 and 101 cm^{-3} for each σ_w, whereas the highest contribution to the variance of N_d is attributed once more to aerosol number and to a limited extent to the chemical composition. By doubling the updraft velocity, the chemical composition during summer exhibits the highest contribution toCDNC compared to the other seasons, indicating the enhancement of vertical mixing which preceded the arrival of the air plume at Finokalia.

In autumn the NPF events (n=36) influenced the CDNC between 10:15 and 21:10 LT, on average 2.8 hours after the t_{dec}. When σ_w is equal to 0.3 m s^{-1} the NPF episodes are associated with s_{max} decreases compared to the period between t_{start} and t_{dec} (Table S6), and in consequence, CDNC throughout the NPF events increased, compared to the pre-t_{Nd} values. The larger σ_w lead to higher values of s_{max} showing an increase of 50%, which allow smaller particles to activate into droplets. N_d displays a substantial augmentation for σ_w= 0.6 m s^{-1} (on average 52%), indicating the impact of mean vertical velocity on the CDNC. The mean N_d concentrations prior and after the t_{Nd}, exhibited relative increase of 15%. The respective variance of N_d when the NPF influence CDNC was 91 and 205 cm^{-3} for both σ_w, respectively while the predicted N_d variability is almost entirely controlled by the aerosol number fluctuation, and to a limited extent by the chemical composition for both updraft velocities.

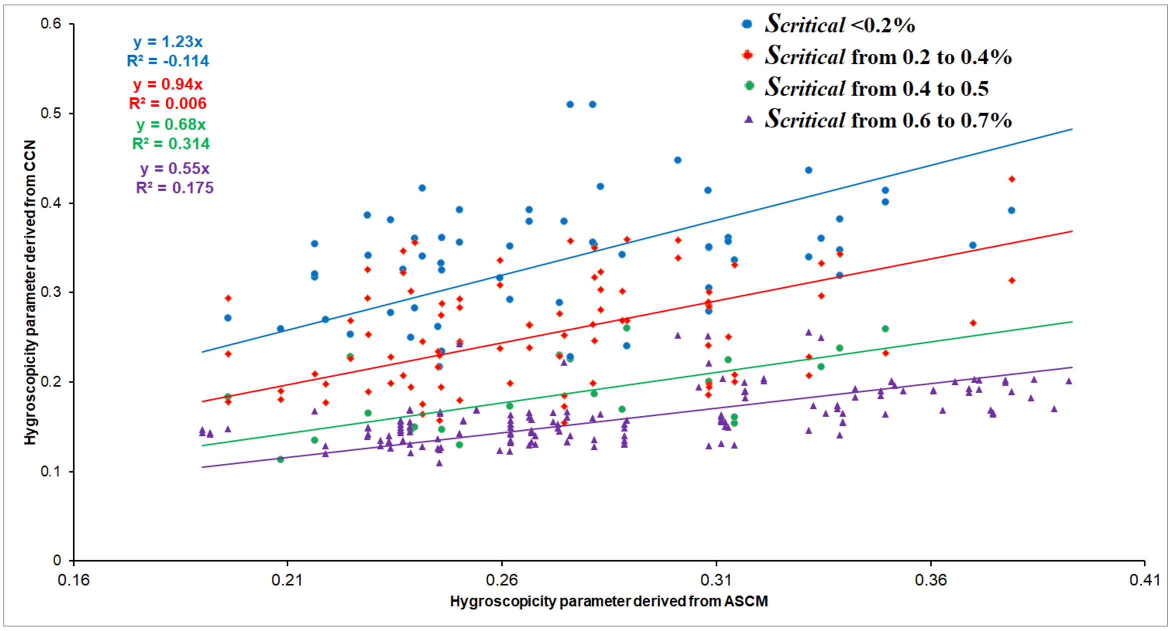

Figure S1. Predicted against measured hygroscopicity parameter (κ) at critical supersaturation under 0.2% (blue dot), from 0.2 to 0.4% (red rhombus), from 0.4 to 0.5% (green dot), and from 0.6 to 0.73% (purple triangle), respectively on 29, 30 August and 9, 22 September 2012.

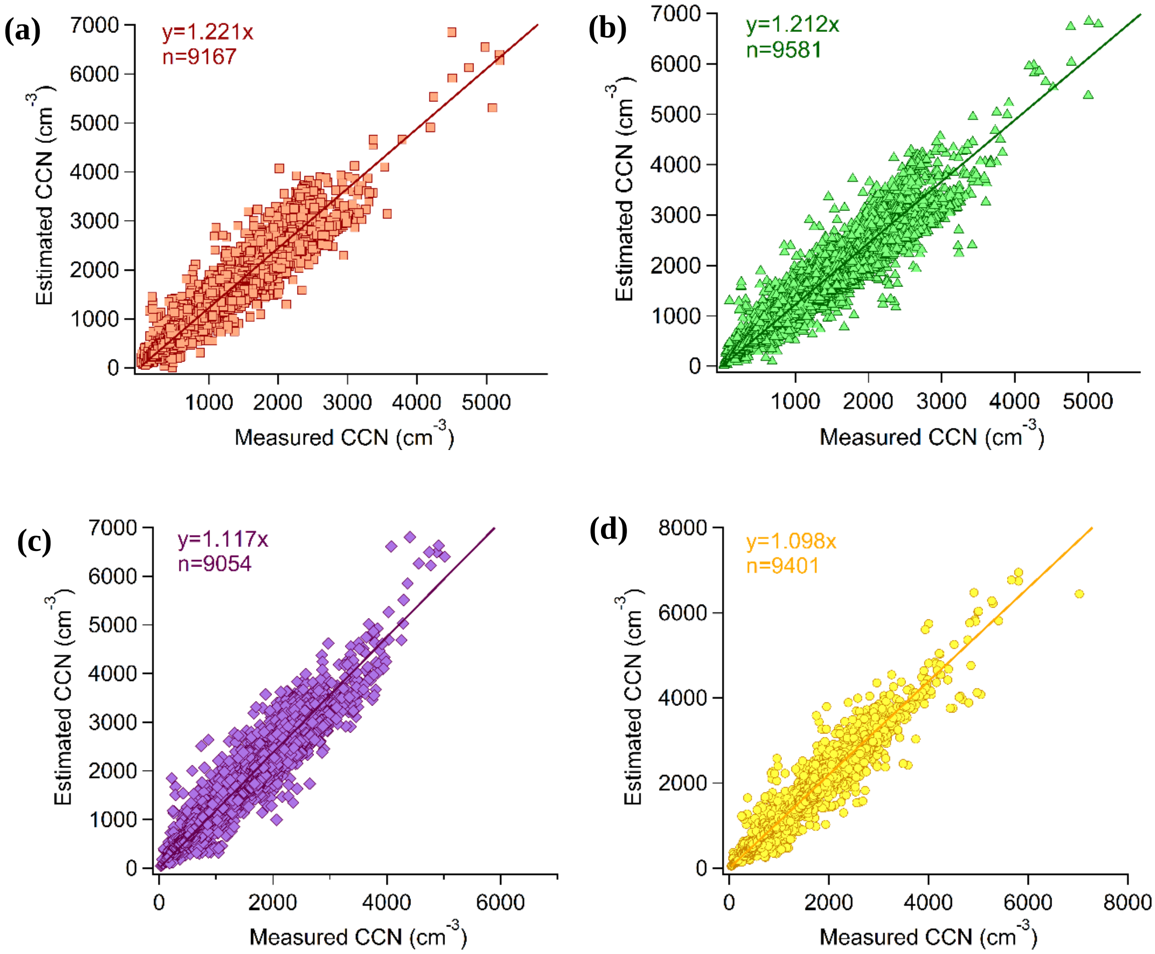

Figure S2. Measured against estimated CCN concentrations at each supersaturations**(a)** 0.38%, **(b)** 0.52%, **(c)** 0.66%, and **(d)** 0.73%.

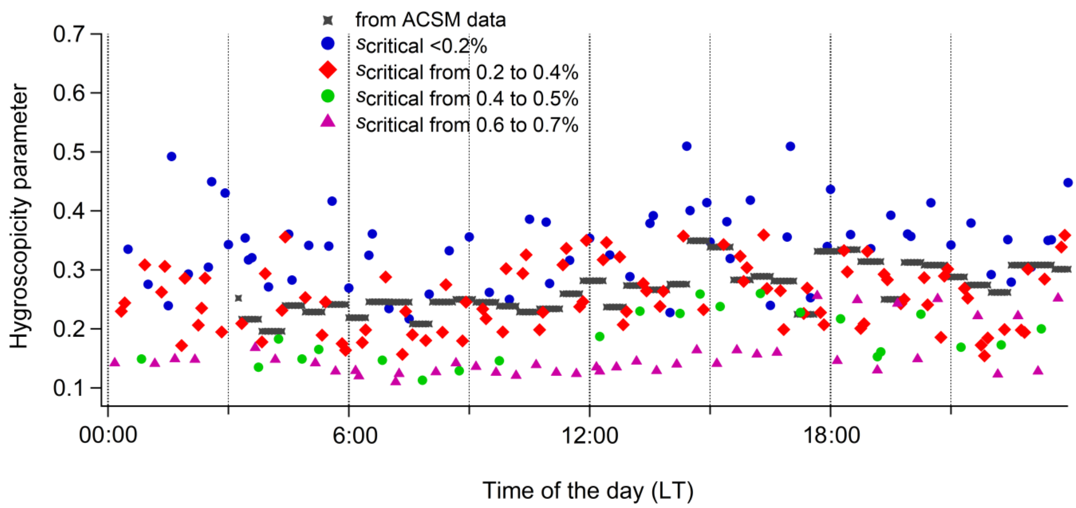

Figure S3. Diurnal evolution of the hygroscopicity parameter (κ) derived from ACSM data (grey rood) and theκ obtained from the CCN counter for critical supersaturation under 0.2% (blue dot), from 0.2 to 0.4% (red rhombus), from 0.4 to 0.5% (green dot), and from 0.6 to 0.73% (purple triangle), respectively on 29 August 2012.

Table S1. Regression statistics for the CCN closure.

Supersaturation, *s* (%) (n=data points)	$\frac{CCN_{estimated}}{CCN_{measured}}$	R^2
0.38 (n=9167)	1.221	0.885
0.52 (n=9581)	1.212	0.892
0.66 (n=9054)	1.117	0.911
0.73 (n=9401)	1.098	0.933

Table S2. Seasonal wind direction, starting time of an NPF event (t_{start}), decoupling time (t_{dec}), R_s and the relative contribution for supersaturations 0.38, 0.52, 0.66, 0.73, and 1.00% determined according to the approach described in the main text. Time is in LT.

	Date	***Dir (º)***	t_{start} ***(LT)***	t_{det} ***(LT)***	$R_{0.38}$ ***(bef)***	$R_{0.38}$ ***(aft)***	***Change (%)***	$R_{0.52}$ ***(bef)***	$R_{0.52}$ ***(aft)***	**Change (%)**	$R_{0.66}$ ***(bef)***	$R_{0.66}$ ***(aft)***	***Change (%)***	$R_{0.73}$ ***(bef)***	$R_{0.73}$ ***(aft)***	***Change (%)***	$R_{1.0}$ ***(bef)***	$R_{1.0}$ ***(aft)***	***Change (%)***
Winter																			
1	4/12/2008	S/SW	11:10	12:05	1.12	1.24	*10.7*	1.1	1.18	*7.3*	1.09	1.18	*8.3*	1.08	1.19	*10.2*	1.07	1.22	*14*
2	13/12/2008	W	10:25	12:55	1.05	2.26	*115.2*	1.08	2.31	*113.9*	1.1	2.24	*103.6*	1.1	2.19	*99.1*	1.1	2.09	*90*
3	26/12/2009	S/SW	12:20	14:55	2.89	8.91	*208.3*	2.9	8.54	*194.5*	3.01	8.19	*172.1*	3.09	8.07	*161.2*	3.76	7.53	*100.3*
4	19/2/2010	W	7:45	16:15	1.4	2.31	*65*	1.42	2.2	*54.9*	1.38	2.04	*47.8*	1.32	1.91	*44.7*	1.32	2	*51.5*
5	26/2/2010	NW	11:30	14:10	1.52	2.16	*42.1*	1.58	2.23	*41.1*	1.58	2.21	*39.9*	1.58	2.2	*39.2*	1.55	2.13	*37.4*
6	3/1/2011	S/SW	14:05	15:55	1.41	1.83	*29.8*	1.4	1.82	*30*	1.4	1.72	*22.9*	1.4	1.78	*27.1*	1.41	1.72	*22*
7	6/1/2011	N	14:45	15:35	1.03	1.08	*4.9*	1.06	1.16	*9.4*	1.06	1.14	*7.5*	1.06	1.13	*6.6*	1.06	1.1	*3.8*
8	17/1/2011	NE	11:10	14:20	0.95	0.96	*1.1*	0.97	1.17	*20.6*	0.98	1.44	*46.9*	1	1.82	*82*	1.03	2.57	*149.5*
9	19/1/2011	N	12:45	17:40	0.84	1.81	*115.5*	0.85	1.73	*103.5*	0.86	1.66	*93*	0.87	1.59	*82.8*	0.89	1.59	*78.7*
10	1/2/2011	N	11:00	17:00	0.96	1.04	*8.3*	0.99	1.43	*44.4*	0.99	1.98	*100*	0.99	2.19	*121.2*	1.06	3.04	*186.8*
11	7/2/2011	E	13:50	14:40	1.45	2.57	*77.2*	1.41	2.51	*78*	1.38	2.58	*87*	1.38	2.64	*91.3*	1.45	2.94	*102.8*

12	10/2/2011	N	11:30	16:30	0.79	0.8	*1.3*	0.83	0.88	*6*	0.85	0.97	*14.1*	0.86	1.02	*18.6*	0.87	1.18	*35.6*
13	11/2/2011	N	10:05	17:15	0.66	1.19	*80.3*	0.64	1.13	*76.6*	0.63	1.04	*65.1*	0.62	0.99	*59.7*	0.62	1.11	*79*
14	1/1/2012	NE	5:45	10:40	1.11	1.75	*57.7*	1.11	1.75	*57.7*	1.12	1.76	*57.1*	1.12	1.72	*53.6*	1.14	1.8	*57.9*
15	26/1/2012	W	4:50	8:05	0.85	0.93	*9.4*	0.87	1.14	*31*	0.88	1.41	*60.2*	0.9	1.79	*98.9*	0.93	1.54	*65.6*
16	21/1/2013	E	11:00	11:50	1.04	1.35	*29.8*	1.01	1.29	*27.7*	1.01	1.26	*24.8*	1	1.25	*25*	1	1.23	*23*
17	23/1/2013	W	10:45	12:10	1.13	1.42	*25.7*	1.12	1.36	*21.4*	1.12	1.33	*18.8*	1.1	1.32	*20*	1.11	1.28	*15.3*
18	8/1/2014	NE	13:10	14:30	1.75	1.94	*10.9*	1.77	1.91	*7.9*	1.78	1.9	*6.7*	1.8	1.89	*5*	1.83	1.92	*4.9*
19	10/1/2014	NW	11:30	12:50	1.14	1.41	*23.7*	1.11	1.33	*19.8*	1.11	1.3	*17.1*	1.1	1.29	*17.3*	1.1	1.33	*20.9*
20	23/1/2014	W	10:05	11:25	1.08	1.66	*53.7*	1.03	1.5	*45.6*	0.99	1.37	*38.4*	0.97	1.37	*41.2*	0.94	1.36	*44.7*
21	30/1/2014	E	11:05	12:15	1.12	1.33	*18.8*	1.09	1.27	*16.5*	1.09	1.24	*13.8*	1.08	1.21	*12*	1.07	1.19	*11.2*
22	22/12/2014	N	9:20	12:30	1.11	1.71	*54.1*	1.11	1.66	*49.5*	1.19	1.65	*38.7*	1.07	1.45	*35.5*	1.1	1.42	*29.1*
23	11/1/2015	NW	11:25	11:50	1.37	2.03	*48.2*	1.46	2.02	*38.4*	1.61	2.14	*32.9*	1.66	2.14	*28.9*	1.75	2.08	*18.9*
24	23/1/2015	S/SW	9:20	10:50	0.77	1.01	*31.2*	0.77	0.99	*28.6*	0.78	1.01	*29.5*	0.78	1.01	*29.5*	0.79	1.01	*27.8*
Spring																			
25	14/3/2009	NW	10:15	12:30	0.96	1.92	*100*	0.99	2.32	*134.3*	1	2.39	*139*	1.05	2.46	*134.3*	1.03	2.3	*123.3*
26	19/3/2009	N	8:50	14:05	1.1	1.72	*56.4*	1.16	2.35	*102.6*	1.21	3.19	*163.6*	1.23	3.5	*184.6*	1.27	4.36	*243.3*
27	30/3/2009	NW	10:35	14:40	0.9	1.02	*13.3*	0.9	1	*11.1*	0.89	0.98	*10.1*	0.89	0.98	*10.1*	0.88	0.97	*10.2*
28	22/5/2009	NE	9:00	10:45	1.01	1.08	*6.9*	0.98	1.01	*3.1*	0.92	0.98	*6.5*	0.9	0.95	*5.6*	0.86	0.92	*7*
29	28/5/2009	NE	8:00	8:35	1.19	1.56	*31.1*	1.17	1.44	*23.1*	1.13	1.38	*22.1*	1.12	1.37	*22.3*	1.09	1.4	*28.4*
30	13/3/2010	W	10:20	11:50	1.09	1.17	*7.3*	1.08	1.13	*4.6*	1.07	1.1	*2.8*	1.07	1.1	*2.8*	1.05	1.06	*1*
31	16/3/2010	N	10:00	12:55	0.98	1.03	*5.1*	0.99	1.06	*7.1*	0.99	1.04	*5.1*	0.99	1.03	*4*	0.99	1	*1*
32	18/3/2010	N	11:15	14:00	1.03	1.11	*7.8*	1.03	1.09	*5.8*	1.01	1.04	*3*	1	1.02	*2*	0.99	1	*1*
33	19/3/2010	N	13:15	16:05	1.2	1.23	*2.5*	1.2	1.27	*5.8*	1.2	1.28	*6.7*	1.2	1.28	*6.7*	1.18	1.25	*5.9*
34	22/3/2010	W	10:50	12:15	0.99	1	*1*	0.98	0.99	*1*	0.98	0.98	*0*	0.98	0.97	*-1*	0.98	0.96	*-2*
35	27/3/2010	N	10:05	12:55	1.03	1.39	*35*	1.08	1.46	*35.2*	1.09	1.39	*27.5*	1.11	1.38	*24.3*	1.11	1.4	*26.1*
36	30/3/2010	NW	11:20	11:30	1.04	1.17	*12.5*	1.08	1.21	*12*	1.03	1.07	*3.9*	1.03	1.04	*1*	1.05	1.03	*-1.9*
37	7/4/2010	NW	9:00	12:15	1.73	1.77	*2.3*	1.71	1.97	*15.2*	1.69	2.18	*29*	1.67	2.27	*35.9*	1.62	2.82	*74.1*
38	8/4/2010	N	11:30	13:30	1	1.37	*37*	0.99	1.29	*30.3*	0.98	1.23	*25.5*	0.97	1.22	*25.8*	0.97	1.19	*22.7*
39	9/4/2010	NE	10:25	12:05	1.24	1.52	*22.6*	1.24	1.49	*20.2*	1.23	1.46	*18.7*	1.29	1.48	*14.7*	1.28	1.49	*16.4*
40	15/4/2010	S/SW	13:00	14:25	0.89	1.05	*18*	0.89	1.06	*19.1*	0.89	1.1	*23.6*	0.9	1.2	*33.3*	0.9	1.52	*68.9*
41	17/4/2010	S/SW	9:50	13:35	2.12	3.43	*61.8*	2.21	3.46	*56.6*	2.16	3.3	*52.8*	2.14	3.22	*50.5*	2.13	3.25	*52.6*
42	29/4/2010	NE	10:15	13:50	0.91	1.23	*35.2*	0.91	1.2	*31.9*	0.91	1.17	*28.6*	0.91	1.16	*27.5*	0.91	1.15	*26.4*
43	1/5/2010	NE	9:25	10:40	1	1.02	*2*	0.97	1	*3.1*	0.91	0.99	*8.8*	0.9	0.98	*8.9*	0.87	0.95	*9.2*
44	30/5/2010	N	7:55	9:40	0.87	0.97	*11.5*	0.88	1.04	*18.2*	0.89	1.09	*22.5*	0.89	1.09	*22.5*	0.89	1.12	*25.8*
45	9/3/2011	NE	10:35	11:50	1.1	1.41	*28.2*	1.11	1.5	*35.1*	1.11	1.48	*33.3*	1.11	1.47	*32.4*	1.08	1.43	*32.4*

46	19/3/2011	W	10:25	12:05	1.3	1.45	*11.5*	1.26	1.38	*9.5*	1.23	1.31	*6.5*	1.22	1.29	*5.7*	1.17	1.27	*8.5*
47	29/3/2011	S/SW	11:55	13:00	1.04	1.36	*30.8*	1.05	1.39	*32.4*	1.06	1.42	*34*	1.07	1.45	*35.5*	1.07	1.5	*40.2*
48	12/4/2011	N	11:00	13:45	1.05	1.69	*61*	1.05	1.58	*50.5*	1.05	1.54	*46.7*	1.06	1.5	*41.5*	1.05	1.44	*37.1*
49	3/5/2011	S/SW	9:40	12:30	1.08	1.36	*25.9*	1.07	1.33	*24.3*	1.07	1.27	*18.7*	1.09	1.27	*16.5*	1.08	1.21	*12*
50	4/5/2011	W	10:30	13:50	2.12	4.01	*89.2*	2.18	3.86	*77.1*	2.17	3.55	*63.6*	2.15	3.43	*59.5*	2.11	2.99	*41.7*
51	14/5/2011	NE	9:25	10:50	1.03	1.08	*4.9*	1	1.03	*3*	0.94	1.02	*8.5*	0.92	1	*8.7*	0.88	0.96	*9.1*
52	25/4/2012	S/SW	12:55	16:10	1.8	3.43	*90.6*	1.8	3.28	*82.2*	1.8	3.38	*87.8*	1.8	3.43	*90.6*	1.81	3.41	*88.4*
53	1/5/2012	NE	9:10	12:05	1.18	1.34	*13.6*	1.17	1.31	*12*	1.17	1.25	*6.8*	1.19	1.26	*5.9*	1.18	1.23	*4.2*
54	14/5/2012	N	8:45	10:55	1.11	1.21	*9*	1.08	1.14	*5.6*	1.02	1.21	*18.6*	1	1.16	*16*	1.06	1.12	*5.7*
55	6/3/2013	N	10:45	12:00	1.13	1.44	*27.4*	1.14	1.53	*34.2*	1.14	1.51	*32.5*	1.14	1.5	*31.6*	1.11	1.46	*31.5*
56	10/3/2013	W	9:35	11:45	1.18	3.6	*205.1*	1.21	3.32	*174.4*	1.2	3.1	*158.3*	1.19	2.73	*129.4*	1.17	2.43	*107.7*
57	13/3/2013	W	9:45	13:15	1.48	3.49	*135.8*	1.53	3.2	*109.2*	1.43	2.79	*95.1*	1.49	2.74	*83.9*	1.46	2.5	*71.2*
58	23/3/2013	NW	8:40	14:50	0.54	0.77	*42.6*	0.54	0.77	*42.6*	0.56	0.78	*39.3*	0.57	0.85	*49.1*	0.59	1.05	*78*
59	24/3/2013	NW	7:40	9:30	1.03	1.8	*74.8*	1.07	1.81	*69.2*	1.05	1.68	*60*	1.06	1.68	*58.5*	1.12	1.69	*50.9*
60	27/3/2013	W	9:10	13:50	1.35	1.8	*33.3*	1.37	1.78	*29.9*	1.36	1.71	*25.7*	1.36	1.68	*23.5*	1.37	1.67	*21.9*
61	5/4/2013	S/SW	10:40	12:20	1.47	2.07	*40.8*	1.46	1.95	*33.6*	1.48	2.01	*35.8*	1.44	1.93	*34*	1.43	1.98	*38.5*
62	19/4/2013	NE	11:00	13:10	1.42	2.33	*64.1*	1.46	2.26	*54.8*	1.51	2.17	*43.7*	1.44	2.07	*43.8*	1.4	2.01	*43.6*
63	21/4/2013	NE	12:10	15:00	1.12	1.54	*37.5*	1.12	1.5	*33.9*	1.06	1.45	*36.8*	1.06	1.45	*36.8*	1.06	1.51	*42.5*
64	1/5/2013	NE	10:35	11:45	1	1.17	*17*	1.01	1.15	*13.9*	1	1.11	*11*	1	1.09	*9*	1	1.09	*9*
65	22/5/2013	NW	12:15	15:30	0.9	1.14	*26.7*	0.92	1.11	*20.7*	0.97	1.11	*14.4*	0.99	1.11	*12.1*	1.12	1.15	*2.7*
66	13/3/2014	NE	12:35	20:05	1.01	1.17	*15.8*	0.99	1.19	*20.2*	0.99	1.3	*31.3*	0.99	1.36	*37.4*	1	1.52	*52*
67	21/3/2014	N	10:00	21:05	0.76	1.96	*157.9*	0.75	2.12	*182.7*	0.75	2.2	*193.3*	0.75	2.21	*194.7*	0.75	2.21	*194.7*
68	23/3/2014	W	8:15	10:15	1.19	1.37	*15.1*	1.19	1.31	*10.1*	1.19	1.27	*6.7*	1.19	1.26	*5.9*	1.22	1.26	*3.3*
69	30/3/2014	N	12:40	13:05	0.38	0.81	*113.2*	0.41	0.82	*100*	0.46	0.83	*80.4*	0.47	0.84	*78.7*	0.53	0.85	*60.4*
70	2/5/2014	S/SW	10:40	13:35	1.12	1.4	*25*	1.1	1.36	*23.6*	1.1	1.3	*18.2*	1.11	1.29	*16.2*	1.11	1.24	*11.7*
71	21/5/2014	N	8:45	10:15	1.05	1.12	*6.7*	1.05	1.12	*6.7*	1.05	1.08	*2.9*	1.04	1.06	*1.9*	1.02	1.03	*1*
72	23/5/2014	NE	8:05	12:30	0.94	1.05	*11.7*	0.92	1.05	*14.1*	0.91	1.05	*15.4*	0.92	1.05	*14.1*	1.05	1.06	*1*
73	25/5/2014	NW	9:40	11:25	0.98	1.14	*16.3*	0.97	1.13	*16.5*	0.95	1.14	*20*	0.95	1.15	*21.1*	0.95	1.13	*18.9*
74	26/5/2014	S/SW	9:15	11:40	0.85	1.03	*21.2*	0.86	1.05	*22.1*	0.92	1.07	*16.3*	0.96	1.08	*12.5*	1.1	1.2	*9.1*
75	30/4/2015	W	7:15	9:35	1.11	3	*170.3*	1.07	3.06	*186*	1.06	3.12	*194.3*	1.07	3.16	*195.3*	1.11	3.27	*194.6*
76	2/5/2015	NW	8:55	10:15	1.04	1.3	*25*	1.07	1.31	*22.4*	1.06	1.33	*25.5*	1.06	1.36	*28.3*	1.07	1.51	*41.1*
Summer																			
77	9/6/2008	W	9:45	14:45	1.71	2.42	*41.5*	1.67	2.24	*34.1*	1.67	2.12	*26.9*	1.67	2.09	*25.1*	1.68	2.02	*20.2*
78	15/6/2008	NW	7:40	9:50	0.97	1.19	*22.7*	0.96	1.17	*21.9*	0.96	1.14	*18.8*	0.96	1.12	*16.7*	1	1.09	*9*
79	16/6/2008	N	8:40	10:20	1.15	1.85	*60.9*	1.1	1.68	*52.7*	1.09	1.63	*49.5*	1.09	1.61	*47.7*	1.1	1.58	*43.6*

80	20/6/2008	NW	7:25	12:05	2.08	3.87	*86.1*	2.05	3.67	*79*	2.02	3.55	*75.7*	2.02	3.53	*74.8*	2	3.47	*73.5*
81	24/7/2008	NW	8:45	9:30	1	1.23	*23*	0.98	1.17	*19.4*	0.97	1.14	*17.5*	0.97	1.16	*19.6*	0.96	1.16	*20.8*
82	25/7/2008	NW	7:50	11:00	1.06	1.51	*42.5*	1.05	1.36	*29.5*	1.05	1.27	*21*	1.04	1.24	*19.2*	1.03	1.15	*11.7*
83	26/7/2008	NW	6:50	9:50	1.02	1.58	*54.9*	1.02	1.52	*49*	1.02	1.5	*47.1*	1.02	1.49	*46.1*	1.05	1.5	*42.9*
84	30/7/2008	N	9:55	12:40	1.22	1.56	*27.9*	1.23	1.65	*34.1*	1.22	1.7	*39.3*	1.21	1.73	*43*	1.2	1.76	*46.7*
85	15/6/2009	NE	10:35	14:10	0.93	1.66	*78.5*	0.91	1.6	*75.8*	0.89	1.57	*76.4*	0.89	1.57	*76.4*	0.88	1.59	*80.7*
86	19/6/2009	NE	11:05	13:45	1.06	1.31	*23.6*	1.05	1.26	*20*	1.03	1.25	*21.4*	1.02	1.26	*23.5*	0.99	1.32	*33.3*
87	21/6/2009	S/SW	10:00	12:45	0.79	0.66	*-16.5*	0.78	0.63	*-19.2*	0.77	0.63	*-18.2*	0.77	0.63	*-18.2*	0.77	0.64	*-16.9*
88	22/7/2009	N	8:50	14:25	0.93	1.51	*62.4*	0.93	1.65	*77.4*	0.92	1.76	*91.3*	0.92	1.81	*96.7*	0.9	1.88	*108.9*
89	29/7/2009	N	10:55	12:05	1.06	1.25	*17.9*	1.05	1.24	*18.1*	1.02	1.24	*21.6*	1.02	1.25	*22.5*	1.04	1.27	*22.1*
90	7/6/2010	N	11:05	12:20	1.04	1.75	*68.3*	1.03	2	*94.2*	1.01	2.17	*114.9*	1.01	2.21	*118.8*	1	2.32	*132*
91	5/7/2010	N	9:10	15:15	1.1	1.16	*5.5*	1.1	1.13	*2.7*	1.09	1.12	*2.8*	1.09	1.11	*1.8*	1.08	1.11	*2.8*
92	24/7/2010	N	9:00	10:35	0.98	0.99	*1*	0.97	0.93	*-4.1*	0.96	0.92	*-4.2*	0.96	0.91	*-5.2*	0.95	0.91	*-4.2*
93	18/8/2010	NW	8:20	9:55	1.52	1.9	*25*	1.5	1.75	*16.7*	1.46	1.62	*11*	1.43	1.56	*9.1*	1.46	1.53	*4.8*
94	30/8/2010	W	10:40	12:30	1.42	2.02	*42.3*	1.41	1.9	*34.8*	1.43	1.96	*37.1*	1.39	1.88	*35.3*	1.38	1.93	*39.9*
95	27/6/2011	N	10:15	12:40	1.03	1.41	*36.9*	1.03	1.32	*28.2*	1.02	1.28	*25.5*	1.01	1.26	*24.8*	1	1.18	*18*
96	11/7/2011	NE	9:45	10:55	1.11	1.3	*17.1*	1.09	1.28	*17.4*	1.08	1.29	*19.4*	1.07	1.29	*20.6*	1.03	1.28	*24.3*
97	16/7/2011	NE	8:25	10:55	1.13	1.58	*39.8*	1.12	1.62	*44.6*	1.1	1.68	*52.7*	1.1	1.71	*55.5*	1.12	1.81	*61.6*
98	18/7/2011	NE	8:20	9:55	0.95	0.98	*3.2*	0.92	0.94	*2.2*	0.92	0.93	*1.1*	0.91	0.93	*2.2*	0.9	0.91	*1.1*
99	22/7/2011	NW	7:15	9:05	0.86	0.95	*10.5*	0.85	1.02	*20*	0.86	1.07	*24.4*	0.86	1.05	*22.1*	0.87	1.03	*18.4*
100	26/7/2011	W	8:45	13:20	0.88	1.45	*64.8*	0.88	1.59	*80.7*	0.87	1.7	*95.4*	0.87	1.74	*100*	0.86	1.8	*109.3*
101	14/6/2012	W	9:25	11:25	0.97	1.5	*54.6*	0.95	1.48	*55.8*	0.93	1.46	*57*	0.94	1.47	*56.4*	0.94	1.5	*59.6*
102	16/6/2012	NE	8:50	9:40	0.95	0.99	*4.2*	0.94	0.99	*5.3*	0.94	1.02	*8.5*	0.94	1.03	*9.6*	0.94	1.05	*11.7*
103	17/6/2012	S/SW	8:25	15:20	0.9	1.09	*21.1*	0.88	1.21	*37.5*	0.87	1.29	*48.3*	0.87	1.33	*52.9*	0.85	1.48	*74.1*
104	18/6/2012	NE	8:20	10:25	1.01	1.35	*33.7*	0.99	1.26	*27.3*	0.98	1.19	*21.4*	0.98	1.17	*19.4*	0.96	1.13	*17.7*
105	19/6/2012	N	11:00	12:40	1.06	1.16	*9.4*	1.06	1.17	*10.4*	1.05	1.16	*10.5*	1.05	1.16	*10.5*	1.03	1.15	*11.7*
106	24/6/2012	NE	8:55	11:15	1.02	1.1	*7.8*	1.01	1.08	*6.9*	1	1.06	*6*	1	1.05	*5*	1	1.05	*5*
107	27/6/2012	N	6:45	9:50	1.01	1.66	*64.4*	1.01	1.66	*64.4*	1.02	1.76	*72.5*	1.02	1.83	*79.4*	1.04	1.91	*83.7*
108	29/6/2012	NE	9:50	10:30	1.02	1.4	*37.3*	1.03	1.45	*40.8*	1.01	1.4	*38.6*	1.01	1.4	*38.6*	1	1.41	*41*
109	19/7/2012	W	9:05	10:45	0.92	1.31	*42.4*	0.91	1.35	*48.4*	0.91	1.46	*60.4*	0.9	1.5	*66.7*	0.9	1.62	*80*
110	31/7/2012	NE	8:40	10:05	1.05	1.06	*1*	1.04	1.07	*2.9*	1.03	1.13	*9.7*	1.02	1.16	*13.7*	1.03	1.3	*26.2*
111	1/8/2012	NE	8:30	9:10	1.08	1.69	*56.5*	1.09	1.61	*47.7*	1.09	1.57	*44*	1.09	1.57	*44*	1.08	1.52	*40.7*
112	19/8/2012	N	9:15	13:45	0.65	0.76	*16.9*	0.67	0.89	*32.8*	0.69	0.98	*42*	0.69	1.06	*53.6*	0.71	1.19	*67.6*
113	20/8/2012	N	7:20	16:55	0.22	0.35	*59.1*	0.24	0.39	*62.5*	0.27	0.45	*66.7*	0.28	0.47	*67.9*	0.32	0.54	*68.8*
114	25/8/2012	NE	9:15	11:00	1.16	2.21	*90.5*	1.15	2.21	*92.2*	1.13	2.18	*92.9*	1.12	2.18	*94.6*	1.14	2.18	*91.2*

115	29/8/2012	N	8:30	13:30	0.94	1.09	*16*	1.02	1.21	*18.6*	1.04	1.25	*20.2*	1.03	1.26	*22.3*	0.99	1.39	*40.4*
116	30/8/2012	NE	8:30	13:40	0.85	1.47	*72.9*	0.92	1.56	*69.6*	0.85	1.43	*68.2*	0.85	1.42	*67.1*	0.86	1.37	*59.3*
117	31/8/2012	N	10:10	11:15	1.08	1.66	*53.7*	1.03	1.5	*45.6*	0.99	1.37	*38.4*	0.97	1.37	*41.2*	0.94	1.36	*44.7*
118	26/6/2013	N	9:20	11:50	0.99	1.37	*38.4*	0.99	1.28	*29.3*	0.98	1.24	*26.5*	0.98	1.23	*25.5*	0.98	1.19	*21.4*
119	23/7/2013	N	8:30	14:55	0.81	1.48	*82.7*	0.81	1.55	*91.4*	0.8	1.6	*100*	0.81	1.63	*101.2*	0.82	1.73	*111*
120	24/7/2013	N	8:40	11:10	1.15	1.6	*39.1*	1.14	1.64	*43.9*	1.13	1.71	*51.3*	1.13	1.74	*54*	1.13	1.83	*61.9*
121	28/7/2013	NE	9:25	12:00	0.92	1.65	*79.3*	0.9	1.68	*86.7*	0.89	1.7	*91*	0.89	1.7	*91*	0.9	1.76	*95.6*
122	30/7/2013	NE	9:40	11:00	1.08	1.27	*17.6*	1.07	1.26	*17.8*	1.05	1.27	*21*	1.05	1.28	*21.9*	1.05	1.3	*23.8*
123	2/8/2013	NE	9:35	10:40	0.81	0.94	*16*	0.8	0.95	*18.8*	0.79	1.02	*29.1*	0.79	1.04	*31.6*	0.79	1.11	*40.5*
124	4/8/2013	NE	8:35	10:45	1.1	1.79	*62.7*	1.08	1.64	*51.9*	1.06	1.56	*47.2*	1.05	1.53	*45.7*	1.04	1.5	*44.2*
125	6/8/2013	NE	8:45	10:10	0.97	1.18	*21.6*	0.96	1.09	*13.5*	0.95	1.03	*8.4*	0.94	1.02	*8.5*	0.93	1.02	*9.7*
126	24/6/2014	N	9:30	13:25	1.08	1.15	*6.5*	1.06	1.1	*3.8*	1.04	1.11	*6.7*	1.03	1.12	*8.7*	1.02	1.16	*13.7*
Autumn																			
127	9/9/2008	N	10:00	15:25	0.99	1.08	*9.1*	0.97	1.05	*8.2*	0.95	1.05	*10.5*	0.95	1.06	*11.6*	0.95	1.1	*15.8*
128	10/9/2008	NE	10:05	14:45	0.97	0.85	*-12.4*	0.97	0.93	*-4.1*	0.96	1.1	*14.6*	0.95	1.16	*22.1*	0.95	1.32	*38.9*
129	12/9/2008	N	9:45	14:55	0.98	1	*2*	0.96	0.95	*-1*	0.95	0.92	*-3.2*	0.95	0.91	*-4.2*	0.94	0.9	*-4.3*
130	23/9/2008	NW	9:20	12:55	1.05	1.99	*89.5*	1.03	2.07	*101*	1.01	2.15	*112.9*	1	2.18	*118*	1.02	2.28	*123.5*
131	7/10/2008	N	10:30	13:35	1.29	1.59	*23.3*	1.26	1.51	*19.8*	1.21	1.5	*24*	1.21	1.53	*26.4*	1.24	1.73	*39.5*
132	12/10/2008	NE	10:20	13:20	0.96	1.39	*44.8*	0.96	2.13	*121.9*	0.96	2.68	*179.2*	0.97	3.11	*220.6*	1	4.19	*319*
133	13/10/2008	NE	12:30	16:10	0.93	1.06	*14*	0.93	1.06	*14*	0.92	1.07	*16.3*	0.91	1.07	*17.6*	0.91	1.22	*34.1*
134	25/10/2008	N	13:05	17:00	1.07	1.49	*39.3*	1.08	1.51	*39.8*	1.09	1.55	*42.2*	1.09	1.58	*45*	1.09	1.68	*54.1*
135	24/11/2008	W	12:00	14:45	1.3	1.39	*6.9*	1.29	1.33	*3.1*	1.26	1.3	*3.2*	1.25	1.29	*3.2*	1.26	1.34	*6.3*
136	5/10/2009	NW	7:40	17:00	1.63	5.4	*231.3*	1.65	5.15	*212.1*	1.65	5	*203*	1.66	4.97	*199.4*	1.68	4.87	*189.9*
137	18/10/2009	E	8:05	9:35	1.14	1.98	*73.7*	1.2	2.13	*77.5*	1.25	2.28	*82.4*	1.27	2.35	*85*	1.37	2.95	*115.3*
138	19/10/2009	S/SW	9:20	11:45	1.16	1.27	*9.5*	1.17	1.22	*4.3*	1.14	1.19	*4.4*	1.14	1.18	*3.5*	1.14	1.17	*2.6*
139	20/10/2009	S/SW	9:35	11:35	0.92	0.96	*4.3*	0.9	1.01	*12.2*	0.9	1.1	*22.2*	0.9	1.25	*38.9*	0.91	1.59	*74.7*
140	24/9/2010	S/SW	8:30	12:35	1.08	1.26	*16.7*	1.07	1.27	*18.7*	1.07	1.3	*21.5*	1.08	1.35	*25*	1.09	1.38	*26.6*
141	6/10/2010	N	8:20	10:00	1.03	1.09	*5.8*	1.02	1.03	*1*	1.01	1.02	*1*	1.01	1.01	*0*	1.01	1	*-1*
142	9/10/2010	N	11:25	15:45	1.12	1.54	*37.5*	1.17	1.57	*34.2*	1.18	1.53	*29.7*	1.18	1.51	*28*	1.14	1.42	*24.6*
143	12/10/2010	S/SW	9:55	10:25	1.03	1.5	*45.6*	1.04	1.53	*47.1*	1.04	1.55	*49*	1.04	1.57	*51*	1.06	1.59	*50*
144	15/10/2010	S/SW	12:25	15:50	1.04	2.26	*117.3*	1.18	2.47	*109.3*	1.16	2.86	*146.6*	1.19	2.97	*149.6*	1.27	3.9	*207.1*
145	28/10/2010	W	8:50	11:50	0.96	1.37	*42.7*	1.03	1.49	*44.7*	1.05	1.51	*43.8*	1.06	1.59	*50*	1.07	1.64	*53.3*
146	1/11/2011	N	11:20	17:45	1.11	1.63	*46.8*	1.1	1.59	*44.5*	1.1	1.69	*53.6*	1.1	1.7	*54.5*	1.14	1.71	*50*
147	10/11/2011	N	6:35	9:40	0.92	1.35	*46.7*	0.92	1.33	*44.6*	0.92	1.31	*42.4*	0.97	1.31	*35.1*	1	1.29	*29*
148	13/11/2011	NW	5:35	8:45	1.13	1.67	*47.8*	1.12	1.61	*43.8*	1.12	1.59	*42*	1.12	1.38	*23.2*	1.15	1.39	*20.9*

149	9/9/2012	W	9:20	11:35	1.04	1.65	*58.7*	1.04	1.55	*49*	1.02	1.43	*40.2*	1.02	1.4	*37.3*	0.99	1.35	*36.4*
150	20/9/2012	W	9:00	11:20	1.03	1.39	*35*	1.02	1.37	*34.3*	1.02	1.39	*36.3*	1.02	1.39	*36.3*	1.02	1.4	*37.3*
151	22/9/2012	NW	9:35	12:45	0.88	1.04	*18.2*	0.87	0.91	*4.6*	0.87	0.87	*0*	0.87	0.83	*-4.6*	0.86	0.77	*-10.5*
152	3/11/2012	S/SW	8:25	10:10	1.24	2.41	*94.4*	1.22	2.01	*64.8*	1.23	1.84	*49.6*	1.24	1.8	*45.2*	1.31	1.76	*34.4*
153	10/11/2012	N	12:50	14:55	1.85	1.98	*7*	1.87	1.97	*5.3*	1.88	1.94	*3.2*	1.9	1.92	*1.1*	1.93	1.97	*2.1*
154	21/11/2012	S/SW	10:30	13:30	1.45	2.07	*42.8*	1.52	2.4	*57.9*	1.55	3.25	*109.7*	1.58	3.83	*142.4*	1.71	6.29	*267.8*
155	18/10/2013	NW	9:00	10:20	1.22	1.74	*42.6*	1.25	1.67	*33.6*	1.26	1.74	*38.1*	1.25	1.78	*42.4*	1.21	2.22	*83.5*
156	20/10/2013	N	9:25	10:00	0.98	1.18	*20.4*	0.98	1.08	*10.2*	0.97	1	*3.1*	0.96	0.98	*2.1*	0.96	0.97	*0.9*
157	8/11/2013	NE	10:00	11:05	1.3	2.24	*72.3*	1.25	1.67	*33.6*	1.18	1.31	*11*	1.16	1.24	*6.9*	1.11	1.12	*0.9*
158	12/9/2014	N	9:15	15:55	0.53	0.85	*60.4*	0.55	0.85	*54.5*	0.55	0.85	*54.5*	0.57	0.85	*49.1*	0.61	0.85	*39.3*
159	19/10/2014	N	6:35	9:35	1.11	1.52	*36.9*	1.11	1.51	*36*	1.12	1.48	*32.1*	1.12	1.47	*31.3*	1.14	1.51	*32.5*
160	20/10/2014	N	9:10	14:30	1.06	1.52	*43.4*	1.11	1.64	*47.7*	1.11	1.9	*71.2*	1.12	2.07	*84.8*	1.12	2.64	*135.7*
161	1/11/2014	NE	9:10	14:00	1.26	3.18	*152.4*	1.24	3.95	*218.5*	1.25	4.58	*266.4*	1.26	4.83	*283.3*	1.22	5.31	*335.2*
162	14/11/2014	NW	8:40	10:20	0.82	1.14	*39*	0.79	1.05	*32.9*	0.8	1.01	*26.3*	0.89	0.98	*10.1*	0.88	0.97	*10.2*

Table S3. Average of estimated s_{max} (maximum supersaturation in the cloud), and N_d (the potential droplet number concentration) calculated according to the approach described in the main text. Two probability density functions (PDFs) of the characteristic updraft velocity are used with σ_w=0.3 m s^{-1} and σ_w=0.6 m s^{-1}. Time is in LT.

				σ_w = 0.3 m s^{-1}						σ_w = 0.6 m s^{-1}					
	Date	***t_{det} (LT)***	***t_{Nd} (LT)***	***Nd (cm^{-3}) (bef)***	***Nd (cm^{-3})(aft)***	***Change (%)***	***S_{max} (%) (bef)***	***S_{max} (%) (aft)***	***Change (%)***	***Nd (cm^{-3}) (bef)***	***Nd (cm^{-3})(aft)***	**Change (%)**	***S_{max} (%) (bef)***	***S_{max} (%) (aft)***	***Change (%)***
Winter															
1	4/12/2008	12:05	15:05	480	493	*2.7*	0.06	0.06	*0.0*	854	856	*0.2*	0.08	0.08	*0.0*
2	13/12/2008	12:55	16:15	162	236	*45.7*	0.19	0.17	*-10.5*	215	346	*60.9*	0.29	0.24	*-17.2*
3	26/12/2009	14:55	15:35	213	294	*38.0*	0.18	0.16	*-11.1*	307	418	*36.2*	0.09	0.07	*-22.2*
4	19/2/2010	16:15	17:45	368	395	*7.3*	0.13	0.11	*-15.4*	522	631	*20.9*	0.21	0.19	*-9.5*
5	26/2/2010	14:10	18:40	292	305	*4.5*	0.15	0.14	*-6.7*	440	462	*5.0*	0.21	0.20	*-4.8*
6	3/1/2011	15:55	19:50	285	299	*4.9*	0.14	0.13	*-7.1*	408	439	*7.6*	0.21	0.20	*-4.8*
7	6/1/2011	15:35	17:20	190	227	*19.5*	0.20	0.19	*-5.0*	275	344	*25.1*	0.29	0.27	*-6.9*
8	17/1/2011	14:20	17:50	288	314	*9.0*	0.15	0.14	*-6.7*	415	456	*9.9*	0.21	0.19	*-9.5*
9	19/1/2011	17:40	18:10	236	338	*43.2*	0.18	0.15	*-16.7*	336	507	*50.9*	0.25	0.20	*-20.0*

10	1/2/2011	17:00	18:15	255	270	*5.9*	0.17	0.16	*-5.9*	365	390	*6.8*	0.25	0.24	*-4.0*
11	7/2/2011	14:40	15:10	473	483	*2.1*	0.13	0.11	*-15.4*	698	813	*16.5*	0.16	0.15	*-6.3*
12	10/2/2011	16:30	17:25	458	484	*5.7*	0.12	0.10	*-16.7*	657	824	*25.4*	0.16	0.15	*-6.3*
13	11/2/2011	17:15	18:20	331	452	*36.6*	0.14	0.13	*-7.1*	507	617	*21.7*	0.20	0.18	*-10.0*
14	1/1/2012	10:40	11:55	483	511	*5.8*	0.13	0.11	*-15.4*	852	911	*6.9*	0.19	0.17	*-10.5*
15	26/1/2012	8:05	9:15	441	473	*7.3*	0.10	0.09	*-10.0*	633	749	*18.3*	0.18	0.16	*-11.1*
16	21/1/2013	11:50	17:50	446	464	*4.0*	0.11	0.10	*-9.1*	696	715	*2.7*	0.15	0.13	*-13.3*
17	23/1/2013	12:10	14:55	476	497	*4.4*	0.12	0.11	*-8.3*	823	849	*3.2*	0.17	0.16	*-5.9*
18	8/1/2014	14:30	17:35	308	342	*11.0*	0.14	0.13	*-7.1*	611	723	*18.3*	0.19	0.18	*-5.3*
19	10/1/2014	12:50	15:55	436	487	*11.7*	0.13	0.11	*-15.4*	573	689	*20.2*	0.22	0.20	*-9.1*
20	23/1/2014	11:25	16:05	361	395	*9.4*	0.12	0.11	*-8.3*	459	527	*14.8*	0.21	0.19	*-9.5*
21	30/1/2014	12:15	15:45	451	484	*7.3*	0.15	0.14	*-6.7*	572	651	*13.8*	0.19	0.18	*-5.3*
22	22/12/2014	12:30	17:50	293	315	*7.5*	0.16	0.15	*-6.3*	457	495	*8.3*	0.22	0.21	*-4.5*
23	11/1/2015	11:50	16:20	300	312	*4.0*	0.12	0.11	*-8.3*	464	477	*2.8*	0.19	0.18	*-5.3*
24	23/1/2015	10:50	11:45	492	516	*4.9*	0.06	0.05	*-16.7*	876	925	*5.6*	0.08	0.07	*-12.5*
Spring															
25	14/3/2009	12:30	17:20	441	490	*11.1*	0.14	0.13	*-7.1*	583	659	*13.0*	0.18	0.17	*-5.6*
26	19/3/2009	14:05	17:35	462	491	*6.3*	0.15	0.14	*-6.7*	547	631	*15.4*	0.20	0.19	*-5.0*
27	30/3/2009	14:40	15:20	485	507	*4.5*	0.06	0.05	*-16.7*	874	923	*5.6*	0.08	0.07	*-12.5*
28	22/5/2009	10:45	15:20	469	493	*5.1*	0.12	0.10	*-16.7*	614	679	*10.6*	0.16	0.15	*-6.3*
29	28/5/2009	8:35	9:25	429	452	*5.4*	0.10	0.09	*-10.0*	625	779	*24.6*	0.15	0.13	*-13.3*
30	13/3/2010	11:50	12:35	311	315	*1.3*	0.13	0.13	*0.0*	473	481	*1.7*	0.19	0.18	*-5.3*
31	16/3/2010	12:55	15:15	367	388	*5.7*	0.14	0.14	*0.0*	497	501	*0.8*	0.19	0.18	*-5.3*
32	18/3/2010	14:00	15:20	348	380	*9.2*	0.14	0.14	*0.0*	459	471	*2.6*	0.20	0.19	*-5.0*
33	19/3/2010	16:05	17:45	413	467	*13.1*	0.16	0.15	*-6.3*	596	678	*13.8*	0.21	0.19	*-9.5*
34	22/3/2010	12:15	16:50	457	463	*1.3*	0.11	0.12	*9.1*	620	763	*23.1*	0.15	0.16	*6.7*
35	27/3/2010	12:55	17:25	316	320	*1.3*	0.13	0.13	*0.0*	476	482	*1.3*	0.19	0.18	*-5.3*
36	30/3/2010	11:30	12:15	246	297	*20.7*	0.14	0.12	*-14.3*	365	443	*21.4*	0.19	0.17	*-10.5*
37	7/4/2010	12:15	15:55	278	287	*3.2*	0.16	0.15	*-6.3*	398	414	*4.0*	0.22	0.21	*-4.5*
38	8/4/2010	13:30	14:25	355	439	*23.7*	0.13	0.10	*-23.1*	497	652	*31.2*	0.17	0.15	*-11.8*
39	9/4/2010	12:05	16:20	348	397	*14.1*	0.14	0.12	*-14.3*	479	531	*10.9*	0.19	0.17	*-10.5*
40	15/4/2010	14:25	16:40	310	325	*4.8*	0.11	0.09	*-18.2*	380	433	*13.9*	0.16	0.14	*-12.5*
41	17/4/2010	13:35	14:40	260	344	*32.3*	0.12	0.09	*-25.0*	384	607	*58.1*	0.16	0.13	*-18.8*
42	29/4/2010	13:50	15:05	379	463	*22.2*	0.13	0.12	*-7.7*	561	663	*18.2*	0.17	0.16	*-5.9*
43	1/5/2010	10:40	15:15	437	450	*3.0*	0.11	0.10	*-9.1*	639	691	*8.1*	0.15	0.14	*-6.7*

44	30/5/2010	9:40	14:30	337	368	*9.2*	0.10	0.09	*-10.0*	451	548	*21.5*	0.14	0.13	*-7.1*
45	9/3/2011	11:50	14:10	267	341	*27.7*	0.14	0.13	*-7.1*	386	471	*22.0*	0.21	0.20	*-4.8*
46	19/3/2011	12:05	14:30	284	310	*9.2*	0.14	0.14	*0.0*	466	509	*9.2*	0.19	0.19	*0.0*
47	29/3/2011	13:00	15:15	274	323	*17.9*	0.12	0.12	*0.0*	404	443	*9.7*	0.17	0.16	*-5.9*
48	12/4/2011	13:45	19:25	336	483	*43.8*	0.14	0.12	*-14.3*	503	652	*29.6*	0.19	0.16	*-15.8*
49	3/5/2011	12:30	17:05	432	479	*10.9*	0.15	0.13	*-13.3*	567	631	*11.3*	0.20	0.19	*-5.0*
50	4/5/2011	13:50	14:45	176	273	*55.1*	0.17	0.14	*-17.6*	268	409	*52.6*	0.23	0.19	*-17.4*
51	14/5/2011	10:50	13:45	336	361	*7.4*	0.13	0.12	*-7.7*	528	601	*13.8*	0.18	0.17	*-5.6*
52	25/4/2012	16:10	17:25	335	389	*16.1*	0.15	0.14	*-6.7*	563	648	*15.1*	0.22	0.21	*-4.5*
53	1/5/2012	12:05	16:35	418	441	*5.5*	0.11	0.10	*-9.1*	601	697	*16.0*	0.18	0.17	*-5.6*
54	14/5/2012	10:55	15:25	406	431	*6.2*	0.12	0.10	*-16.7*	582	656	*12.7*	0.19	0.18	*-5.3*
55	6/3/2013	12:00	17:20	234	243	*3.8*	0.18	0.17	*-5.6*	364	367	*0.8*	0.25	0.24	*-4.0*
56	10/3/2013	11:45	14:25	176	260	*47.7*	0.19	0.15	*-21.1*	269	435	*61.7*	0.26	0.19	*-26.9*
57	13/3/2013	13:15	16:05	214	252	*17.8*	0.17	0.16	*-5.9*	347	416	*19.9*	0.23	0.21	*-8.7*
58	23/3/2013	14:50	18:20	223	240	*7.6*	0.19	0.18	*-5.3*	366	394	*7.7*	0.25	0.24	*-4.0*
59	24/3/2013	9:30	18:05	300	379	*26.3*	0.14	0.13	*-7.1*	508	614	*20.9*	0.19	0.17	*-10.5*
60	27/3/2013	13:50	15:45	384	419	*9.1*	0.11	0.10	*-9.1*	632	698	*10.4*	0.17	0.16	*-5.9*
61	5/4/2013	12:20	15:10	236	254	*7.6*	0.13	0.12	*-7.7*	380	421	*10.8*	0.18	0.17	*-5.6*
62	19/4/2013	13:10	14:00	435	462	*6.2*	0.12	0.09	*-25.0*	600	758	*26.3*	0.18	0.15	*-16.7*
63	21/4/2013	15:00	17:15	469	492	*4.9*	0.09	0.08	*-11.1*	774	813	*5.0*	0.15	0.13	*-13.3*
64	1/5/2013	11:45	19:10	432	442	*2.3*	0.07	0.06	*-14.3*	751	756	*0.7*	0.10	0.09	*-10.0*
65	22/5/2013	15:30	17:15	228	241	*5.7*	0.11	0.10	*-9.1*	346	356	*2.9*	0.15	0.14	*-6.7*
66	13/3/2014	20:05	21:35	546	558	*2.2*	0.12	0.12	*0.0*	983	1006	*2.3*	0.16	0.16	*0.0*
67	21/3/2014	21:05	21:45	453	464	*2.4*	0.13	0.13	*0.0*	588	622	*5.8*	0.17	0.17	*0.0*
68	23/3/2014	10:15	15:50	493	503	*2.0*	0.09	0.08	*-11.1*	897	920	*2.6*	0.13	0.12	*-7.7*
69	30/3/2014	13:05	18:15	322	327	*1.6*	0.16	0.15	*-6.3*	486	517	*6.4*	0.21	0.20	*-4.8*
70	2/5/2014	13:35	15:20	316	378	*19.6*	0.12	0.11	*-8.3*	455	502	*10.3*	0.15	0.15	*0.0*
71	21/5/2014	10:15	16:50	440	456	*3.6*	0.09	0.08	*-11.1*	732	787	*7.5*	0.13	0.13	*0.0*
72	23/5/2014	12:30	15:40	418	427	*2.2*	0.10	0.09	*-10.0*	741	745	*0.5*	0.14	0.13	*-7.1*
73	25/5/2014	11:25	12:50	264	307	*16.3*	0.14	0.12	*-14.3*	356	434	*21.9*	0.18	0.16	*-11.1*
74	26/5/2014	11:40	16:25	350	379	*8.3*	0.07	0.06	*-14.3*	567	621	*9.5*	0.12	0.11	*-8.3*
75	30/4/2015	9:35	11:05	365	419	*14.8*	0.12	0.10	*-16.7*	450	623	*38.4*	0.16	0.15	*-6.3*
76	2/5/2015	10:15	12:20	384	417	*8.6*	0.12	0.10	*-16.7*	504	656	*30.2*	0.16	0.15	*-6.3*
Summer															
77	9/6/2008	14:45	17:00	458	521	*13.8*	0.05	0.03	*-40.0*	836	856	*2.4*	0.07	0.05	*-28.6*

78	15/6/2008	9:50	14:25	378	387	*2.4*	0.07	0.07	*0.0*	594	602	*1.3*	0.12	0.11	*-8.3*	
79	16/6/2008	10:20	16:20	424	478	*12.7*	0.07	0.05	*-28.6*	770	878	*14.0*	0.09	0.07	*-22.2*	
80	20/6/2008	12:05	16:25	434	476	*9.7*	0.06	0.05	*-16.7*	794	881	*11.0*	0.08	0.06	*-25.0*	
81	24/7/2008	9:30	13:40	376	432	*14.9*	0.11	0.09	*-18.2*	532	729	*37.0*	0.14	0.12	*-14.3*	
82	25/7/2008	11:00	12:30	422	432	*2.4*	0.10	0.10	*0.0*	645	754	*16.9*	0.14	0.13	*-7.1*	
83	26/7/2008	9:50	13:40	442	456	*3.2*	0.08	0.07	*-12.5*	811	855	*5.4*	0.11	0.09	*-18.2*	
84	30/7/2008	12:40	16:20	446	457	*2.5*	0.07	0.06	*-14.3*	781	794	*1.7*	0.10	0.09	*-10.0*	
85	15/6/2009	14:10	15:40	412	445	*8.0*	0.09	0.08	*-11.1*	745	829	*11.3*	0.13	0.11	*-15.4*	
86	19/6/2009	13:45	15:20	279	329	*17.9*	0.12	0.12	*0.0*	453	498	*9.9*	0.16	0.15	*-6.3*	
87	21/6/2009	12:45	16:20	389	408	*4.9*	0.07	0.07	*0.0*	692	710	*2.6*	0.11	0.10	*-9.1*	
88	22/7/2009	14:25	17:00	370	403	*8.9*	0.10	0.09	*-10.0*	510	647	*26.9*	0.14	0.13	*-7.1*	
89	29/7/2009	12:05	15:55	452	494	*9.3*	0.09	0.08	*-11.1*	764	853	*11.6*	0.10	0.09	*-10.0*	
90	7/6/2010	12:20	13:00	441	453	*2.7*	0.08	0.07	*-12.5*	761	805	*5.8*	0.13	0.12	*-7.7*	
91	5/7/2010	15:15	19:25	424	431	*1.7*	0.06	0.06	*0.0*	718	728	*1.4*	0.09	0.09	*0.0*	
92	24/7/2010	10:35	14:00	399	412	*3.3*	0.06	0.05	*-16.7*	712	732	*2.8*	0.08	0.07	*-12.5*	
93	18/8/2010	9:55	10:45	361	380	*5.3*	0.07	0.06	*-14.3*	639	680	*6.4*	0.11	0.09	*-18.2*	
94	30/8/2010	12:30	14:30	310	333	*7.4*	0.11	0.10	*-9.1*	664	702	*5.7*	0.13	0.12	*-7.7*	
95	27/6/2011	12:40	14:15	419	441	*5.3*	0.10	0.09	*-10.0*	671	722	*7.6*	0.14	0.13	*-7.1*	
96	11/7/2011	10:55	12:05	406	421	*3.7*	0.09	0.08	*-11.1*	622	703	*13.0*	0.14	0.13	*-7.1*	
97	16/7/2011	10:55	12:30	382	397	*3.9*	0.10	0.10	*0.0*	502	569	*13.3*	0.12	0.11	*-8.3*	
98	18/7/2011	9:55	12:15	393	417	*6.1*	0.08	0.07	*-12.5*	701	757	*8.0*	0.10	0.09	*-10.0*	
99	22/7/2011	9:05	15:10	421	441	*4.8*	0.07	0.06	*-14.3*	723	771	*6.6*	0.10	0.09	*-10.0*	
100	26/7/2011	13:20	14:40	438	451	*3.0*	0.09	0.08	*-11.1*	807	831	*3.0*	0.11	0.10	*-9.1*	
101	14/6/2012	11:25	13:20	431	449	*4.2*	0.06	0.05	*-16.7*	808	849	*5.1*	0.08	0.07	*-12.5*	
102	16/6/2012	9:40	15:05	423	438	*3.5*	0.07	0.06	*-14.3*	751	793	*5.6*	0.10	0.09	*-10.0*	
103	17/6/2012	15:20	17:00	385	397	*3.1*	0.09	0.09	*0.0*	656	671	*2.3*	0.14	0.13	*-7.1*	
104	18/6/2012	10:25	11:25	278	353	*27.0*	0.12	0.11	*-8.3*	435	473	*8.7*	0.16	0.15	*-6.3*	
105	19/6/2012	12:40	14:45	410	423	*3.2*	0.09	0.08	*-11.1*	754	782	*3.7*	0.12	0.12	*0.0*	
106	24/6/2012	11:15	16:25	444	453	*2.0*	0.05	0.05	*0.0*	795	808	*1.6*	0.07	0.07	*0.0*	
107	27/6/2012	9:50	12:25	413	438	*6.1*	0.06	0.05	*-16.7*	733	782	*6.7*	0.08	0.07	*-12.5*	
108	29/6/2012	10:30	16:50	411	428	*4.1*	0.08	0.07	*-12.5*	698	764	*9.5*	0.12	0.11	*-8.3*	
109	19/7/2012	10:45	11:50	395	408	*3.3*	0.09	0.08	*-11.1*	612	713	*16.5*	0.14	0.13	*-7.1*	
110	31/7/2012	10:05	12:55	416	428	*2.9*	0.06	0.06	*0.0*	725	761	*5.0*	0.09	0.09	*0.0*	
111	1/8/2012	9:10	17:15	419	437	*4.3*	0.07	0.06	*-14.3*	750	803	*7.1*	0.10	0.09	*-10.0*	
112	19/8/2012	13:45	17:00	387	409	*5.7*	0.09	0.08	*-11.1*	633	700	*10.6*	0.13	0.12	*-7.7*	

113	20/8/2012	16:55	20:05	430	446	*3.7*	0.11	0.09	*-18.2*	626	819	*30.8*	0.14	0.12	*-14.3*
114	25/8/2012	11:00	17:35	413	421	*1.9*	0.06	0.06	*0.0*	734	753	*2.6*	0.09	0.09	*0.0*
115	29/8/2012	13:30	17:25	231	285	*23.4*	0.13	0.12	*-7.7*	356	419	*17.7*	0.18	0.17	*-5.6*
116	30/8/2012	13:40	16:50	274	326	*19.0*	0.12	0.11	*-8.3*	464	526	*13.4*	0.16	0.15	*-6.3*
117	31/8/2012	11:15	12:35	327	418	*27.8*	0.11	0.10	*-9.1*	535	669	*25.0*	0.14	0.13	*-7.1*
118	26/6/2013	11:50	16:25	396	417	*5.3*	0.08	0.08	*0.0*	699	750	*7.3*	0.12	0.11	*-8.3*
119	23/7/2013	14:55	16:30	322	392	*21.7*	0.11	0.10	*-9.1*	468	535	*14.3*	0.15	0.14	*-6.7*
120	24/7/2013	11:10	15:55	430	437	*1.6*	0.08	0.07	*-12.5*	768	783	*2.0*	0.11	0.10	*-9.1*
121	28/7/2013	12:00	17:25	379	403	*6.3*	0.07	0.06	*-14.3*	609	676	*11.0*	0.11	0.10	*-9.1*
122	30/7/2013	11:00	12:40	403	413	*2.5*	0.05	0.05	*0.0*	689	718	*4.2*	0.08	0.07	*-12.5*
123	2/8/2013	10:40	13:30	408	430	*5.4*	0.06	0.05	*-16.7*	704	770	*9.4*	0.09	0.08	*-11.1*
124	4/8/2013	10:45	13:35	432	450	*4.2*	0.06	0.05	*-16.7*	768	812	*5.7*	0.08	0.07	*-12.5*
125	6/8/2013	10:10	13:30	428	447	*4.4*	0.08	0.07	*-12.5*	782	801	*2.4*	0.12	0.10	*-16.7*
126	24/6/2014	13:25	14:30	458	462	*0.9*	0.06	0.05	*-16.7*	827	840	*1.6*	0.09	0.07	*-22.2*
Autumn															
127	9/9/2008	15:25	19:25	401	411	*2.5*	0.06	0.06	*0.0*	681	703	*3.2*	0.10	0.10	*0.0*
128	10/9/2008	14:45	17:00	397	408	*2.8*	0.08	0.07	*-12.5*	690	709	*2.8*	0.12	0.11	*-8.3*
129	12/9/2008	14:55	15:55	452	468	*3.5*	0.05	0.04	*-20.0*	812	848	*4.4*	0.07	0.07	*0.0*
130	23/9/2008	12:55	16:30	373	397	*6.4*	0.10	0.09	*-10.0*	455	559	*22.9*	0.15	0.14	*-6.7*
131	7/10/2008	13:35	14:10	459	469	*2.2*	0.12	0.11	*-8.3*	655	683	*4.3*	0.15	0.14	*-6.7*
132	12/10/2008	13:20	21:10	422	431	*2.1*	0.09	0.08	*-11.1*	603	678	*12.4*	0.15	0.13	*-13.3*
133	13/10/2008	16:10	20:55	439	452	*3.0*	0.08	0.07	*-12.5*	684	704	*2.9*	0.12	0.11	*-8.3*
134	25/10/2008	17:00	19:25	438	456	*4.1*	0.09	0.08	*-11.1*	595	698	*17.3*	0.15	0.14	*-6.7*
135	24/11/2008	14:45	17:00	230	310	*34.8*	0.15	0.13	*-13.3*	315	475	*50.8*	0.22	0.18	*-18.2*
136	5/10/2009	17:00	17:50	396	427	*7.8*	0.09	0.08	*-11.1*	727	801	*10.2*	0.13	0.12	*-7.7*
137	18/10/2009	9:35	10:15	238	280	*17.6*	0.13	0.12	*-7.7*	359	409	*13.9*	0.18	0.16	*-11.1*
138	19/10/2009	11:45	16:30	364	372	*2.2*	0.12	0.11	*-8.3*	419	449	*7.2*	0.16	0.15	*-6.3*
139	20/10/2009	11:35	13:40	281	302	*7.5*	0.12	0.11	*-8.3*	369	386	*4.6*	0.18	0.17	*-5.6*
140	24/9/2010	12:35	19:30	398	407	*2.3*	0.08	0.08	*0.0*	594	602	*1.3*	0.14	0.13	*-7.1*
141	6/10/2010	10:00	14:55	365	404	*10.7*	0.09	0.08	*-11.1*	538	629	*16.9*	0.14	0.13	*-7.1*
142	9/10/2010	15:45	16:20	323	402	*24.5*	0.13	0.12	*-7.7*	446	497	*11.4*	0.18	0.17	*-5.6*
143	12/10/2010	10:25	11:35	200	222	*11.0*	0.12	0.11	*-8.3*	294	330	*12.2*	0.17	0.16	*-5.9*
144	15/10/2010	15:50	19:40	203	229	*12.8*	0.14	0.13	*-7.1*	291	318	*9.3*	0.20	0.19	*-5.0*
145	28/10/2010	11:50	16:15	157	183	*16.6*	0.19	0.18	*-5.3*	202	247	*22.3*	0.28	0.26	*-7.1*
146	1/11/2011	17:45	18:55	352	439	*24.7*	0.14	0.13	*-7.1*	527	631	*19.7*	0.20	0.18	*-10.0*

147	10/11/2011	9:40	10:55	259	311	*20.1*	0.13	0.12	*-7.7*	376	431	*14.6*	0.18	0.17	*-5.6*
148	13/11/2011	8:45	10:25	409	463	*13.2*	0.10	0.09	*-10.0*	606	739	*21.9*	0.15	0.14	*-6.7*
149	9/9/2012	11:35	12:50	406	422	*3.9*	0.10	0.09	*-10.0*	569	693	*21.8*	0.14	0.13	*-7.1*
150	20/9/2012	11:20	16:50	428	446	*4.2*	0.07	0.06	*-14.3*	705	728	*3.3*	0.11	0.10	*-9.1*
151	22/9/2012	12:45	16:50	393	416	*5.9*	0.10	0.09	*-10.0*	479	568	*18.6*	0.14	0.13	*-7.1*
152	3/11/2012	10:10	13:40	413	421	*1.9*	0.11	0.10	*-9.1*	579	694	*19.9*	0.14	0.13	*-7.1*
153	10/11/2012	14:55	16:35	240	309	*28.8*	0.15	0.14	*-6.7*	385	515	*33.8*	0.21	0.19	*-9.5*
154	21/11/2012	13:30	17:25	223	279	*25.1*	0.14	0.13	*-7.1*	288	439	*52.4*	0.22	0.18	*-18.2*
155	18/10/2013	10:20	13:20	266	365	*37.2*	0.13	0.12	*-7.7*	383	443	*15.7*	0.18	0.16	*-11.1*
156	20/10/2013	10:00	12:15	413	459	*11.1*	0.12	0.11	*-8.3*	576	619	*7.5*	0.16	0.15	*-6.3*
157	8/11/2013	11:05	13:15	209	244	*16.7*	0.17	0.16	*-5.9*	365	456	*24.9*	0.23	0.20	*-13.0*
158	12/9/2014	15:55	18:10	391	407	*4.1*	0.10	0.06	*-40.0*	573	602	*5.1*	0.10	0.09	*-10.0*
159	19/10/2014	9:35	10:55	259	301	*16.2*	0.14	0.13	*-7.1*	378	427	*13.0*	0.18	0.17	*-5.6*
160	20/10/2014	14:30	16:40	368	421	*14.4*	0.09	0.08	*-11.1*	671	718	*7.0*	0.13	0.12	*-7.7*
161	1/11/2014	14:00	17:25	425	455	*7.1*	0.08	0.07	*-12.5*	626	735	*17.4*	0.15	0.12	*-20.0*
162	14/11/2014	10:20	13:10	296	402	*35.8*	0.14	0.13	*-7.1*	483	569	*17.8*	0.19	0.17	*-10.5*

Table S4. Variance of N_d and relative contribution to this variance of aerosol number (N_{total}) and chemical composition (κ) during all the NPF events from May 2012 to May 2015, based on the ACSM measurements.

Date		***Variance N_d***		***Contribution of κ***		***Contribution of N_{total}***	
		σ_w =0.3 m s^{-1}	***σ_w =0.6 m s^{-1}***	***σ_w =0.3 m s^{-1}***	***σ_w =0.6 m s^{-1}***	***σ_w =0.3 m s^{-1}***	***σ_w =0.6 m s^{-1}***
Winter							
1	**22/12/2014**	94.4	146.9	12.0 %	15.0 %	88.0 %	85.0 %
2	**11/1/2015**	94.7	182.8	14.0 %	6.0 %	86.0 %	94.0 %
3	**23/1/2015**	205.2	567.9	1.0 %	1.0 %	99.0 %	99.0 %
Spring							
4	**6/3/2013**	48.9	81.4	6.0%	5.0%	94.0%	95.0%
5	**10/3/2013**	70.6	117.1	24.0%	22.0%	76.0%	78.0%
6	**13/3/2013**	59.4	92.7	28.0%	27.0%	72.0%	73.0%

7	**23/3/2013**	77.7	133.6	15.0%	14.0%	85.0%	86.0%
8	**24/3/2013**	177.8	243.6	12.0%	7.0%	88.0%	93.0%
9	**27/3/2013**	191.1	262.6	21.0%	14.0%	79.0%	86.0%
10	**5/4/2013**	185.7	311.2	6.0%	5.0%	94.0%	95.0%
11	**19/4/2013**	155.8	288.4	0.0%	1.0%	100.0%	99.0%
12	**21/4/2013**	59.7	300.3	0.0%	4.0%	100.0%	96.0%
13	**1/5/2013**	16.7	41.8	1.0%	0.0%	99.0%	100.0%
14	**22/5/2013**	56.2	150.4	20.0%	7.0%	80.0%	93.0%
15	**30/4/2015**	208.2	221.7	3.0 %	5.0 %	97.0 %	95.0 %
16	**2/5/2015**	83.4	151.2	5.0 %	8.0 %	95.0 %	92.0 %
Summer							
17	**14/6/2012**	11.8	40.1	4.0%	6.0%	96.0%	94.0%
18	**16/6/2012**	8.3	21.2	7.0%	5.0%	93.0%	95.0%
19	**17/6/2012**	15.1	79.6	11.0%	23.0%	89.0%	77.0%
20	**24/6/2012**	14.9	46.3	1.0%	0.0%	99.0%	100.0%
21	**27/6/2012**	28.8	73.3	1.0%	1.0%	99.0%	99.0%
22	**29/6/2012**	20.2	78.5	2.0%	6.0%	98.0%	94.0%
23	**19/7/2012**	12.1	96.1	5.0%	21.0%	95.0%	79.0%
24	**31/7/2012**	28.3	90.2	1.0%	1.0%	99.0%	99.0%
25	**1/8/2012**	13.5	35.8	7.0%	3.0%	93.0%	97.0%
26	**19/8/2012**	28.9	109.6	11.0%	18.0%	89.0%	82.0%
27	**20/8/2012**	93.5	96.1	53.0%	37.0%	47.0%	63.0%
28	**25/8/2012**	26.5	74.8	2.0%	6.0%	98.0%	94.0%
29	**29/8/2012**	172.6	147.0	10.0%	10.0%	90.0%	90.0%
30	**30/8/2012**	176.7	150.4	12.0%	12.0%	88.0%	88.0%
31	**31/8/2012**	36.1	120.1	31.0%	42.0%	69.0%	58.0%
32	**26/6/2013**	11.3	59.2	8.0%	45.0%	92.0%	55.0%
33	**23/7/2013**	47.3	513.3	23.0%	34.0%	77.0%	66.0%
34	**24/7/2013**	20.2	290.2	2.0%	2.0%	98.0%	98.0%
35	**28/7/2013**	32.9	85.3	2.0%	1.0%	98.0%	99.0%

36	**30/7/2013**	13.7	32.5	3.0%	4.0%	97.0%	96.0%
37	**2/8/2013**	9.1	20.8	3.0%	3.0%	97.0%	97.0%
38	**4/8/2013**	10.6	26.9	2.0%	3.0%	98.0%	97.0%
39	**6/8/2013**	4.7	38.2	9.0%	38.0%	91.0%	62.0%
Autumn							
40	**20/9/2012**	44.1	119.2	1.0%	1.0%	99.0%	99.0%
41	**22/9/2012**	22.5	71.5	1.0%	13.0%	99.0%	87.0%
42	**3/11/2012**	115.3	224.1	2.0%	6.0%	98.0%	94.0%
43	**18/10/2013**	96.6	96.8	7.0%	7.0%	93.0%	93.0%
44	**20/10/2013**	40.2	54.4	17.0%	15.0%	83.0%	85.0%
45	**8/11/2013**	43.4	77.9	17.0%	21.0%	83.0%	79.0%
46	**12/9/2014**	38.5	108.6	1.0 %	0.0%	99.0 %	100.0 %
47	**1/11/2014**	251.6	837.1	1.0 %	1.0 %	99.0 %	99.0 %
48	**14/11/2014**	192.9	274.2	6.0 %	5.0 %	94.0%	95.0 %

Table S5. Seasonal average ± standard deviation of the total particle number concentration (N_{total}), number concentration of estimated CCN (N_{CCN}) for each supersaturation (0.10, 0.38, 0.52, 0.66, 0.73, and 1.00%), hygroscopicity parameter (κ), and critical diameter (d_c) for the aforementioned supersaturations, respectively.

	Winter	**Spring**	**Summer**	**Autumn**
	n=24	**n=52**	**n=50**	**n=36**
N_{total} (cm^{-3})	2982±1095	3215±807	4254±372	2997±662
N_{CCN}(0.1%) (cm^{-3})	451±97	420±28	813 ±107	491 ±39
N_{CCN}(0.38%) (cm^{-3})	1294±253	1444±166	2576 ±299	1411 ±214
N_{CCN}(0.52%) (cm^{-3})	1555±313	1726±220	2968 ±331	1681 ±256
N_{CCN}(0.66%) (cm^{-3})	1748±360	1943±245	3247 ±354	1883 ±287

N_{CCN}(0.73%) (cm^{-3})	1839±386	2026±259	3350 ±365	1971 ±315
N_{CCN}(1.00%) (cm^{-3})	2121±483	2283 ±299	3619±386	2288 ±422
κ	0.416±0.003	0.419±0.001	0.403±0.001	0.456 ±0.003
d_c (0.1%) (nm)	151.0±0.7	148.7±0.6	147.2±0.3	142.2 ±0.5
d_c (0.38%) (nm)	61.8±0.3	61.1±0.2	60.5±0.1	58.4 ±0.2
d_c (0.52%) (nm)	50.2±0.2	49.6±0.2	49.1±0.1	47.4 ±0.2
d_c (0.66%) (nm)	42.8±0.2	42.3±0.2	41.9±0.1	40.4 ±0.1
d_c (0.72%) (nm)	40.0±0.2	39.5±0.2	39.1±0.1	37.8 ±0.1
d_c (1.00%) (nm)	32.5±0.1	32.0±0.1	31.7±0.1	30.6 ±0.1

Table S6. Seasonal percentage change of the estimated s_{max} (maximum supersaturation in the cloud) and N_d (the potential droplet number concentration) before and after the t_{Nd}, the variance of N_d, the relative contribution of the total aerosol number (N_{total}) and the hygroscopicity (κ) to the droplet number calculated according to the approach described in the main text. Two probability density functions (PDFs) of the characteristic updraft velocity are used with σ_w=0.3 m s^{-1} and σ_w=0.6 m s^{-1}.

	Winter	Spring	Summer	Autumn
σ_w=0.3 m s^{-1}				
Percentage change of the s_{max}(%)	(-) 9.8	(-) 9.7	(-) 10.0	(-) 10.0
Percentage change of the N_d (cm^{-3})	12.6	12.0	7.0	12.5

Variance of N_d	131	111	32	91
Contribution of κ	9.0	11.0	9.0	6.0
Contribution of N_{total}	91.0	89.0	91.0	94.0
σ_W=0.6 m s^{-1}				
Percentage change of the s_{max}(%)	(-) 8.9	(-) 7.5	(-) 10.0	(-) 6.3
Percentage change of the N_d (cm^{-3})	16.7	15.3	9.0	15.0
Variance of N_d	299	175	101	205
Contribution of κ	7.0	9.0	14.0	8.0
Contribution of N_{total}	93.0	91.0	86.0	92.0