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Annual cycle of hygroscopic properties and mixing state of the suburban aerosol in Athens, Greece

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Figure S1

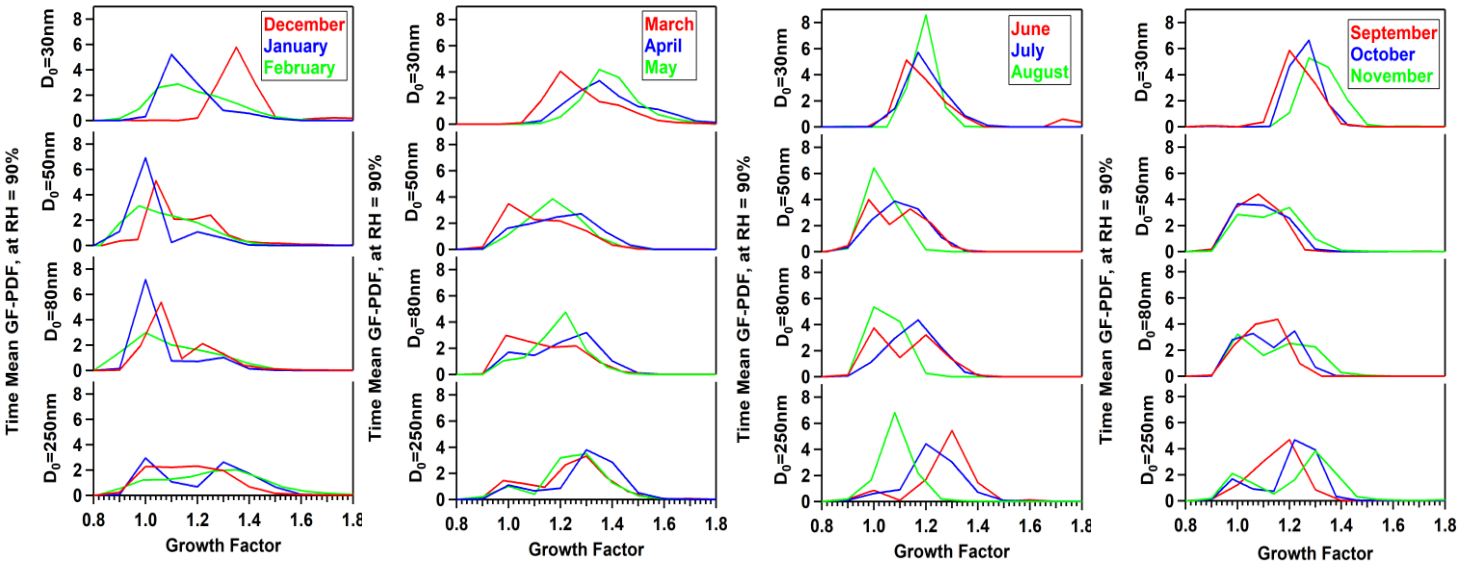

Figure S1 Monthly mean GF-PDFs for different dry particle sizes (30, 50, 80 and 250 nm)

Figure S2

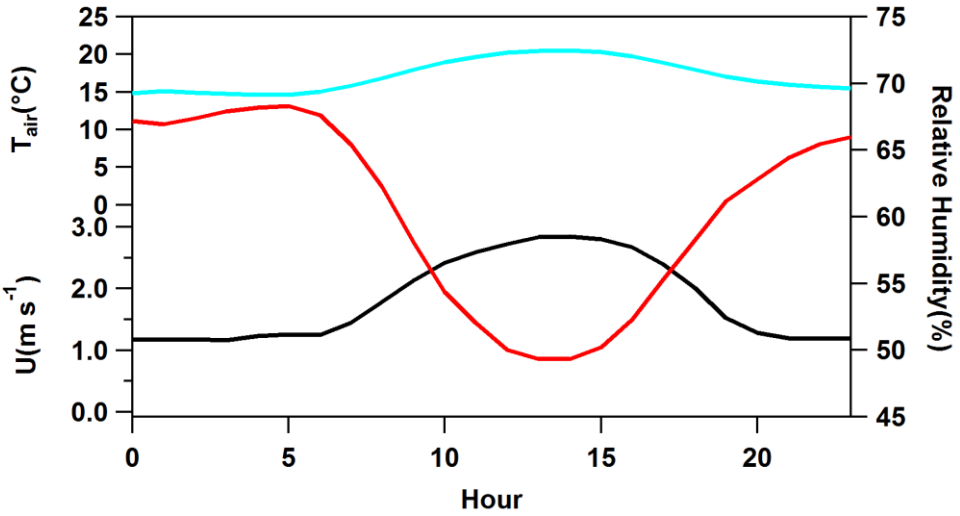

Figure S2 Diurnal variation of wind speed (black line), temperature (blue line) and relative humidity (red line).

Figure S3

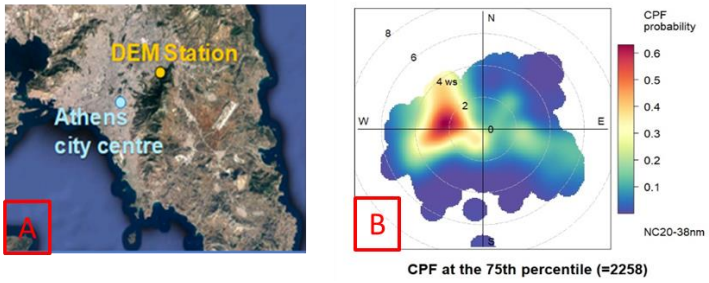

Figure S3 The DEM station in Athens, (from © Google Maps), A, and the CPF (conditional probability function) polar plot of 75th percentile of the total number concentration in the size range from 20 to 38nm, B (OpenAir; Carslaw and Ropkins, 2012).

Figure S4

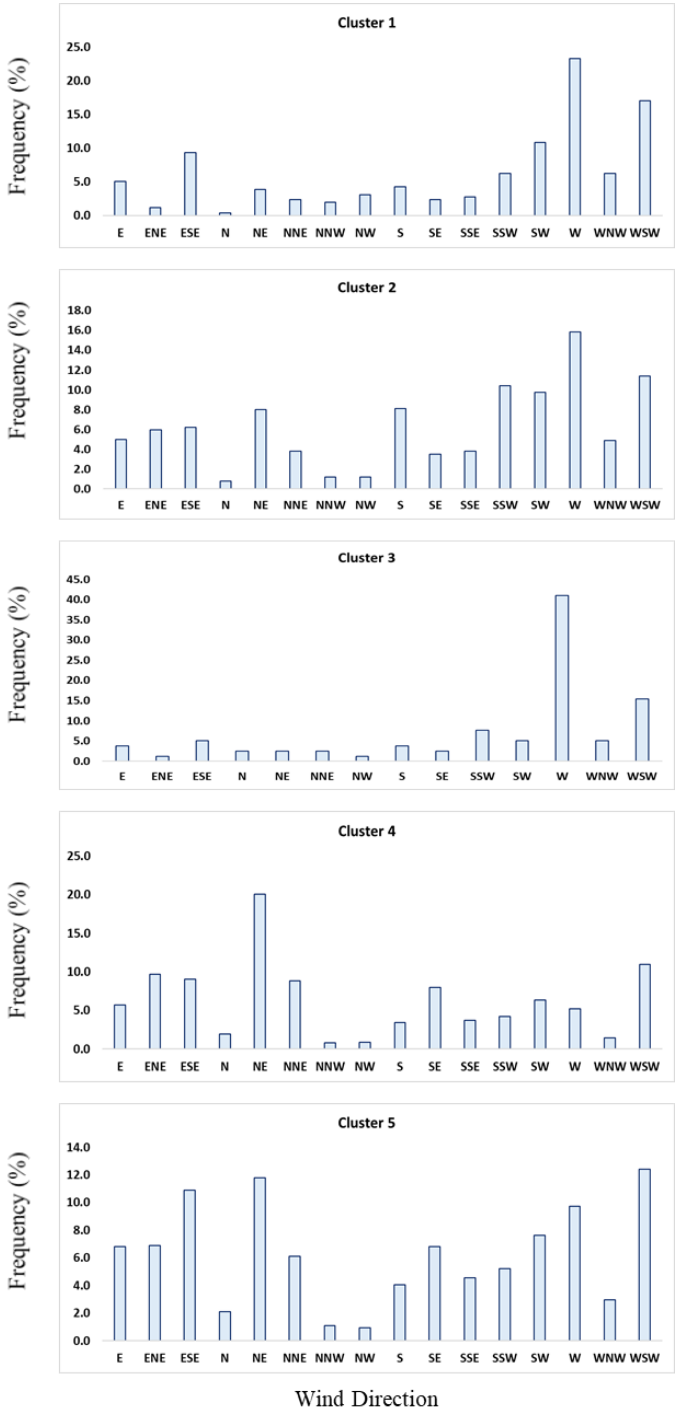

Figure S4 Frequency of wind direction for each cluster.

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Table S1 Monthly mean GF at RH=90%, the mean GF for the two distinct GF ranges below/above the threshold GF of 1.12, the hygroscopicity parameter κ mean and the number fraction of each mode, for dry diameters 30, 50, 80 and 250nm.

Month	**GF_{mean}**	**κ_{mean}**	**GF<1.12**	**$f_{GF<1.12}$**	**GF>1.12**	**$f_{GF<1.12}$**
Dry diameter of particle, D_0=30nm						
01	1.17	0.12	1.08	0.07	1.22	0.58
02	1.19	0.14	1.05	0.08	1.26	0.60
03	1.29	0.19	1.10	0.08	1.29	0.92
04	1.39	0.33	1.11	0.02	1.38	0.98
05	1.40	0.28	1.12	0.01	1.40	0.99
06	1.23	0.19	1.10	0.02	1.22	0.98
07	1.20	0.14	1.10	0.1	1.19	0.9
08	1.20	0.22	1.11	0.11	1.20	0.89
09	1.25	0.26	1.10	0.05	1.24	0.95
10	1.27	0.20	1.11	0.01	1.26	0.99
11	1.32	0.26	1.10	0.01	1.32	0.99
12	1.41	0.29	1.10	0.01	1.40	0.99
Dry diameter of particle, D_0=50nm						
01	1.03	0.02	1.00	0.83	1.23	0.17
02	1.08	0.07	1.00	0.65	1.22	0.35
03	1.13	0.06	1.03	0.54	1.22	0.46
04	1.19	0.13	1.04	0.32	1.26	0.68
05	1.18	0.11	1.06	0.33	1.22	0.67
06	1.09	0.05	1.02	0.61	1.18	0.39
07	1.10	0.05	1.04	0.59	1.18	0.41
08	1.03	0.03	1.03	0.90	1.14	0.10
09	1.09	0.06	1.04	0.70	1.16	0.30
10	1.09	0.06	1.04	0.63	1.18	0.37
11	1.13	0.08	1.03	0.49	1.21	0.51
12	1.15	0.08	1.05	0.53	1.24	0.47
Dry diameter of particle, D_0=80nm						
01	1.06	0.03	1.00	0.79	1.25	0.21
02	1.11	0.08	1.00	0.59	1.25	0.41

03	1.15	0.08	1.03	0.49	1.20	0.51
04	1.21	0.13	1.04	0.29	1.27	0.71
05	1.19	0.11	1.04	0.26	1.23	0.74
06	1.22	0.07	1.03	0.50	1.22	0.50
07	1.15	0.08	1.05	0.39	1.20	0.61
08	1.05	0.03	1.05	0.90	1.14	0.10
09	1.10	0.06	1.05	0.60	1.17	0.40
10	1.12	0.07	1.03	0.54	1.21	0.46
11	1.15	0.08	1.02	0.45	1.24	0.55
12	1.13	0.08	1.04	0.61	1.24	0.39
Dry diameter of particle, D_0=250nm						
01	1.22	0.12	1.02	0.38	1.33	0.62
02	1.26	0.16	1.01	0.31	1.33	0.69
03	1.24	0.12	1.02	0.25	1.30	0.75
04	1.29	0.16	1.02	0.18	1.33	0.82
05	1.24	0.11	1.02	0.16	1.29	0.84
06	1.27	0.15	1.01	0.12	1.30	0.88
07	1.23	0.12	1.04	0.15	1.25	0.85
08	1.09	0.05	1.05	0.73	1.17	0.27
09	1.15	0.11	1.04	0.37	1.20	0.63
10	1.20	0.11	1.01	0.23	1.26	0.77
11	1.23	0.13	1.01	0.30	1.31	0.70
12	1.22	0.09	1.03	0.08	1.26	0.58

Table S2 Mean GF-PDFs per cluster for different dry particle sizes (30, 50, 80 and 250 nm)

Cluster	**$GF_{Ddry=30nm}$**	**$GF_{Ddry=50nm}$**	**$GF_{Ddry=80nm}$**	**$GF_{Ddry=250nm}$**
1	**1.35**	**1.16**	**1.19**	**1.23**
2	**1.28**	**1.11**	**1.13**	**1.22**
3	**1.34**	**1.17**	**1.19**	**1.26**
4	**1.26**	**1.10**	**1.11**	**1.20**

5	**1.29**	**1.11**	**1.13**	**1.21**

Table S3 Modal analysis of the average particle number size distributions per cluster

	σg1	NMD1	NC1	σg2	NMD2	NC2	σg3	NMD3	NC3	σg4	NMD4	NC4
Cluster 1	2.5	6.1	16403	1.6	**28.2**	8293	1.9	**76.1**	6275			
Cluster 2	2.4	5.0	5183				2.1	**56.6**	11138			
Cluster 3	1.5	6.3	38886	1.6	**16.0**	16046	2.2	**54.2**	7966			
Cluster 4	2.5	7.1	2330				2.2	**61.4**	3303	1.4	174.9	392
Cluster 5	1.4	6.9	2904	2.2	**13.6**	8570	2.1	**70.9**	4072			

References

Carslaw, D. C. and Ropkins, K.: openair – An R package for air quality data analysis, Environ. Model. Softw., 27–28, 52–61, https://doi.org/10.1016/j.envsoft.2011.09.008, 2012