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Aerosol hygroscopicity and its link to chemical composition in the coastal atmosphere of Mace Head: marine and continental air masses

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Table S1. Summary of start and end time of each event.

Event	Starting date& time	End date& time
C1	2009.01.01 00:00	2009.01.10 18:00
C2	2009.03.17 00:00	2009.03.22 12:00
M1	2009.01.15 16:00	2009.01.24 12:00
M2	2009.03.06 18:00	2009.03.12 12:00

Table S2. Averaged chemical composition during each event.

	C1	C2	M1	M2
Sea-salt ($\mu g\ m^{-3}$)	0.17±0.22	0.13±0.17	0.63 ±0.28	0.58 ±0.23
Organics ($\mu g\ m^{-3}$)	1.99±1.54	6.00±8.57	0.02 ±0.02	0.08 ±0.07
Nitrate ($\mu g\ m^{-3}$)	0.92±1.03	4.06±3.90	0.01 ±0.007	0.01 ±0.006
nss-sulfate ($\mu g\ m^{-3}$)	1.47±0.70	2.04±1.64	0.08 ± 0.05	0.16 ±0.17
Ammonium ($\mu g\ m^{-3}$)	0.72±0.49	1.82±1.52	0.002 ±0.004	0.003 ±0.03
MSA ($\mu g\ m^{-3}$)	0.007±0.007	0.006±0.004	0.001± 0.001	0.002 ±0.002
Black carbon ($ng\ m^{-3}$)	500±377	518±499	10.1±3.3	9.9±3.7

Table S3. Hygroscopicity GF (mean ± standard deviation) for each event.

D0	C1	C2	M1	M2
35 nm	1.32±0.09	1.42±0.13	1.87±0.17	1.85±0.18
50 nm	1.34±0.08	1.47±0.12	2.00±0.14	1.97±0.20
75 nm	1.38±0.12	1.53±0.12	2.04±0.09	2.00±0.19
110 nm	1.45±0.14	1.59±0.13	2.07±0.08	2.00±0.15
165 nm	1.53±0.14	1.65±0.13	2.11±0.07	2.05±0.15

Table S4. GF (mean ± standard deviation) for more hygroscopicity mode

Events	Size	GF of MH mode
C	35 nm	1.39±0.05
	50 nm	1.41±0.04
	75 nm	1.45±0.05
	110 nm	1.49±0.05
	165 nm	1.54±0.05
M	35 nm	1.57±0.10
	50 nm	1.58±0.07
	75 nm	1.62±0.05
	110 nm	1.66±0.05
	165 nm	1.70±0.05

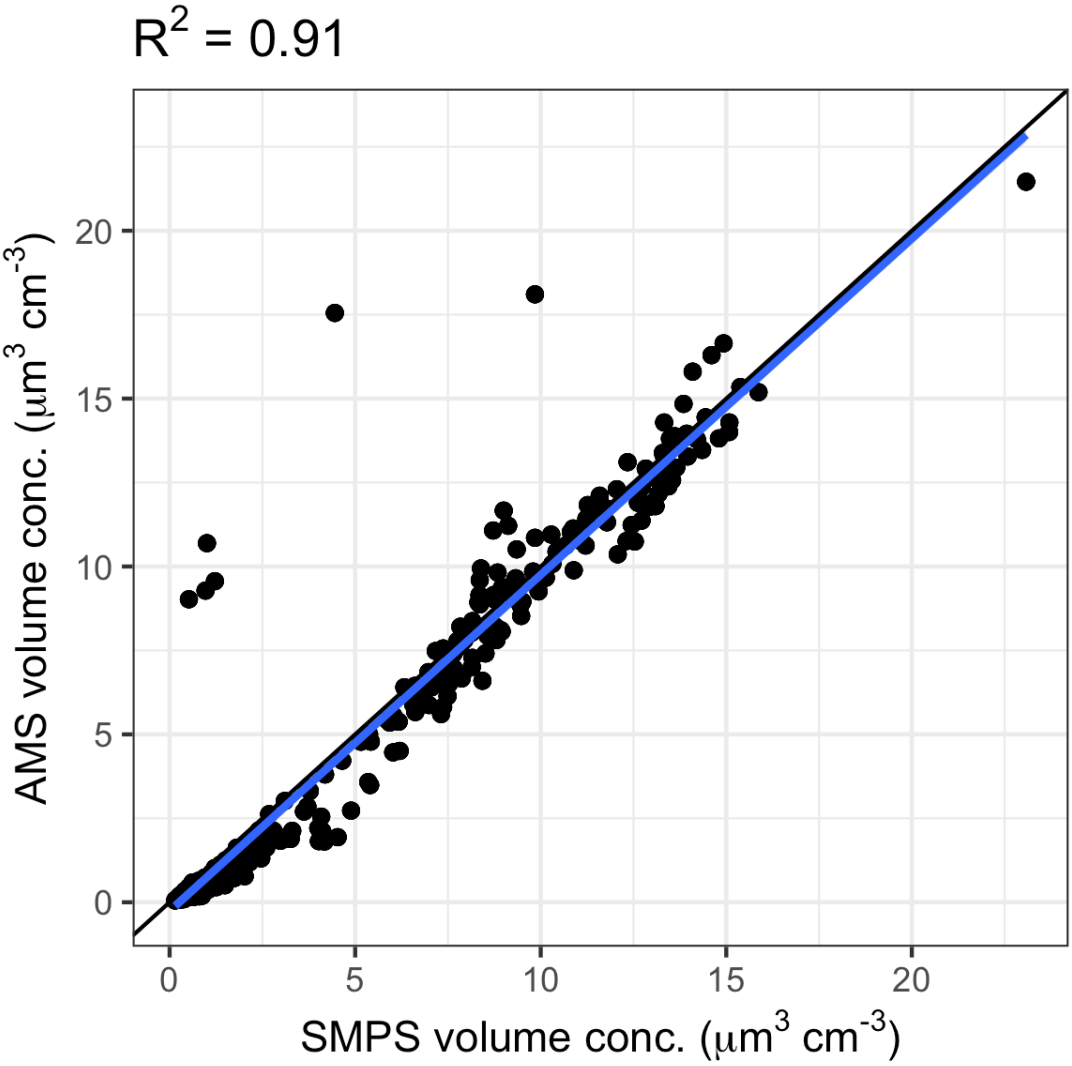

Figure S1. PM1 volume measured by AMS vs SMPS volume. The calculated PM1 volume was obtained by using a species-dependent density of 1.40 g cm^{-3} for Org, 1.78 g cm^{-3} for sulfate, 1.72 g cm^{-3} for nitrate, 1.75 g cm^{-3} for ammonium, 1.4 g cm^{-3} for chloride, 1.65 g/cm^3 for BC, 2.17 g cm-3 for sea salt and 1.48 for MSA.

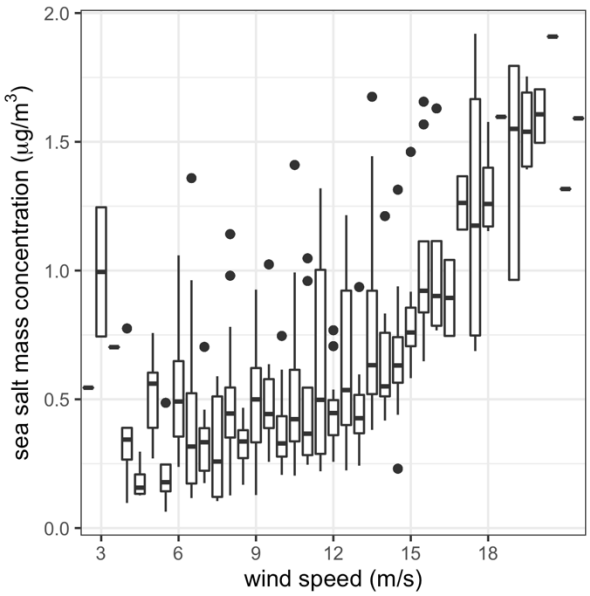

Figure S2. Sea salt concentration measured by AMS versus wind speed during 2009, the lines represent medians, the boxes represent 25-75% percentile and whiskers represent 1.5 interquartile range.

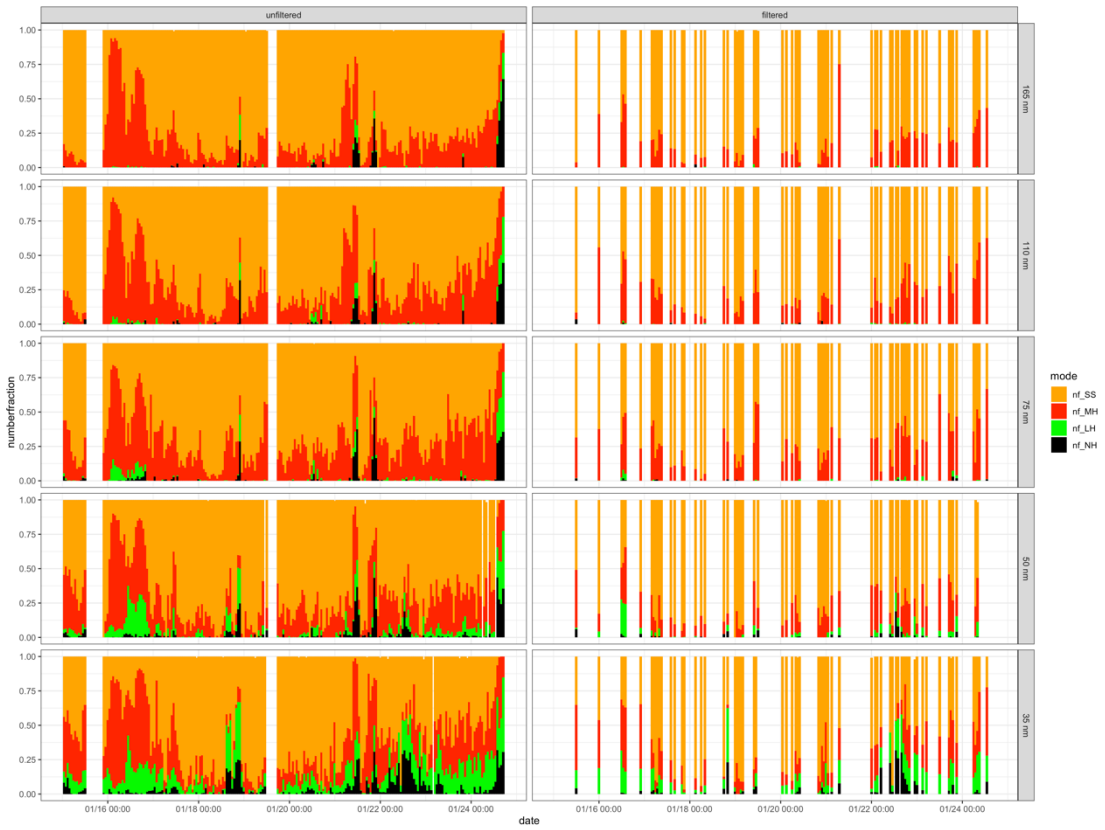

Figure S3. Time series of the number fraction of near-hydrophoblic (NH) mode in black (GF < 1.11), less-hygroscopic (LH) mode in green, (1.1 1< GF < 1.33), more-hygroscopic (MH) mode in red(1.33 < GF < 1.85) and sea-salt (SS) mode in brown (GF > 1.85) of aerosols with pre-selected dry diameter of unfiltered and filtered M1 events.

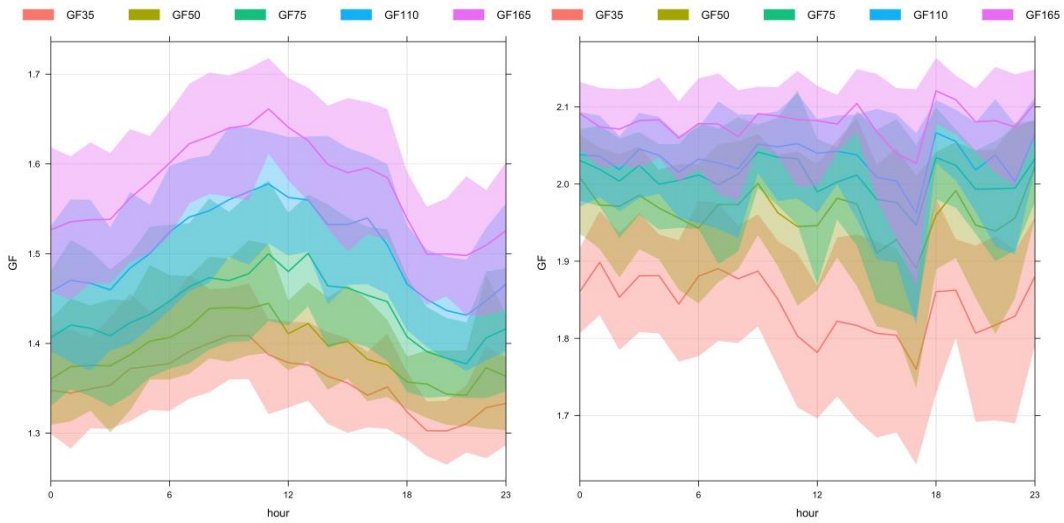

Figure S4. Diurnal variation of GF of C1&C2 air masses (left), M1&M2 (right).

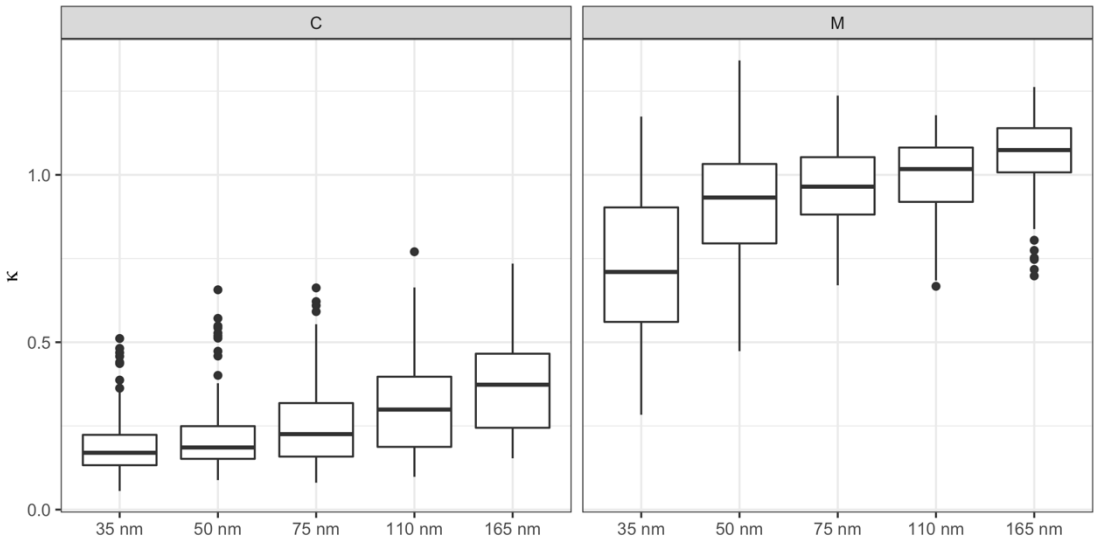

Figure S5. Size resolved kappa values for (a) Continental (C) and (b) Marine (M). The horizontal lines represent median GF, the boxes represent 25-75 % percentile and whiskers represent 1.5*IQR from the boxes (where the IQR is the interquartile range). Data beyond the end of whisker are plotted individually as outliers.

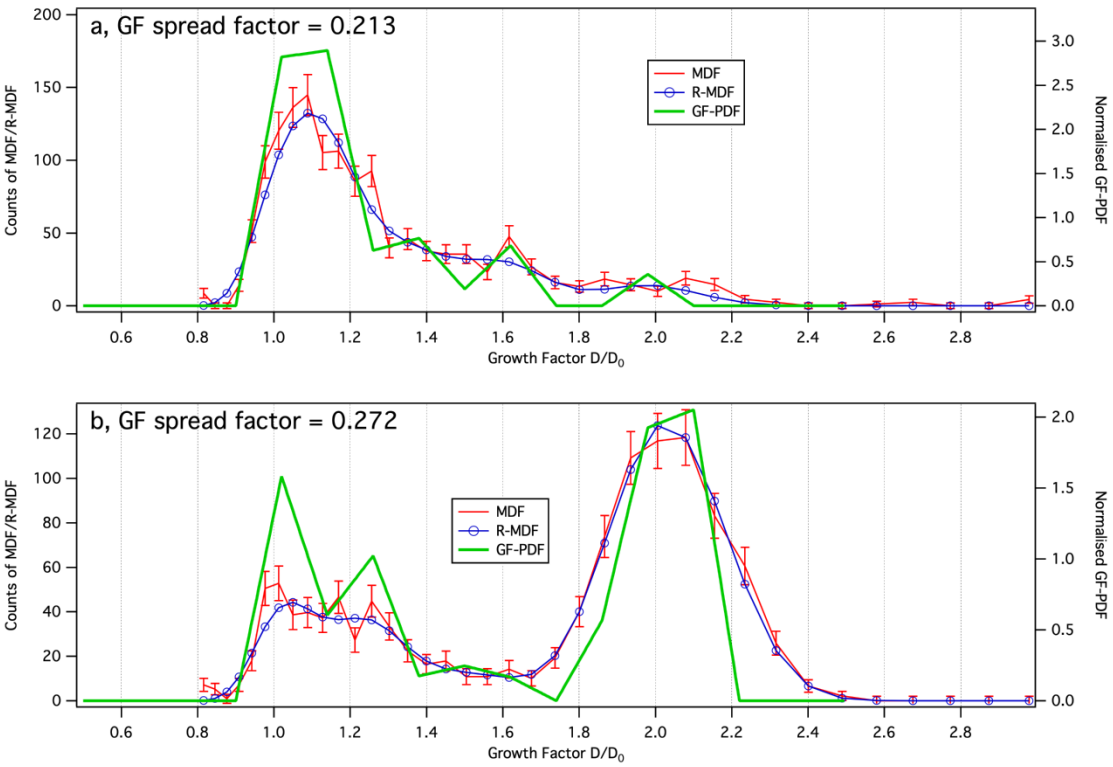

Figure S6. Examples of growth factor- probability density functions with GF spread factor > 0.2: (a) GF spread factor 0.213; (b)GF spread factor 0.272.

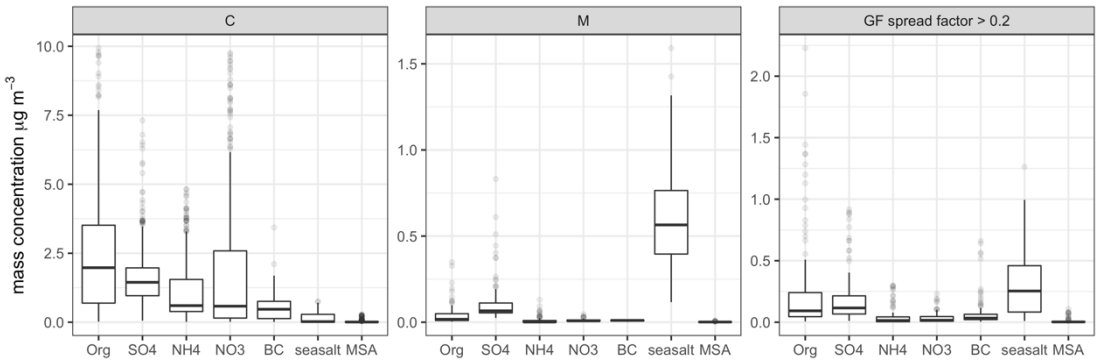

Figure S7. Comparison of chemical composition between Continental (C), Marine (M) and those data with growth factor (GF) spread factor > 0.2. Lines represent median concentration, boxes represent 25 - 75 % percentile, whiskers represent 1.5* interquartile range from the boxes. Data beyond the end of whisker are plotted individually.

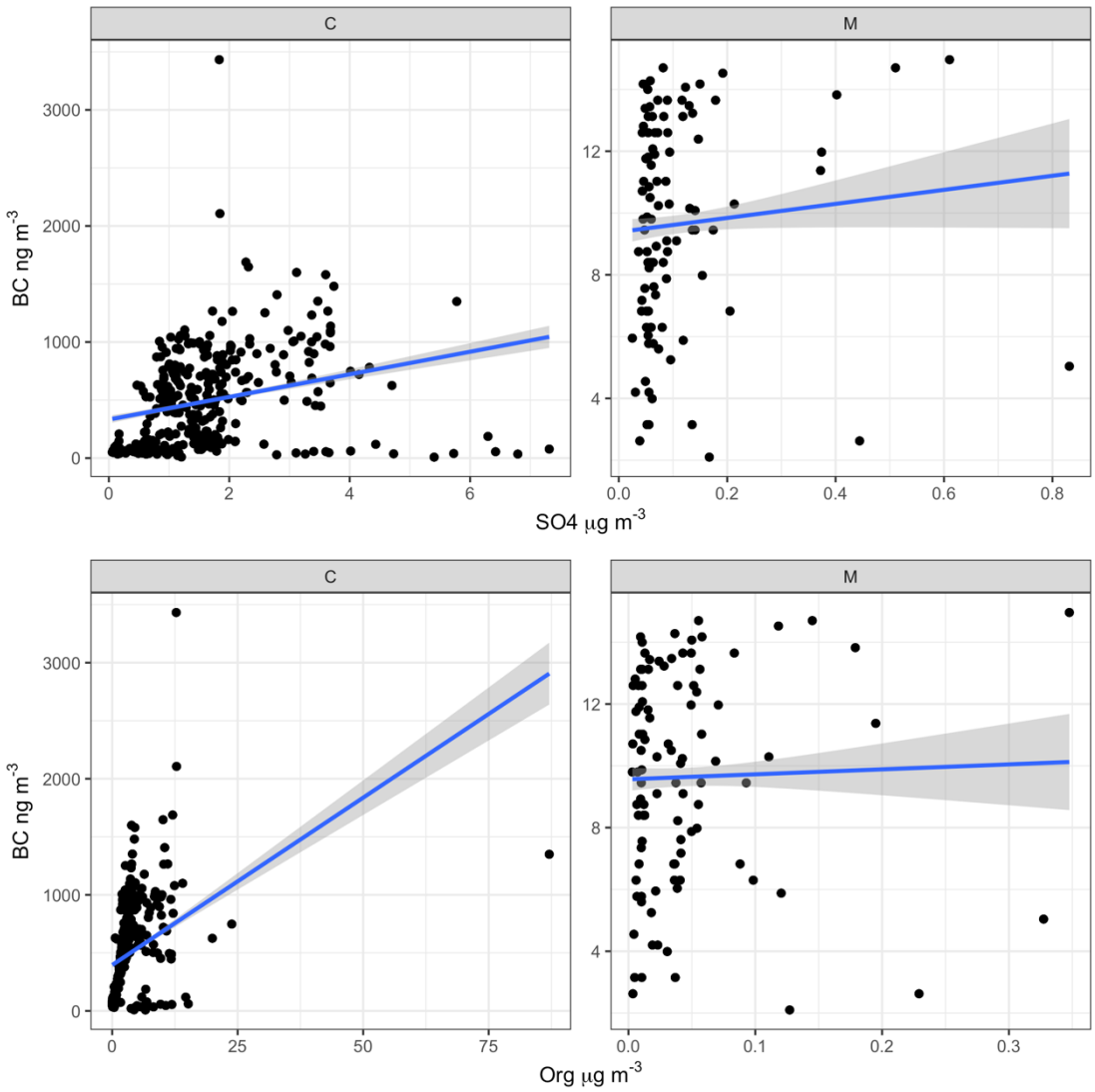

Figure S8. The relationship between Org, SO4 versus BC for Continental (C) and Marine (M) case events.