



Supplement of

A global study of hygroscopicity-driven light-scattering enhancement in the context of other in situ aerosol optical properties

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Table S1 summarises the number of datapoints of $f(\text{RH}=85\%)$ and $f_b(\text{RH}=85\%)$ included in Fig. 1 at each site.

Figure S1 shows the variability in the backscattering enhancement factor, $f_b(\text{RH}=85\%)$, across sites.

Figure S2 shows an example for each site type (rural, marine, urban and Arctic) of the individual relationships between $f(\text{RH}=85\%)$ and $f_b(\text{RH}=85\%)$.

5 Figure S3 shows the relationship of the forcing efficiency enhancement as a function of $f(\text{RH})$.

Figure S4 shows the relationship between the scattering enhancement factor and the single scattering albedo, as a function of the scattering Angström exponent at each individual site.

Table S1. Table listing sites (ordered as in Fig. 1) and number of $f(\text{RH}=85\%)$ and $f_b(\text{RH}=85\%)$ datapoints included in Fig. 1 statistics.

Station ID	$f(\text{RH}=85\%)$ datapoints	$f_b(\text{RH}=85\%)$ datapoints
JFJ	2016	9
ZEP	155	12
BRW	1956	295
PVC	2670	465
CBG	893	542
PYE	1186	176
THD	21880	14104
GRW	4383	2475
MHD	61	29
KCO	615	492
GSN	139	43
CES	657	501
HLM	499	284
HYY	274	0
APP	27627	13123
SGP	68290	24838
FKB	1875	205
MEL	99	77
MAO	797	0
UGR	2566	547
PGH	699	108
HFE	2089	999
NIM	19	4

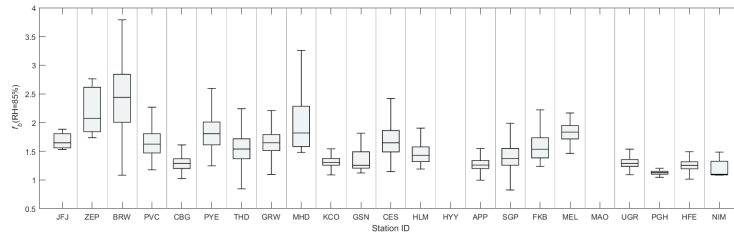


Figure S1. Boxplot of $f_b(\text{RH}=85\%)$ at $\lambda=550$ nm. Sites are sorted by site type and scattering coefficient (from low to high) as in Figure 1 in main text. For each box, the central mark is the median, the box extends vertically between the 25th and 75th percentiles, the whiskers extend to the most extreme data that are not considered outliers.

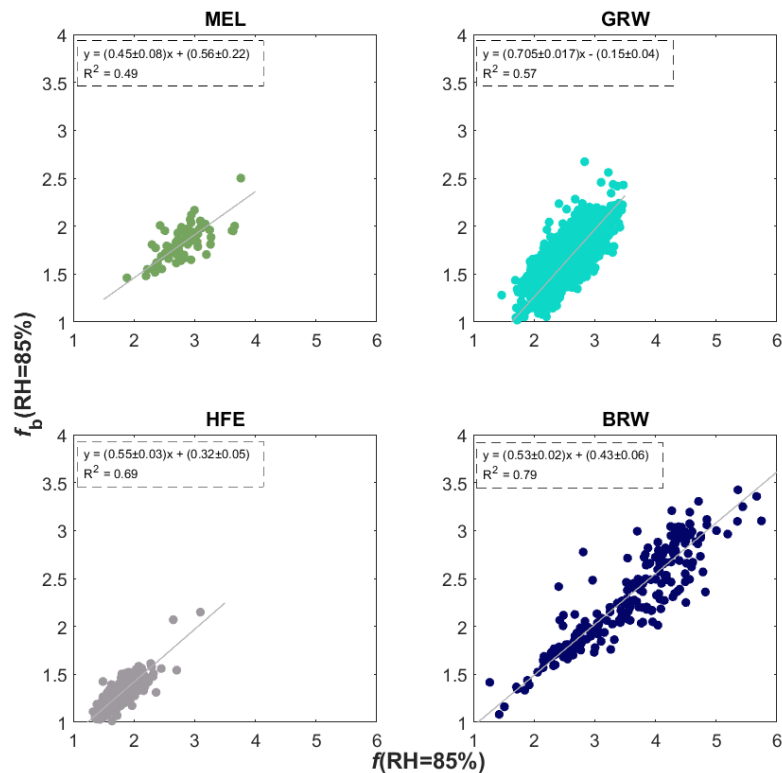


Figure S2. Scatterplot of $f_b(\text{RH}=85\%)$ versus $f(\text{RH}=85\%)$ at 550 nm for one site of each site type category. The figure includes the results of a weighted bivariate fit.

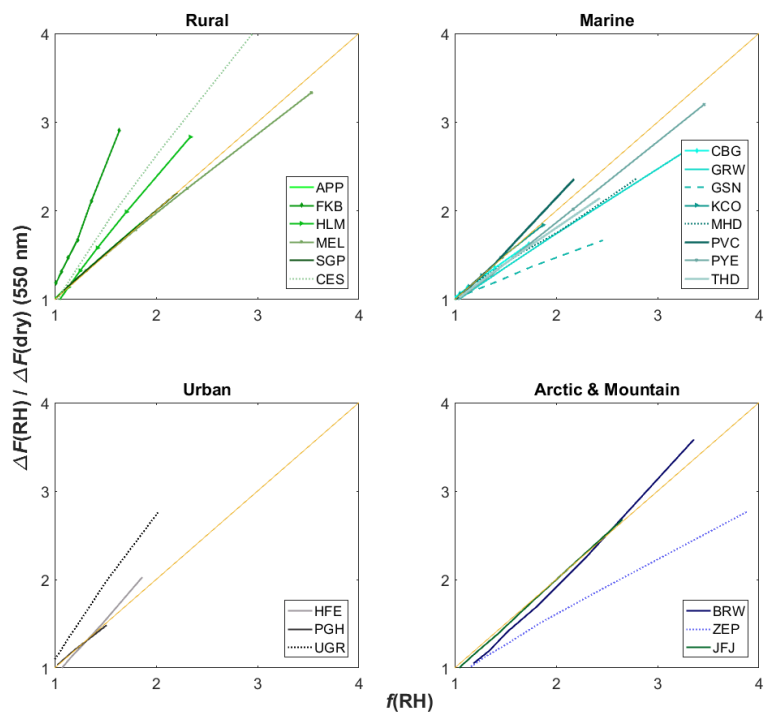


Figure S3. Median values of the radiative forcing at certain RH to the radiative forcing at dry conditions (RH<40%) as a function of $f(\text{RH})$. The yellow line represents the 1:1 line. All variables refer to 550 nm wavelength.

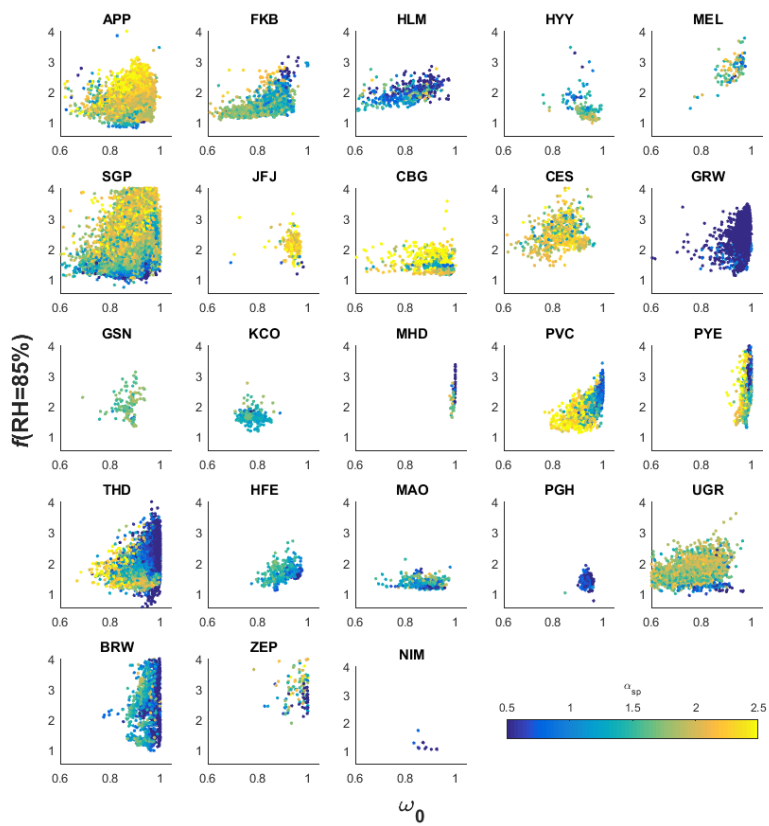


Figure S4. Scatterplot of $f(\text{RH}=85\%)$ versus single scattering albedo color-coded as a function of scattering Angström exponent at each individual site. All variables refer to 550 nm wavelength, except at HYY that $\lambda = 525$ nm.