Manuscript prepared for Atmos. Chem. Phys.
with version 4.2 of the LaTeX class copernicus.cls.
Date: 9 July 2013

Supplement to ”Effects of relative humidity on aerosol light scattering: results from different European sites”

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This supplement shows the detailed result of the sensitivity study of Sect. 6.3. (”Can a simple analytical method be established for the f(RH)-prediction?”) and a table on the agreement of the closure study.

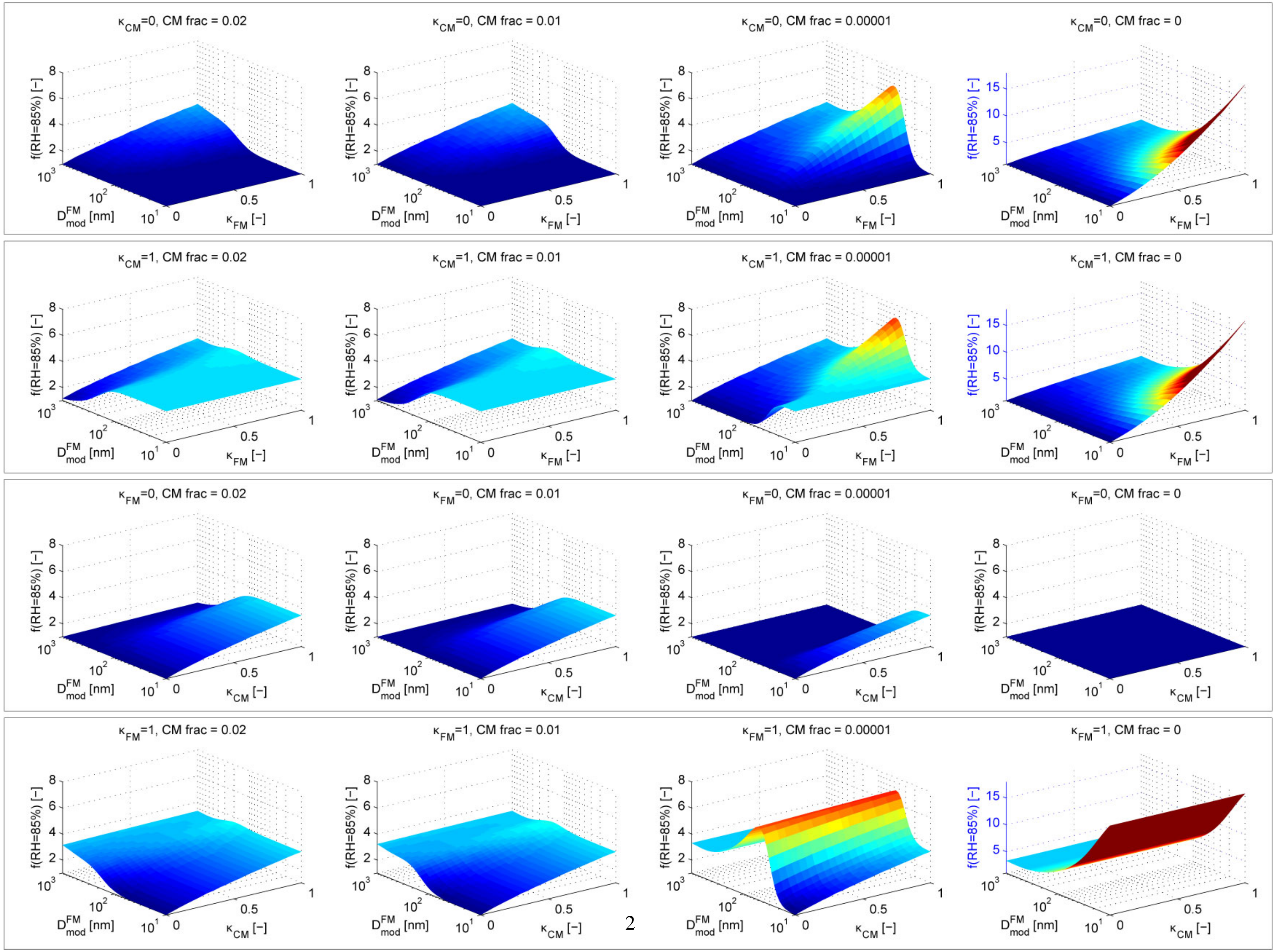

Fig. 1. The scattering enhancement $f(\mathrm{RH})$ at $\mathrm{RH} = 85\,\%$ and $\lambda = 550\mathrm{nm}$ modeled for different coarse mode (CM) fractions, fine mode (FM) mode diameters and hygroscopicities. A refractive index of $m = 1.54$ and a mode width of $\sigma = 1.8$ for fine and coarse mode of the lognormal size distribution is assumed. The mode diameter of the coarse mode is assumed to be constant at $D = 2\,\mu\mathrm{m}$. Note the different scale of the z-axis for the monomodal case (CM frac = 0, blue axis).

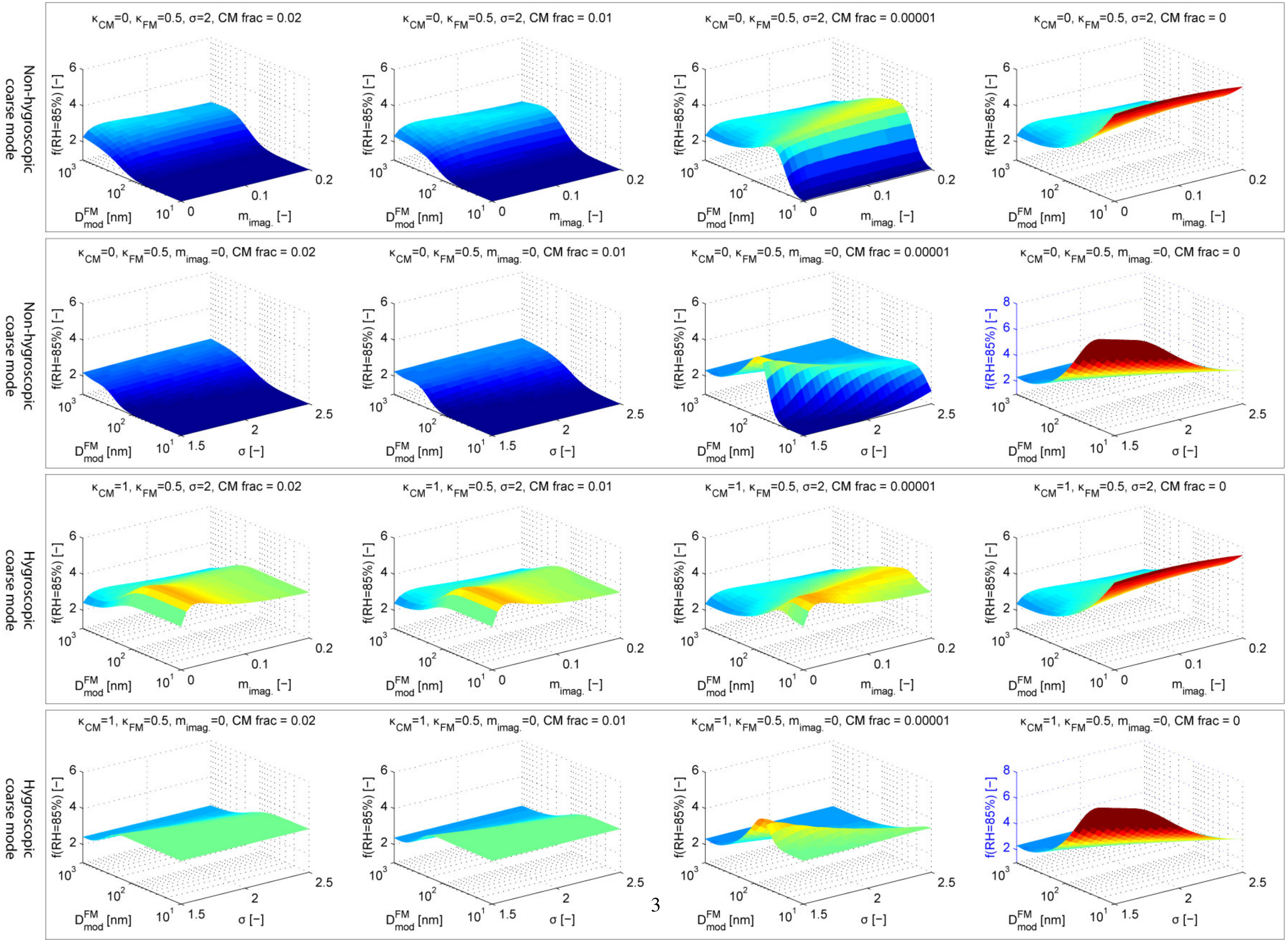

Fig. 2. The scattering enhancement $f(\mathrm{RH})$ at RH = 85 % and $\lambda = 550\mathrm{nm}$ modeled for different imaginary parts of the refractive index ($m_{\mathrm{imag.}}$) and different standard deviations of the fine mode (σ). The fine mode hygroscopicity is assumed to be constant with $\kappa_{\mathrm{FM}} = 0.5$, while the real part of the refractive index is $m_{\mathrm{real}} = 1.54$. The mode diameter of the coarse mode is assumed to be constant at $D = 2\,\mu\mathrm{m}$. Note the different scale of the z-axis for the monomodal case (blue axis).

Table 1. Mean and standard deviation of measured and predicted f(RH=85%,550nm) for the individual studies (see Fig. 6 and Sect. 6.3). The ratio of predicted to measured f(RH=85%,550nm) and the standard deviation are given in the last two columns. g denotes the hygroscopic growth factor derived from H-TDMA or AMS measurements. See manuscript for details.

	Mean f(RH=85%)$_{\mathrm{meas.}}$	Mean f(RH=85%)$_{\mathrm{pred.}}$	STD f(RH=85%)$_{\mathrm{meas.}}$	STD f(RH=85%)$_{\mathrm{pred.}}$	Mean [f(RH=85%)$_{\mathrm{pred.}}$/ f(RH=85%)$_{\mathrm{meas.}}$]	STD [f(RH=85%)$_{\mathrm{pred.}}$/ f(RH=85%)$_{\mathrm{meas.}}$]
JFJ: g_{HTDMA}	2.28	2.50	0.27	0.30	1.07	0.12
JFJ: g_{AMS}	2.28	2.53	0.27	0.38	1.08	0.13
JFJ: Size dist. const	2.28	2.45	0.27	0.28	1.06	0.14
JFJ: Chem. const	2.28	2.54	0.27	0.17	1.11	0.12
JFJ: Size & chem. const	2.28	2.48	0.27	0.12	1.10	0.14
JFJ: Nessler pred.	2.30	2.36	0.33	0.30	1.07	0.27
NYA: g=1.94 (max)	3.24	5.61	0.63	1.16	1.78	0.41
NYA: g=1.33 (min)	3.24	1.99	0.63	0.12	0.64	0.11
NYA: g=1.6 (mean)	3.24	3.35	0.63	0.44	1.07	0.20
NYA: $g(V_{\mathrm{OPC}}/V_{\mathrm{tot}})$	3.24	3.27	0.63	0.24	1.05	0.19
MHD: g_{HTDMA} all	2.31	2.31	0.55	0.55	1.07	0.18
MHD: g_{HTDMA} clean sector	2.29	2.56	0.18	0.40	1.10	0.16
MHD: g_{HTDMA} polluted sector	1.79	1.81	0.26	0.47	1.00	0.20
CAB: $g_{\mathrm{H-TDMA}}$	2.72	2.46	0.38	0.30	0.91	0.09
CAB: $g(V_{\mathrm{APS}}/V_{\mathrm{tot}},V_{\mathrm{BC}}/V_{\mathrm{tot}})$	2.72	2.69	0.38	0.24	1.00	0.12
CAB: g=1.48 (mean)	2.72	2.45	0.38	0.13	0.92	0.15
MEL: mean g_{AMS} & m_{AMS}	2.77	2.97	0.37	0.19	1.11	0.21
MEL: g_{AMS},m_{AMS}	2.77	2.93	0.37	0.46	1.08	0.22
MEL: g_{HTDMA},m_{AMS}	2.77	2.80	0.37	0.48	1.01	0.18
MEL: g_{AMS},m_{AMS}, size distr. const	2.77	2.91	0.37	0.42	1.07	0.19
MEL: g_{AMS},m_{AMS}, CM NaCl	2.77	3.24	0.37	0.46	1.20	0.25
MEL: g_{AMS},m_{AMS}, CM dust	2.77	2.76	0.37	0.49	1.02	0.22