



Supplement of

Modeled source apportionment of black carbon particles coated with a light-scattering shell

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Supplement:

Comparison of absorption Ångström exponents of the wavelength pairs 470/950 and 440/700

Absorption coefficients at $\lambda = 440 \text{ nm}$, 470 nm , 870 nm and 950 nm were calculated for spherical BC particles coated with an ammonium sulfate shell. The particle size distributions were unimodal with the geometric mean diameter D_g range of $50 - 500 \text{ nm}$, geometric standard deviations σ_g of 1.4 , 1.6 and 1.8 and size-independent shell volume fraction f_s ranging from 0 to 99% . Absorption Ångström exponents α_{abs} were calculated for two wavelength pairs, $440/870$ and $470/950$. See the main text section 2 for details. Fig. S1 presents the scatter plot of these two Ångström exponents, Fig. S2 their size-dependent average differences and Table S1 the statistics of the comparison.

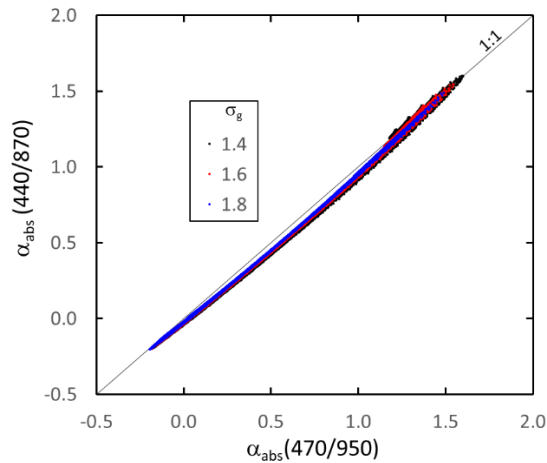


Figure S1. $\alpha_{\text{abs}}(440/870)$ vs. $\alpha_{\text{abs}}(470/950)$ for unimodal coated BC-particle size distributions with the D_g range of $50 - 500 \text{ nm}$, f_s range $0 - 99\%$ and $\sigma_g = 1.4, 1.6$ and 1.8 .

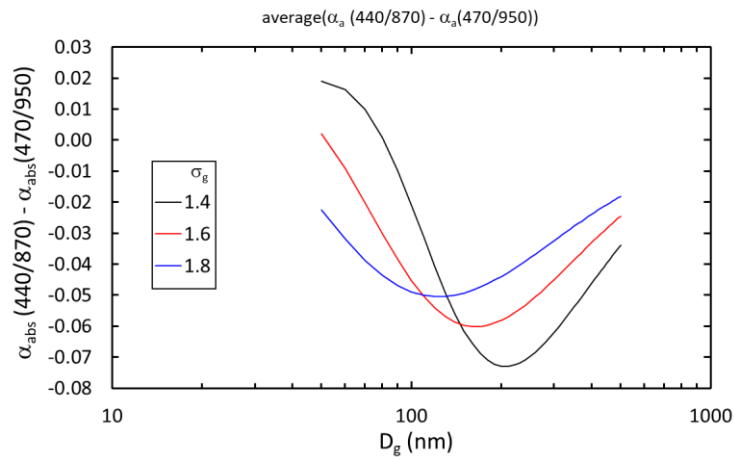


Figure S2. Average difference between $\alpha_{\text{abs}}(440/870)$ and $\alpha_{\text{abs}}(470/950)$ as a function of D_g and σ_g of the size distribution.

Table S1. Statistics of the comparison of $\alpha_{\text{abs}}(470/950)$ and $\alpha_{\text{abs}}(440/870)$. σ_g : geometric standard deviation of the size distributions. k and Y_0 : slope and offset of the linear regression; se : standard error of the respective coefficient; for the difference $\alpha_{\text{abs}}(440/870) - \alpha_{\text{abs}}(470/950)$ and $\alpha_{\text{abs}}(440/870)$ there are shown the average \pm standard deviation, minima and maxima and selected percentiles.

$X = \alpha_{\text{abs}}(470/950)$, $Y = \alpha_{\text{abs}}(440/870)$											
σ_g	linear regression, $Y = kX + Y_0$			Difference $Y - X$				percentiles			
	$k \pm se$	$Y_0 \pm se$	R^2	ave \pm std	min	5	25	50	75	95	max
1.4	1.009 ± 0.0009	-0.053 ± 0.0007	0.997	-0.047 ± 0.028	-0.099	-0.082	-0.070	-0.052	-0.031	0.013	0.042
1.6	0.993 ± 0.0006	-0.038 ± 0.0004	0.998	-0.041 ± 0.018	-0.073	-0.065	-0.056	-0.043	-0.029	-0.012	0.035
1.8	0.978 ± 0.0004	-0.027 ± 0.0002	0.999	-0.034 ± 0.013	-0.059	-0.053	-0.046	-0.035	-0.024	-0.011	0.013