Supplement of Atmos. Chem. Phys., 22, 9265–9282, 2022
https://doi.org/10.5194/acp-22-9265-2022-supplement
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Atmospheric Chemistry and Physics
Open Access
EGU

Supplement of

Quantifying the effects of mixing state on aerosol optical properties

Yu Yao et al.

Correspondence to: Nicole Riemer (nriemer@illinois.edu), Yu Yao (yuyao3@illinois.edu)

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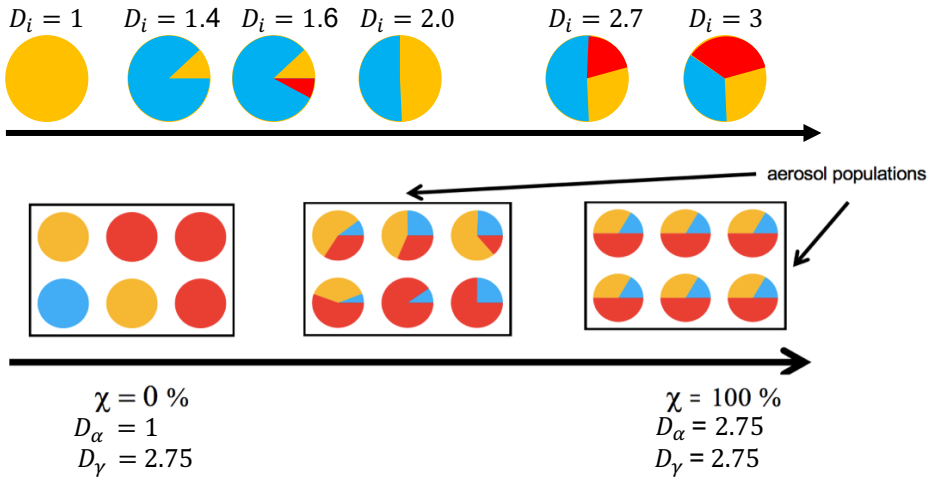

Figure S1. Illustration of single particle diversity D_i, per-particle average diversity D_α, bulk average diversity D_γ and mixing state metric χ.

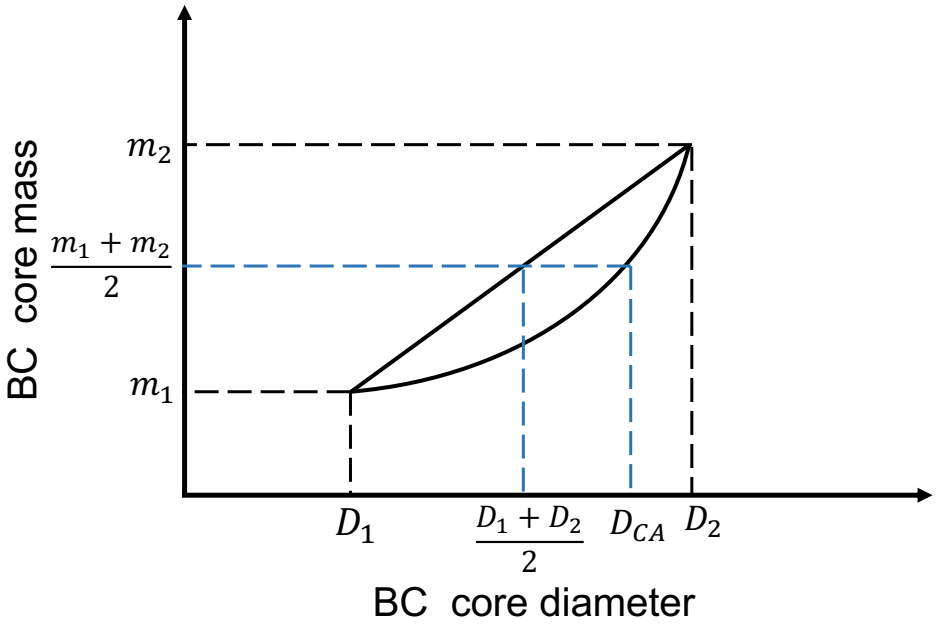

Figure S2. BC core diameter changes due to composition-averaging. The diameters D_1 and D_2 are BC core diameters before composition-averaging and correspond to BC core masses of m_1 and m_2. The diameter D_{CA} is the BC core diameter after composition-averaging corresponding to the particle BC mass after composition averaging, which is the average of the original BC core masses.

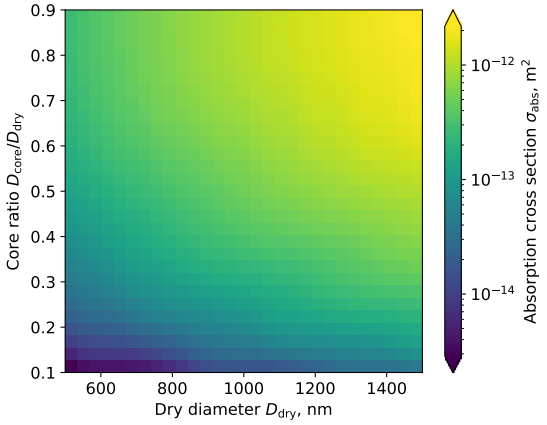

Figure S3. Particle absorption cross section σ_{abs} as a function of dry diameter and core ratio.

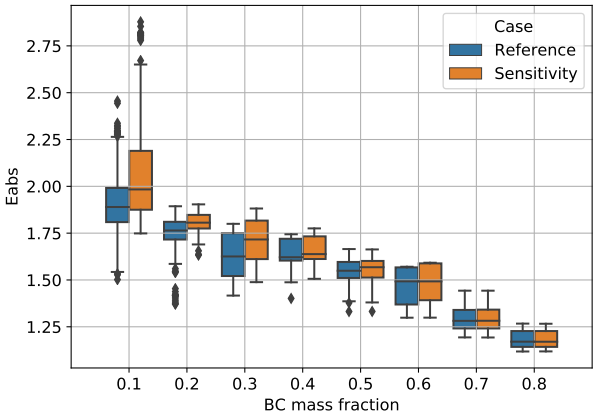

Figure S4. Relation between E_{abs} and bulk BC mass fraction. The bulk BC mass fractions of the populations were binned in increments of 0.1, and for plotting the data was aligned at the right edge of each bin (i.e. the value 0.1 on the x-axis stands for BC mass fractions between 0 and 0.1).

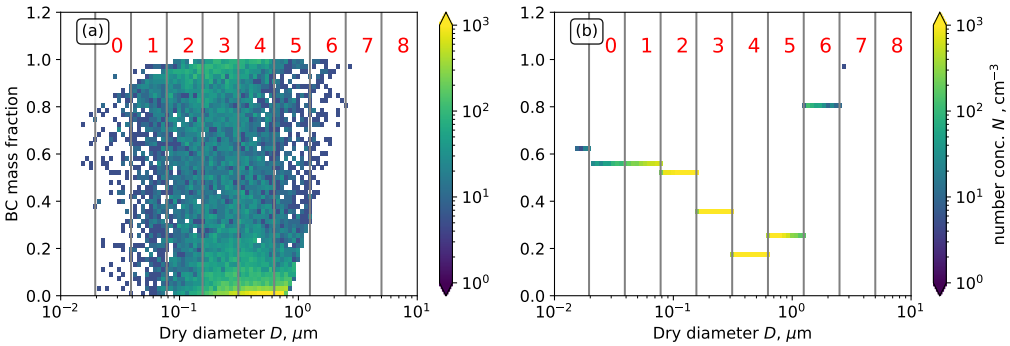

Figure S5. Two-dimensional distributions of BC mass fraction in (a) Reference scenario and (b) Sensitivity scenario at RH0. This population is from scenario 77 at 2 h.

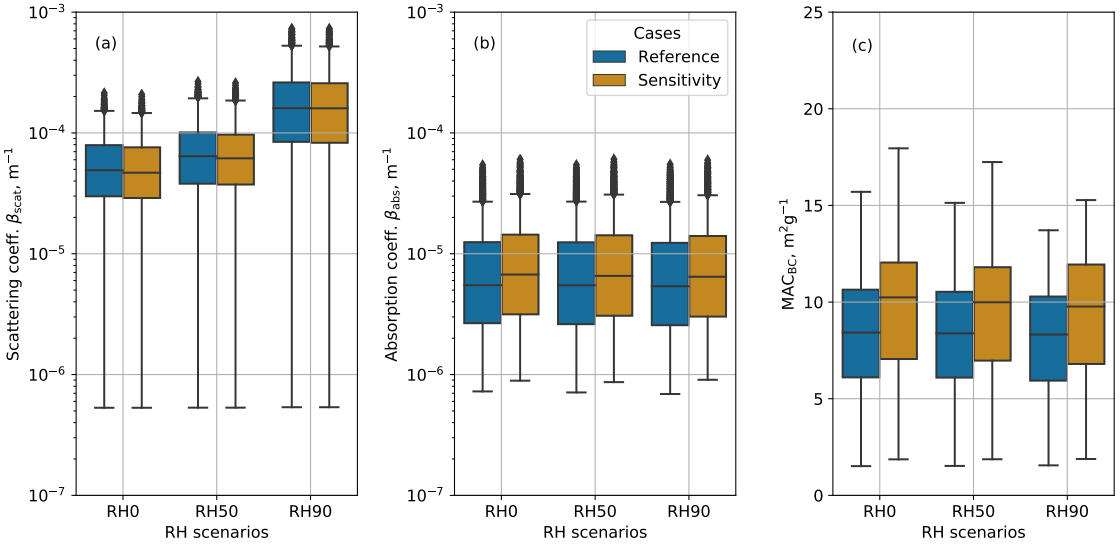

Figure S6. Box plots of (a) volume scattering coefficients β_{scat}, (b) volume absorption coefficients β_{abs} and (c) $\mathrm{MAC_{BC}}$ at the RH levels of 0, 50, 90%. Blue is for populations from the reference library and orange is for the sensitivity library.