Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2020-1238

Anonymous Referee #2

Referee comment on "Measurement report: The effect of aerosol chemical composition on light scattering due to the hygroscopic swelling effect" by Rongmin Ren et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-1238-RC1, 2021

The effects of aerosol chemical composition on the relative humidity dependence of light scattering are presented for a site in Beijing. Parameterizations of f(RH) are developed for different observed conditions (e.g., very clean, moderately polluted, polluted based on measured light scattering levels). The paper is very well written and the figures (with one exception) clearly convey the results of the study. I only have minor comments - see below.

Line 39: change to “that REDUCES the amount”. Also, please add a brief description of how SO2 control reduces the amount of sulfate.

Lines 109 – 111: Why is the absorption coefficient at 880 nm transformed into those at 525 nm? Doesn’t the 7-wavelength aethalometer have a measurement wavelength near to 525 nm?

Lines 163 – 164: It is stated that “the proportion of organic matter and BC with weak hygroscopic abilities was low” from the southeast sector. Figure 3d indicates that mass fractions of BC were high in the southeast sector which seems to contradict this statement. Please clarify in the text.

Figure 6: The inset figures showing organic mass fraction vs. f(RH) are difficult to read because of their size – especially if a reader is looking at a print version of the paper. I recommend putting the insets into a separate figure.

Lines 258 – 260: Please report the mass fractions of organics, SO4, and NO3 if they were provided in Malm et al. (2003), Pan et al. (2009), Quinn et al. (2005), and Yan et al. (2009). It is difficult to assess differences in the role of NO3 versus SO4 in determining f(RH) in these different regions without knowing the chemical composition reported in these previously published papers.

Lines 261 – 263: Does this mean the Chinese government has made more efforts to control SO2 emissions than other governments or has made more efforts to control SO2 than NOx emissions? Please clarify in the text.

Line 315: Please define "DF".