

Interactive comment on “Development of an improved two-sphere integration technique for quantifying black carbon concentrations in the atmosphere and seasonal snow” by Xin Wang and Xueying Zhang

Anonymous Referee #2

Received and published: 8 October 2019

“Development of an improved two-sphere integration technique for quantifying black carbon concentrations in the atmosphere and seasonal snow” by Wang and Zhang.

The paper describes a new methodology for quantifying black carbon concentration in the atmosphere and seasonal snow. The article is appropriate for the AMT journal. The authors have described the methodology in detail and have presented comparison with thermal-optical method. Real data from field has also been presented. I recommend that the article may be published in the AMT journal. My specific comments are:

1. Line 260: What are the factors contributing to the uncertainty? How they are estimated. A little bit more explanation is desired. 2. Line 213, line 231-234, and 278: Mass absorption cross-sections (MAC) at 550 nm 525 nm were assumed. Any reference related to this that may be cited? How broad of the spectrum was averaged for computation using MAC at these wavelengths? Could the uncertainty due to the error in the assumption of MAC be quantified? 3. Figure 2 depicts the schematic of the developed TSI instrument. It would be beneficial to list out the components used in the instrument. For example what was the light source, what wavelength range etc. Similarly on the detector side, and if any optical filters were used. 4. Is broadband attenuation measurement possible with this instrument? If so could this be useful for further speciation based on broad absorption properties? 5. Filter loading is a common problem in similar instruments. Some details on how this was dealt with would be beneficial.

[Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-303, 2019.](#)

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