

Interactive comment on “Key factors affecting single scattering albedo calculation: Implications for aerosol climate forcing” by Duseong S. Jo et al.

Anonymous Referee #2

Received and published: 1 January 2018

Single scattering albedo (SSA) is an important parameter for the aerosol radiative forcing calculations. However, previous studies have not paid much attention to it. Jo et al. 2017 manuscript has tested the sensitivities of SSA to the black carbon (BC) physical properties, the aerosol mixing state, the inclusion of brown carbon (BrC), and the dust size distribution. It concludes some interesting points on the relative roles of these factors on the SSA. Overall, this manuscript reads well and will add some merits to the aerosol community.

Major comments.

The paper concludes that “the external mixing assumption showed better performance than the model using internal mixing assumptions”. I didn’t see the evidence. At least from the Figure 6, while the model with the external mixing assumption underestimated

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the observed SSA, the model with the internal mixing assumption over-predicted the observed SSA. In addition, many studies have shown the BC aerosols in the real atmosphere are indeed internally mixed with organic aerosol and/or sulfate aerosol. Therefore the internal mixing assumption is physically more realistic than the external mixing assumption.

This study conducted many cases (over 10, for example, see the table 5), which results in many acronyms. This makes it confusing to read the paper. So I suggest making an extra table (like table 3) to explain the names of these cases.

Minor comments

Page 6, line 19. Can the authors briefly explain how they calculated the BrC/OC ratio here so that the readers would have a basic idea without reading the reference?

Page 9, line 9. Can the authors give a reference for choosing 0.012 micrometer here?

Page 10, line 7. Please change “between” to “of”. And also change that on the line below.

Page 15, line 10. The value of 0.949 is the mean value?

Page 16, line 15. This line reads odd. I don’t follow that.

Page 17, line 20-21. This sentence reads odd too.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-1104>,
2017.