

## ***Interactive comment on “The Absorption Ångström Exponent of black carbon: from numerical aspects” by Chao Liu et al.***

**Chao Liu et al.**

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Received and published: 4 November 2017

First, we would like to thank the reviewer for his/her valuable comments, and these suggestions will significantly improve the manuscript. We agree with him/her that the topic and focus of this study is quite important, and this study tries to provide a rigorous and systematic research on BC AAE. However, the reviewer may misunderstand some details of this study due to our unclear discussions. We would like to present a short reply at this point, and a more detailed response as well as revision will be provided after the discussion is closed.

1. Actually, all results shown in the manuscript are bulk scattering properties averaged over an ensemble of particles, and, thus, we only mention the integral over particle size

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once at Page 7 line 25-27. Because the corresponding discussion is not emphasized enough in the paper (Actually we found that it is only mentioned once briefly), and readers may easily miss the point. Thus, we really thank the reviewer for pointing this out, and we will include much more discussions in the revision to indicate that all results are based on bulk properties.

2. To carry out a fair comparison, the results are illustrated with a constant BC amount/volume. Thus, the GMD is used to describe the diameter of the corresponding volume-equivalent sphere for aggregates, and that of BC core is considered for the coated particles. Furthermore, the MSTD used in this study is an accurate model to account for the interaction between BC aggregates and the coating sphere. We will clarify those points with much more details in the revision.

3. We did miss some of the key references in the manuscript, and we will include more in the revision. Thanks the reviewer for providing the corresponding comments.

We will stress other comments in details after the discussion is done.

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-836>, 2017.

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