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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Different trends between extreme and median surface aerosol extinction coefficients over China inferred from quality controlled visibility data" *by* Jing Li et al.

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Anonymous Referee #1 Received and published: 27 October 2017 This is original analysis air pollution trends in China based on aerosol extinction mea- surements. The paper is well structured and clearly written. I do not find any scientific errors in methods or data interpretation. I recommend this paper to published in ACP after considering the following minor issues.

Thank you very much to the reviewer for his/her encouraging comments on our paper! We have replied to the specific comments below, and have also revised the manuscript accordingly.

Scientific issues: Lines 53-55: There is at least one more point why remote sensing observations are problematic here: they do not easily distinguish between different mixed-layer height, which is a major parameters affecting surface air pollution.

Thanks a lot for this note. We added a discussion here as follows: "Moreover, remote sensing techniques cannot recognize mixed layer height, a major parameter affecting surface air pollution, which make them unsuitable for air quality studies."

Lines 61-63. The authors compared visibility observations against remote sensing here. How about in situ measurements of air pollution vs. visibility observations? I suppose that there are clear differences in terms of both spatial coverage and length of time series. I would like to see in situ measurement shortly (couple of lines) mentioned in this context as well.

We did compare visibility converted AEC data against in situ PM2.5 and PM10 observations in our previous paper: Li, J., C. Li, C. Zhao, and T. Su (2016), Changes in surface aerosol extinction trends over China during 1980–2013 inferred from quality-controlled visibility data, Geophys. Res. Lett., 43, 8713–8719, doi:10.1002/2016GL070201.

The figure is attached at the end.

We also added a phrase here that the visibility data used in this study compare well with surface air quality measurements. In the end of Section 2.1 we also mentioned that "This AEC dataset has also been validated against surface PM2.5 and PM10 measurements. Please refer to Li et al. (2016) for detailed description of the correction and validation processes."

Technical issues: The use of tense is not in a good balance in the abstract. I would recommend the authors to consider this point carefully and make the necessary revisions. Both AEC and its trend have a unit. It seems that these units have been scaled out somehow from figures 1-4, making it impossible interprete the real magnitude of AEC (or its trend) from these figures. The authors should add this information.

We are sorry for the confusion. The reviewer is correct in that the unit of AEC has been scaled out, i.e., the trends in this paper actually refer to relative changes. This is because the absolute magnitudes of mean and extreme AEC are different and thus the absolute trends cannot be directly compared. We have ensured that the term trend is consistent throughout the manuscript. We have also added an explanation in the abstract that the magnitude of the trends are “expressed in terms of relative changes”.

line 266-267: studies – > studied...remains to be understood whether...

Corrected.

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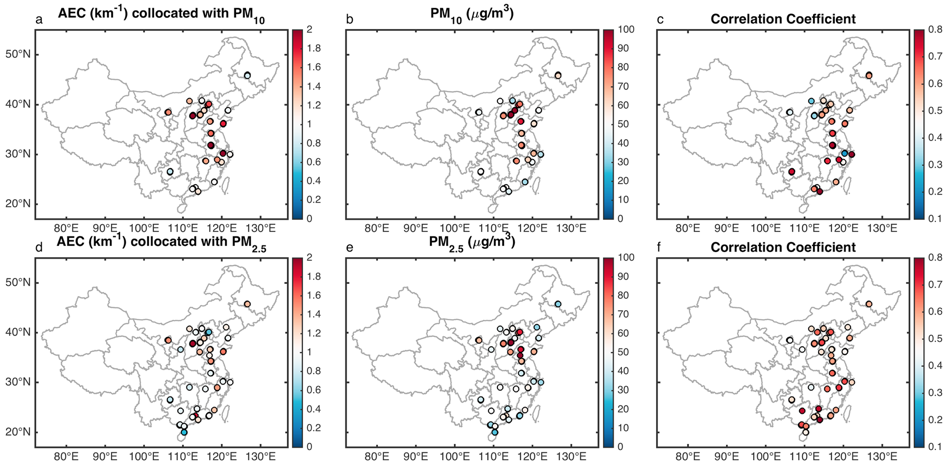

Fig. 1. Figure R1. Validation of visibility converted aerosol extinction coefficient (AEC, km-1) against PM10 (μg/m3) and PM2.5 (μg/m3) concentration. (a–c) The spatial distribution of AEC collocates with PM1