

General Comments:

The paper is very interesting and well written. As the authors state at the beginning, the presented database is very useful for future studies on climate and the atmospheric environment over China.

Response: The authors would like to appreciate the reviewer's positive comments.

The authors also say that other parameters, such as single scattering albedo, should be measured in the future. However I wonder if some of these retrievals are already available for at least some sites, and particular cases. In fact it is very difficult understanding the origin and type of particles analyzing only AOD and Angstrom exponent.

Response: Yes. The authors agree with the reviewer. There are already some retrievals about SSA and size distributions for some CARSNET sites for the research of urban pollution events. For all sites data processing, it is conducting now.

For example at the end of page 10 and the beginning of page 11, it is written that large Alpha (>1.20) were found along the southern reaches of the Yangtze River and at clean sites of NE China. In these two cases particles are very different and in the southern sites there is very high AOD, whereas in the northeast sites AOD is smaller. I expect very absorbing particles in the former respect to the latter, and this information (given by SSA) would be very useful in this case.

Response: Yes. We agree that the speculation could be right. Recently, we analyzed the SSA of urban and suburban region of Yangtze River and found that the SSA of urban area is obviously lower than the suburban ones which suggests the absorbing particles in urban areas are more than suburban clean ones in Yangtze River region.

Another case is at the beginning of section 3.2.1 where the AOD variation at Akedala from June-July to October-December is supposed to be due to local burning of coal for cooking and heating. If possible, I suggest the authors to provide SSA albedo results in the above cases and in similar others.

Response: So far we have not processed the SSA data of Akedala site. The explanation in this article is just offer a possible reason and needs to be prove in future.

Specific Comments

Below find minor suggestions:

1) Abstract and summary: specify the wavelength AOD is referred to, and the wavelengths used for the calculation of Angstrom exponent.

Response: The wavelength information has been added in the revised manuscript.

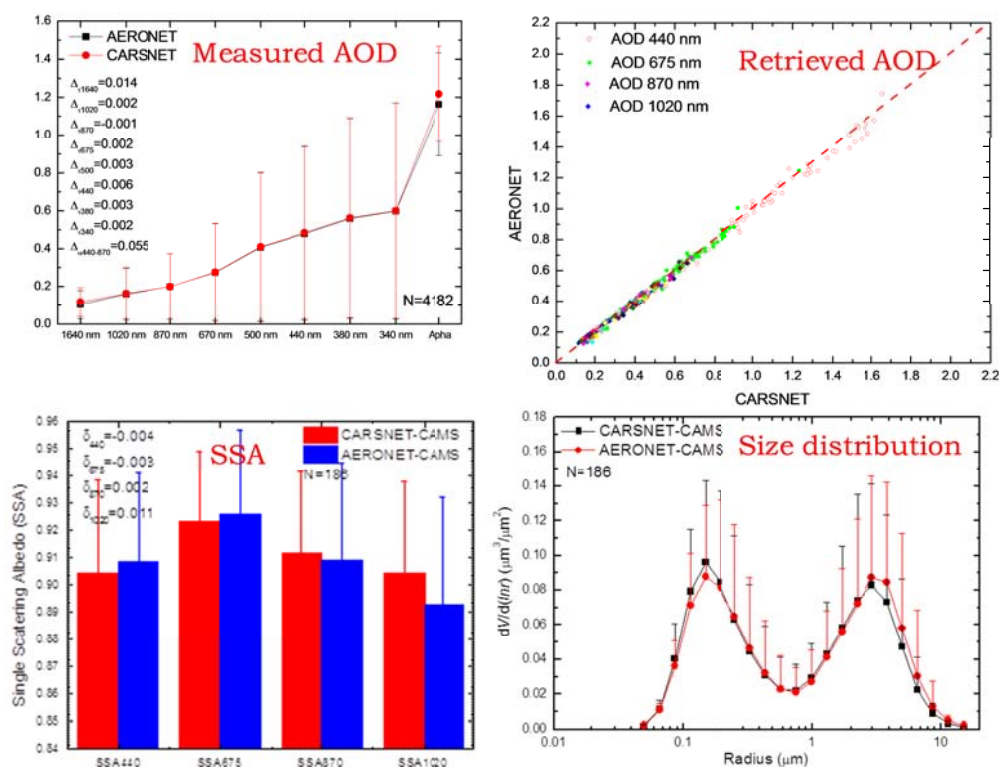
2) pag 7, line 3: I think that "urban sites" are not the "d" ensemble of rural sites, but it the the 3rd ensemble (remote, rural, urban). Remove "d".

Response: Yes. According to the reviewer's suggestion, "(d)" has been deleted in the

revised manuscript.

3) Pag 7 line 24: Did you develop you own retrieval software, or did you use the AERONET official software? Why these values are not presented in this paper?.

Response: Yes. We combined Dubovik's processing code and the pre-processing code written by Dr. V. Estelles and improved by X. Xia and H.Che to processing sky measurements of CARSNET. The inter-comparison between AERONET results and CARSNET ones show good consistencies (see Figure below). The related publication is preparing and this manuscript is mainly focus on AOD and AE. Thus we did not mention much about the retrieval in this paper.



4) Pag 8 line 10: not all the instrument types has the 500 nm wavelength. Does the master instrument has it? Has the master instrument the largest number of wavelengths in order to make possible the intercalibration of all the types of Cimel?

Response: Yes. The master instruments have 9 wavelengths at 340, 380, 440, 500, 670, 870, 940, 1020, and 1640 nm. Thus the masters could be used for the inter-calibration of all types of Cimel field instruments of CARSNET.

5) pag9 line 6: was the interpolation performed for daily averages or for all the data?

Response: The interpolation was performed for daily averages based on the annual inter-calibration coefficients.

6) Figure 2, at which wavelength is the AOD? what the box at the right bottom of

Figures 2 should indicate?.

Response: AOD at this paper refers to AOD at 440nm. The right bottom of Figures 2 is part of map of whole China including the islands of South China Sea region.

7) Figure3: the Nanning area seems to be very polluted, all the year. Can you provide any reason? is this site affected by Hong Kong or it produces emissions by itself?

Response: Nanning is far from Hong Kong where pollutions could hardly be transported to Nanning. The AOD is high mainly due to the emissions by Nanning itself. Nanning is the capital city of Guangxi Zhuang Autonomous Region of China with more than 7 million people and 1 million vehicles there. Moreover, it belongs to basin geophysical characteristic. The AOD is high all the year could be related to this special geographical characteristic, which is against pollution diffusion.

8) Pag 13: What are the values of AOD and Alpha shown in line 21? In line 16-17 it is written that the mean values are 0.42 and 0.82.

Response: They are the average values of AOD and AE over 11 rural desert sites. Now it has been corrected as "The average AODs and Alphas at the CLP stations were higher than those over the desert regions (0.34 ± 0.12 for AOD and 0.55 ± 0.19 for AE)."

9) In the text the references to Figures 6-10 are missing.

Response: The references to Figure 6-10 have been added in the revised manuscript.

10) Pag 25, lines 24-25: the meaning of the following sentence is not clear

" CARSNET operates two pairs of sites with both urban sites and rural stations.

Response: The sentence has been revised as following "Among CARSNET sites, there are Beijing and Lanzhou with both urban sites and rural stations."