

## ***Interactive comment on “Ground-based aerosol climatology of China: aerosol optical depths from the China Aerosol Remote Sensing Network (CARSNET) 2002–2013” by H. Che et al.***

**Anonymous Referee #3**

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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. 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. 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

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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. 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. 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. 2) pag 7, line 3: I think that "urban sites" are not the "d" ensemble of rural sites, but it is the 3rd ensemble (remote, rural, urban). Remove "d". 3) Pag 7 line 24: Did you develop your own retrieval software, or did you use the AERONET official software? Why these values are not presented in this paper?. 4) Pag 8 line 10: not all the instrument types have the 500 nm wavelength. Does the master instrument have it? Has the master instrument the largest number of wavelengths in order to make possible the intercalibration of all the types of Cimel? 5) pag 9 line 6: was the interpolation performed for daily averages or for all the data? 6) Figure 2, at which wavelength is the AOD? what the box at the right bottom of Figures 2 should indicate?. 7) Figure 3: 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? 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. 9) In the text the references to Figures 6–10 are missing. 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."

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