General comments:

This paper studied more than 10 years' measurements of aerosol optical depths and Angstrom exponents made for 50 sites of CARSNET compiled into a climatology of aerosol optical properties for China. This is an outstanding work about the ground-based aerosol optical property study. It lets us see a detailed full-scale description of AOD observations over China. The results would benefit us a lot in comprehending the temporal and special distribution aerosol optical property over China. Also the data would be worthful to those communities of aerosol satellite retrieval, modelling validation, numerical assimilation, etc. I do think CARSNET contributions to science would be extremely important for Chinese science and the world in future. This article is clearly structured and English usage is very good, well suited for the publication in ACP. I just have few minor suggestions for the author to consider before the final publication.

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

Special comments:

(1) Introduction part: I suggest the authors include more related references about ground-based aerosol optical property study of China. As far as I know, there are at least 10 references about Cimel aerosol optical property study which the authors ignored to cite in the context.

Response: According to the reviewer's suggestion, the following 14 references have been added in the revised paper:

1. *Chaudhry, Z., Martins, J. V., Li, Z., Tsay, S.-C., Chen, H., Wang, P., Wen, T. , Li, C., and Dickerson, R. R.: In situ measurements of aerosol mass concentration and radiative properties in Xianghe, southeast of Beijing, J. Geophys. Res., 112, D23S90, 2007. doi:10.1029/2007JD009055.*
2. *Che, H., Xia, X., Zhu, J., Wang, H., Wang, Y., Sun, J., Zhang, X., and Shi, G.: Aerosol optical properties under the condition of heavy haze over an urban site of Beijing, China. Environ. Sci. Pollut. R., 22, 1043-1053, 2015a. DOI: 10.1007/s11356-014-3415-5*
3. *Che, H., Zhao, H., Wu, Y., Xia, X., Zhu, J., Wang, H., Wang, Y., Sun, J., Yu, J., Zhang, X., and Shi, G.: Analyses of aerosol optical properties and direct radiative forcing over urban and industrial regions in Northeast China. Meteorol. Atmos. Phys., 127, 345-354, 2015b. DOI 10.1007/s00703-015-0367-3.*
4. *Chen, J., Jiang, H., Wang, B., Xiao, Z., Jiang, Z., Zhou, G., and Yu, S: Aerosol optical properties from Sun-photometric measurements in Hangzhou, China, Int. J. Remote. Sens.,33, 2451-2461, 2012. doi: 10.1080/01431161.2011.611184.*
5. *Cheng, T., Liu, Y., Lu, D., Xu, Y., and Li, H.: Aerosol properties and radiative forcing in Hunshan Dake desert, northern China, Atmos. Environ., 40, 2169-2179, 2006. doi:10.1016/j.atmosenv.2005.11.054*
6. *Cheng, T., Xu, C., Duan, J., Wang, Y., Leng, C., Tao, J., Che, H., He, Q., Wu, Y., Zhang, R., Li, X., Chen, J., Kong, L., and Yu, X.: Seasonal variation and difference of aerosol optical properties in columnar and surface atmospheres over Shanghai, Atmos. Environ., 2015. doi: 10.1016/j.atmosenv.2015.05.029 (in*

press).

7. *Li, B., Yuan, H., Feng, N., and Tao, S.: Comparing MODIS and AERONET aerosol optical depth over China, Int. J. Remote. Sens., 30, 6519-6529, 2009.*
8. *Logan, T., Xi, B., and Dong, X.: A comparison of the mineral dust absorptive properties between two Asian dust events, Atmosphere, 4, 1-16, 2013. doi:10.3390/atmos4010001.*
9. *Wu, Y., Zhu, J., Che, H., Xia, X., and Zhang, R.: Column-integrated aerosol optical properties and direct radiative forcing based on sun photometer measurements at a semi-arid rural site in Northeast China, Atmos. Res., 157, 15 56-65, http://dx.doi.org/10.1016/j.atmosres.2015.01.021.*
10. *Xue, Y., Xu, H., Guang, J., Mei, L., Guo, J., Li, C., Mikusauskas, R., and He, X.: Observation of an agricultural biomass burning in central and east China using merged aerosol optical depth data from multiple satellite missions, Int. J. Remote. Sens., 35, 5971-5983, 2014. http://dx.doi.org/10.1080/2150704X.2014.943321.*
11. *Yu, X., Zhu, B., Yin, Y., Fan, S., and Chen, A.: Seasonal variation of columnar aerosol optical properties in Yangtze River Delta in China, Adv. Atmos. Sci., 28, 1326-1335, 2011.*
12. *Zhang, J., Chen, J., Xia, X., Che, H., Fan, X., Xie, Y., Chen, H., and Lu, D.: Heavy aerosol loading over the Bohai Bay as revealed by ground and satellite remote sensing, Atmos. Environ., 2015. doi:10.1016/j.atmosenv.2015.03.048. (in press).*
13. *Zhuang B.L., Wang T.J., Li S., Liu J., Talbot R., Mao H.T., Yang X.Q., Fu C.B., Yin C.Q., Zhu J.L., Che H.Z., and Zhang X.Y.: Optical properties and radiative forcing of urban aerosols in Nanjing, China, Atmos. Environ., 83, 43-52, 2014. http://dx.doi.org/10.1016/j.atmosenv.2013.10.052.*
14. *Zhou, C. Gong, S., Zhang, X., Liu, H., Xue, M., Cao, G., An, X., Che, H., Zhang, Y., and Niu, T.: Towards the improvements of simulating the chemical and optical properties of Chinese aerosols using an online coupled model CUACE/Aero. Tellus B, 64, 18965, 2012. http://dx.doi.org/10.3402/tellusb.v64i0.18965*

(2) Page 12719, line 18-19: One more reference of Wang et al. 2011 JGR should be added.

Response: The Wang et al. (2011 JGR) has been added in the revised context.

(3) Page 12722, line 4: It should be “Holben et al., 1998”. Please correct it.

Response: This mistake has been corrected in the revised manuscript.

(4) 3 Results: CARSNET measurements: I suggest the authors add more literatures related to prove their explanations and speculations.

Response: In the Result part, the authors have added some related publications to support the explanations and the speculations.