

Response to Anonymous Referee #1

Thanks for your comment, we agree with you. The average values of SSA and g from AERONET measurements of Xianghe site are shown in Figure 2 of the manuscript. And a paragraph is added in Section 4.1 to discuss this result.

Response to Anonymous Referee #2

Thanks for your comment. The changes about “observing an incomplete diurnal cycle has only second-order consequences on direct radiative effect estimates” can be found in lines from 393 to 396 and 427 to 429 of the manuscript.

As for the change of the refractive index of core, the results have changed a little bit, and it does not affect the conclusion made in this research. Previously, the refractive index of black carbon (BC) used in researches of our group is from (Seinfeld and Pandis, 2006). We think the values of refractive indices should be consistent with those used in (Ma et al., 2012) due to the optically equivalent mixing states retrieved from (Ma et al., 2012) are used in this research.

Ma, N., Zhao, C. S., Müller, T., Cheng, Y. F., Liu, P. F., Deng, Z. Z., Xu, W. Y., Ran, L., Nekat, B., van Pinxteren, D., Gnauk, T., Müller, K., Herrmann, H., Yan, P., Zhou, X. J., and Wiedensohler, A.: A new method to determine the mixing state of light absorbing carbonaceous using the measured aerosol optical properties and number size distributions, *Atmos. Chem. Phys.*, 12, 2381-2397, 10.5194/acp-12-2381-2012, 2012.

Seinfeld, J. H., and Pandis, S. N.: *Atmospheric chemistry and physics: from air pollution to climate change*, John Wiley & Sons, 2006.

Thanks for your kindly reminds for typos, and we revised them accordingly.