This study discussed the diurnal variations of AOD and PM2.5 in South Korea based on the Aeronet, satellite (GOCI), KORUS-AQ observation and WRF-Chem model. Although the authors highlighted the diurnal variations of AOD and PM2.5, the scientific questions are not mentioned in the whole manuscript especially in introduction. I believe the parameters of diurnal variations of AOD and PM2.5 may be useful for the assessment of aerosol radiative forcing, but this study is out of this topic.

Reply. Thank you for your review. The importance of diurnal variation of AOD vs. PM2.5 relationship is discussed in the introduction section and section for background and motivation. As articulated in these sections, there is a growing interesting to derive surface PM2.5 from satellite-based AOD and other ancillary data

Moreover, there is nothing new findings of this manuscript and the ACPD revision was similar with the original version with few revision. I wish the authors would address the followed critical comments and carefully polish the English throughout the manuscript.

1. I suggest the authors to provide the progress of relevant studies in South Korea rather than USA in the section of introduction or the background and motivation.

Reply. We added the following into the discussion. If there more suggestions, please us know. "In South Korea, Ghim et al. (2015) showed that PM2.5 average concentration in Seoul in 2002-2008 peaks at 9 am and again around mid-night, but such typical diurnal variation can sometimes be affected by long-range transport of dust. Similar diurnal variation for PM10 was also found by Yoo et al. (2015) over the S. Korean Peninsular, although its peak at daytime is one hour lagged behind that of PM2.5, which is found in Ghim et al. (2015). Furthermore, both Ghim et al. (2015) and Yoo et al. (2015) showed that PM concentrations can significantly vary with space and time."

Ghim, Y. S., Y.-S. Chang, and K. Jung (2015), Temporal and Spatial Variations in Fine and Coarse Particles in Seoul, Korea, *Aerosol and Air Quality Research*, *15*(3), 842-852, doi:10.4209/aaqr.2013.12.0362.

Yoo, J. M., M. J. Jeong, D. Kim, W. R. Stockwell, J. H. Yang, H. W. Shin, M. I. Lee, C. K. Song, and S. D. Lee (2015), Spatiotemporal variations of air pollutants (O_3, NO_3, SO_2, CO, PM_{10}, and VOCs) with land-use types, *Atmos. Chem. Phys.*, *15*(18), 10857-10885, doi:10.5194/acp-15-10857-2015.

2. Since the results from WRF-Chem were poorly matched with the observation, why the authors still used it? What can we learn from it?

Reply. We didn't use WRF-Chem for any process studies in this paper. Part of the motivation for this paper is to evaluate the performance of WRF-Chem . We found that WRF-Chem AOD in average has close-to-zero mean bias with respect to AOD measured by AERONET (Fig. 5a), although the correlation is only 0.4. This low correlation is in part because the model lacks the fidelity for describing diurnal variation of AOD, which suggests future improvement for WRF-Chem. Thereby, the observation data can be helpful for improving the model prediction. We discussed those in the summary section of this paper.