

Reviewer 2:

Comments: The authors use more than two years of CATS data to examine the diurnal cycles of the aerosol loading on global scale. Their results show that a strong peak at 6 am local time in aerosol extinction profile over North Africa during the June-November season. This finding is exciting and brand new. I would recommend this manuscript be published in ACP after a few minor changes

Response: We thank the reviewer for his/her encouragement and his/her thoughtful comments

Comments: (1) In Figure 5, there are some spikes above 2 km in the aerosol extinction vertical profiles seen in the CATS data, but not present in the CALOP data. Are they due to the cloud screening differences between CATS and CALIOP?

Response: We suspect that the high spikes were introduced by a bug in the code which allowed a very small number of larger extinction values through. This has been fixed, and the spikes are no longer present. The overall shapes of the profiles remain unchanged.

Comments: (2) Line# 353-354, unlike CALIOP, MODIS Aqua aerosol products are only available in the early afternoon, but not in the early morning, since the algorithm only performs retrieval over daytime.

Response: We have revised the sentence to “as CALIOP provides early morning and afternoon over passes, and Aqua MODIS has an over pass time after local noon, ”

Comments: (3) Line# 355-356, please add a sentence or two to briefly elaborate what aerosol above cloud issues are as reported by Rajapashe et al., (2017).

Response: This study has been explained in Section 2.2. To avoid duplication, we have revised the sentence to “It is also possibly due to aerosol above cloud related issues as reported by Rajapakshe et al. (2017), as explained in Section 2.2”

Comments: (4) Line# 358, please spell out “AGL”.

Response: Done. We have added “Above Ground Level (AGL)”

Comments: (5) The aerosol extinction at 1064 nm may not be as sensitive to the fine mode aerosols (such as smoke and urban pollutant aerosols) compared to the coarse mode aerosols (such as dust). The authors probably should add a few sentences to address this

Response: Great point. We have added the following discussions to address this issue. "Still, readers shall be aware that AOD retrievals at the 1064 nm are less sensitive to fine mode aerosols such as smoke and pollutant aerosols, compared to coarse mode aerosols such as dust aerosols. Thus, an investigation of diurnal variations of aerosol properties at the visible channel may be also needed for a future study."