

Interactive comment on “Measurement Report: Determination of aerosol vertical features on different time-scales over East Asia based on CATS aerosol products” by Yueming Cheng et al.

Anonymous Referee #1

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General comments:

The aerosol vertical distribution is crucial to the study of aerosol climate and environmental effects. Characterizing the diurnal variation of aerosol species in the atmosphere on a regional basis is an important project and can only be achieved by satellite measurements. Currently, due to the orbit limitations in most satellite instruments, it is still challenging for people to have a complete acknowledge of aerosol vertical structure. Moreover, there is seldom study focusing on the diurnal variations of aerosol vertical distribution. In this paper, the authors take the advantage of the Cloud-Aerosol Transport System (CATS) lidar on board the International Space Station (ISS) to report

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the temporal-spatial distributions of aerosol properties especially the diurnal vertical variations over the East Asia. This paper also investigates the possible reasons for the aerosol vertical variations in three typical regions. This measurement report is a good contribution to our understanding of the aerosol vertical features and the aerosol diurnal variations over East Asia. It is also helpful for the improving of aerosol vertical modelling over this important region. Generally speaking, the manuscript is scientific sound and well written and organized. I recommend to accepting it after minor revision.

Major comments:

1. The number of CATS observations over each selected regions are significantly different during the four local times. The authors should clearly present the available sample of the observations per 6-hour and discuss the sample effect on the analysis of aerosol diurnal variations.
2. Although CALIPSO is unable to provide the aerosol observations at various local times, since it is the longest existing satellite with lidar system, the authors should consider to validate the CATS observations using the CALIOP observations at least during the overpass times.

Specific comments:

1. Lines 95-96, it is difficult to understand ‘allows CATS to observe more comprehensive coverage of the tropics and midlatitudes at different local times each overpass with roughly a 4 day repeat cycle’, please restructure this sentence.
2. Line 107, please clarify the quality-control procedures in detail.
3. Restructure the sentence in Lines 139-140.
4. Figure 2, ‘Spring’ should start with lower case in figure caption.
5. Lines 185-186, the authors state that ‘the dominant compositions vary with season and height’ and ‘the dominant aerosol in North China is pure dust aerosol in all sea-

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sons'. There are some inconsistencies between these two sentences, please modify it.

6. Figure 3, the color of 'Marine Mixture' is difficult to distinguish.

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