

## ***Interactive comment on “Evaluating nighttime CALIOP 0.532 $\mu\text{m}$ aerosol optical depth and extinction coefficient retrievals” by J. R. Campbell et al.***

### **Anonymous Referee #2**

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The manuscript presents an evaluation of the CALIPSO nighttime and daytime cloud-screened 1-degree averaged aerosol product using the NAAPS model with satellite data assimilation. The model is employed to bridge a gap between daytime passive satellite and high quality nighttime lidar observations. The paper is well written; the CALIPSO and NAAPS data qualities are discussed in extensive detail. The potential issues are clearly identified. The paper is clearly relevant and appropriate for publication to AMT. I highly recommend the paper for publication after few general comments are addresses. I do not have much to add to the specific comments of the previous review.

## GENERAL COMMENTS:

- Authors should clarify the goals of the study. It is not completely clear if the main goal of the paper is to contribute to CALIPSO validation efforts by evaluating the CALIOP cloud-cleared climatology, or to evaluate the applicability of the CALIOP AOD climatology for potential assimilation into NAAPS.
- Authors should add additional discussions on when CALIPSO-NAAPS differences are likely to be attributed to NAAPS/and satellite retrieval biases (likely for land-water differences) and when differences are due to the CALIPSO retrievals themselves (likely due to aerosol model assumptions as pointed out in the previous review).
- Authors state on the page 2756 that NAAPS model errors co-vary close with those of satellite data. Is it true for 00-hr NAAPS analysis that was compared to CALIPSO data? NAAPS nighttime data when there is no satellite data is available for assimilation might differ from those of satellites.

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Interactive comment on Atmos. Meas. Tech. Discuss., 5, 2747, 2012.

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