Reviewer 2

Reviewer: The matchup data in the tables are appreciated. But, I would impress the importance of considering how the community is to use this data and general conclusions.

(1) *Reviewer: First, regressions provide information, but RMSE values should also be included. MODIS AOT bias, RMSE, and RMSD as well as mean absolute error as a function of AATS AOT (or given how few data points there are, smoke and background) ultimately is what defines error. These parameters should be compared and contrasted for 3 and 10 km products, thus defining what "noisier" actually means in the conclusions.*

Response: Tables 2 and 3 already include values of RMSD (=RMSE) and mean MODIS minus AATS absolute and relative difference (=bias). They now also include a column for p-values. As noted in the response to Reviewer 1's comments, we have deleted "noisier". We have edited the text in a number of places to refer to specific values of bias and RMSD. This data set is too limited to permit an objective calculation of mean absolute error as a function of AATS AOT.

(2) *Reviewer: I also think a little more effort should be placed on identifying specific biases, perhaps Hyer et al., 2011 should be reviewed. For example, is there any bias as a function of lower boundary condition? Since the AATS has a 2.2 um channel, maybe the 2.2 AOT should be looked at. The figures only have wavelengths out to 0.7 um…*

Response: The number of AATS/MODIS near-coincident data points is simply too limited to permit the type of analysis reported in Hyer et al. (2011) or Levy et al. (2010), for which thousands of AERONET/MODIS data points were available. We have added a paragraph at the end of Section 1 that discusses the merits and the drawbacks of the airborne sunphotometer study, and we amplify this in the conclusions. The MODIS 2.1 micron AOD over land is an unvalidated product, and while it may tell us something about the retrieval, it has no information about the Earth. Therefore, we purposely chose to exclude both MODIS and AATS data at 2.1 μm and to focus on the 0.553 μm MODIS AOD product.

(3) *Reviewer: As for the spectral dependence issue, slope from AE is a bit problematic. I would very much like to see at least error stats to be presented for a couple of wavelengths, even if the general conclusion that there is no sizing information in the retrieval. The reason for this is that I have seen several wavelengths used by modelers, not just 550 but also 670.*

Response: We calculated MODIS AE by fitting log(AOD) vs log(wavelength) for the three shortest MODIS wavelengths of 466, 553, and 645 nm (Section 2.1), and we cite these calculated values sparingly in the text. However, we only show MODIS AOD at multiple wavelengths in the spectral plots, as we chose to focus our study on comparing AODs at 553 nm only; in fact, this decision was based on the Levy et al. (2010) conclusion (referenced in Section 2.1 of our manuscript) that is no sizing information in the MODIS AE, but rather it just reflects algorithm assumptions about particle type. Following (at least partially) Reviewer 1's suggestion, we have deleted Figure 14 and the corresponding text in Section 3.6. However, we have chosen to retain

Table 3, which includes the various statistical measures (R^2 and associated p-value, bias, RMSD) for calculated AE. Our limited data set provides no evidence to refute the Levy et al. (2010) conclusion on the information content of the MODIS AE.

(4) *Reviewer: Finally, one more important point should be mentioned is that satellite-airborne comparisons tend to portray satellite data at its best….Thus, representativeness of studies like these need at least a few sentences of attention.*

Response: The original manuscript addressed the limitations of our analysis in the last paragraph (unchanged in the draft revision) of Section 1. As noted in our response to (2) above, we have amplified this by adding another paragraph (at the end of Section 1) that discusses the merits and the drawbacks of airborne sunphotometer/satellite comparison studies compared to ground-based sunphotometer/satellite studies. We address this further in the last paragraph (Section 4) of the manuscript.