

## ***Interactive comment on “Comparison of MODIS 3 km and 10 km resolution aerosol optical depth retrievals over land with airborne sunphotometer measurements during ARCTAS summer 2008” by J. M. Livingston et al.***

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Review: This review is short not because I did not thoroughly read the paper, but I am short of time with the ongoing SEAC4RS mission. First and foremost, I agree with anonymous reviewer #1, and will not repeat most of these points. These papers from the Ames group are pretty consistent across the field campaigns. That is not to say these are not useful, indeed such studies are critically important. But, they have the formula down. The matchup data in the tables are appreciated. But, I would

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impress the importance of considering how the community is to use this data and general conclusions. 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.

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  $\mu\text{m}$  channel, maybe the 2.2 AOT should be looked at. The figures only have wavelengths out to 0.7  $\mu\text{m}$ . Thick smoke can impact the near IR. Partly because of simple high AOT can drag out there, particles because there is at times a significant coarse mode associated with large ash and dust particles entrained into the smoke.

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.

Finally, one more important point should be mentioned is that satellite-airborne comparisons tend portray satellite data at its best. After going through the AATS teams papers in the past, we have found the regression data is much better than that from AERONET data. Part of this is because the aircraft can fly a gradient across an optically consistent air-mass. Thus, representativeness of studies like these need at least a few sentences of attention.

-Jeffrey Reid