**Atmospheric
Measurement
Techniques**
Discussions

Interactive comment on "MODIS 3 km aerosol product: applications over land in an urban/suburban region" *by* L. A. Munchak et al.

L. A. Munchak et al.

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We thank the reviewer for his or her helpful comments. We have changed the text accordingly:

— It is improper to mention that the 10 km product is for climate studies and the 3 km product for air quality research. The authors can state that the fine resolution is intended for air quality even though the quality is poor. —-

Excellent point. We do retain references to applications for the air quality community considering that much of the paper focuses on the product's poor performance over urban areas. However, we recognize that there are many non-air quality needs for higher resolution aerosol retrievals, and have changed the text in both the introduction

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and conclusion in order to reflect that. Amongst other changes, we specifically:

Changed the following line in the introduction from: "the 10 km resolution of the MODIS aerosol products is insufficient to resolve small-scale features relevant to local air quality" to "the 10 km resolution of the MODIS aerosol products is insufficient to resolve small-scale aerosol features

Removed the following line in the introduction: "Accordingly, the 10 km product is still the best choice for studies concerning aerosol effects on climate.

Changed the following line in the introduction from "In response to requests from the air quality community" to "In response to clear scientific needs for aerosol observations at a higher spatial resolution"

— Remer et al. 2013 shows that the global expected error is 0.05 +/- 0.25 AOD, and here the authors evaluate this quantity using high density measurements. The authors can use the same expected error throughout the manuscript instead of a more stringent error criteria used here (0.05 +/- 0.15 AOD). —

Although Remer et al., 2013 have established a new global expected error, we have chosen to still employ the use of the old EE for the bulk of our analysis, in order to provide a even comparison between 10 & 3 km. We did add a line in the text stating the percent within expected error of the new 3 km EE.

— P1684 L13: Better if you can show the % variation of AOD here. —

Although this is important information, we don't want to say AOD can vary up to XX percent, because this will end up exaggerating the change due to smaller AOD changes that happen when AOD is very small (say, increasing an AOD of .05 to 0.15 – a smaller absolute change, but a much larger percent change). So we chose to keep the absolute change in the abstract. If readers are curious, section 4.1 states "Within a single MODIS 10 km pixel, the maximum HSRL measured AOD change is 0.25, increasing from 0.36 to 0.61 AOD".

— P1684 L19: Show the bias of 3 km product (22 to 26 %). —

We have added the bias statistic (and RMSE) for both 10 and 3 km product in a table. We did change the abstract to include mention of the high bias of the 3 km product.

— Quantify the bias of 10 km product using the two collocation techniques (better to show MODIS 10 km / SP comparison just like the left panels of Fig 6). —

We have changed figure 6 to include the 10 km product, treated in the same manner as the 3 km product in the original figure 6a and 6c. Because each panel becomes smaller, we have chosen to remove the statistics from the figures, and put all of the information into a table. We have added bias and RMSE to this table for 10 km and 3 km spatial average and single pixel collocations.

— P1694 L11: "time period." — Fixed, thank you.

— P1697 L19: "single pixel; the pattern" — Fixed, thank you.

— Fig. 7: Inset: Y = 0.97 X + 0.04 and Y = 0.93 X + 0.05 — Fixed, thank you.

— Fig. 9: Caption: Expected error 0.05 +/- 0.15 AOD (be consistent throughout the manuscript). —

Because the quantity plotted is the percent of collocations above expected error, this corresponds to +.05+.15AOD, not 0.05 +/-.15AOD, so we did not change it. We apologize if this was not clear. We did notice the inconsistencies throughout the manuscript and have fixed them.

We also wish to mention that the version of the MODIS algorithm used to create the discussion paper changed in between the publication of the discussion paper, and this response. Accordingly, we have updated all the figures and numbers in the paper to reflect the updates. The code used to generate the granules in this revised version of the paper is the frozen, final Collection 6 code.