

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

Anonymous Referee #2

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This manuscript describes the evaluation of the MODIS 3 km AOD product using spatially dense measurements by airborne High Spectral Resolution Lidar and surface-based sun photometer during the summer 2011 DISCOVER-AQ campaign over the Baltimore/Washington D.C. corridor of the United States. The 3 km product has the expected performance of a fine resolution data to resolve aerosol gradients, but with high bias over the urban regions. The improper characterization of the urban pixels is a limitation of the product, and the authors have left it as an open question. This high resolution product is very useful for air quality researchers, and the evaluation is highly relevant. The manuscript is well written and acceptable for publication after clarifying the points listed below.

It is unfortunate that the fine resolution product has poor performance over urban re-

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gions where the air quality research community is mostly interested in. The poor performance of the 3 km product compared to the 10 km product is due to its stringent pixel selection criteria. The authors can try avoiding highly biased urban pixels of 3 km product by comparing with the 10 km product. This filtering can be useful.

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.

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).

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

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

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).

P1694 L11: “time period.”

P1697 L19: “single pixel; the pattern”

Fig. 7: Inset: $Y = 0.97 X + 0.04$ and $Y = 0.93 X + 0.05$

Fig. 9: Caption: Expected error 0.05 ± 0.15 AOD (be consistent throughout the manuscript).

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