

Interactive comment on “MISR Research Aerosol Algorithm: refinements for dark water retrievals” **by J. A. Limbacher and R. A. Kahn**

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Review of Limbacher and Kahn MISR Research Aerosol Algorithm: refinements for dark water retrievals

Review: I performed a pre-review of this paper and provided extensive comments up front. The authors have done a reasonable job addressing most of my big picture concerns. Further, Andy Sayer has taken the load off of the rest of us with his very thorough review. There are a few things though that I think require some special attention. Most notable is comment #3.

1. Abstract: In the second half there are quite a few metrics thrown around, and it is not entirely clear what the authors mean. For example, in the sentence starting “When

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all adjustments are included” and RMSE’s are provided for the RA and SA, it is not clear if it is the SA or if it is your own simulation of the SA. Or, we estimate that if these were incorporated into the SA, the RMSE would reduce by. . .” A bit more wordy, but it pays to be clear here.

2. P7839 L26+: I think the authors need to be more clear on the relationships between the SA and RA, and how these are used in the community. For us mere mortals, we are dependent on the SA, and if we grovel hopefully someone at GSFC can run the RA for specific cases or field campaigns. But from the point of climatology datasets, the community must rely on the SA due to computational resources requirements.

3. P7841 L24+: Andy picked up a little of this, but really the authors are purposely excluding cloud clearing, which is THE big dog in satellite AOT product errors. Please see the recent paper by

Shi, Y., Zhang, J., Reid, J. S., Liu, B., and Hyer, E. J.: Critical evaluation of cloud contamination in the MISR aerosol products using MODIS cloud mask products, *Atmos. Meas. Tech.*, 7, 1791-1801, doi:10.5194/amt-7-1791-2014, 2014.

We know over oceans that most products (including MISR) have large cloud induced errors. Such errors are seen in MAN data, are much more prevalent in AERONET comparisons, and, due to verification data collection constraints, are likely much more significant for when verification data is not available. This needs to be laid out. The authors show some improvement by limiting cases to cloud fraction to <50%, but there is no doubt sampling bias embedded in this number. I think given the circumstances, the authors can use the escape clause, saying that all things being equal and given good clear sky radiances, this is the uncertainty. But this should not be confused with the real uncertainty in the product, which is likely greater in practice. But all things being equal, you can show that the modifications performed result in a better retrieval which is just fine. But based on this, I am not so sure you can say ‘This is the error bar when I do a retrieval for such and such a case’

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