

Interactive comment on “Aerosol direct radiative effect over clouds from synergy of OMI and MODIS reflectance” by Martin de Graaf et al.

Hiren Jethva (Editor)

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Received and published: 6 May 2019

Dear Author,

The open review period of your submitted manuscript is now closed. Your manuscript # amt-2019-53 has received comments from two reviewers, for which you are encouraged to prepare and provide a response along with a revised version of the manuscript.

While reading through the manuscript, I realized that the derived direct radiative effects of aerosols above clouds are correlated with AERONET AOT measured at Ascension Island for 2016 and 2017. Though a general correlation is observed between the two quantities, comparing large area-averaged aerosol effects with AOT from a station might result in mismatch due to sampling differences, i.e., above-cloud versus

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cloud-free, difference in observed conditions, i.e., above-cloud versus total column, and so on.

The strength of above-cloud aerosol direct radiative effects is governed by aerosol amounts above cloud as well as brightness (COD) of cloud underneath the aerosol layer. Therefore, it is expected that derived radiative effects should correlate with the above-cloud AOT such as provided by the OMACA product of OMI [Jethva et al., 2016].

The author is strongly recommended to include a similar comparison chart (Figure 7) showing a time-series of area-averaged above-cloud AOT from OMI for 2016 and 2017. Please also retain the AERONET AOT time-series as it is. The OMI/OMACA Level 2 product is freely accessible from the AVDC's data holding portal <https://avdc.gsfc.nasa.gov/pub/data/satellite/Aura/OMI/V03/L2/OMACA/>. Please contact me back should you face difficulties in locating/reading the OMACA dataset.

A similar product of above-cloud AOT for the Southeastern Atlantic has also been derived using the 'color ratio' information [Jethva et al., 2013] and multi-spectral MODIS observations [Meyer et al., 2015]. Adding the results of these two products to Figure 7 would further confirm the consistency (or lack thereof) between the radiative effects estimated in this paper and satellite products of above-cloud AOT.

To get the access of MODIS multi-spectral ACAOT regional product, please reach out to Kerry Meyer (kerry.meyer@nasa.gov). The 'color ratio' product of ACAOT hasn't been made to the public yet for which the link to download the data will be sent in a separate communication.

We are looking forward to your response and revised paper.

Best,

Hiren Jethva Associate Editor, AMT

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-53, 2019.

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