

Interactive comment on “OMI surface UV irradiance in the continental United States: quality assessment, trend analysis, and sampling issues” by Huanxin Zhang et al.

Anonymous Referee #1

Received and published: 30 September 2018

This paper deals with the validation of the UV irradiance retrieved from OMI against ground-based measurements at 31 sites in the US. It is a well written study which with the following corrections it could be published in the Atmospheric Chemistry and Physics journal.

My most serious comment has to do with the collocation logic of satellite and ground-based measurements in terms of atmospheric conditions persistence. I do not see the point at comparing 31 ground stations with satellite retrievals and making such a big assumption. The comparison at local noon seems to not follow scientific criteria because the transferability of the sensitive UV irradiance at different time positions

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undermines fundamental assumptions, but, at the same time, has an interpretation oriented to usefulness and applicability as at local noon the impact of UV irradiance on human health is major, so I believe that the whole effort is worthwhile. To my understanding there are no alternative ways to compare these datasets at local noon but it is highly recommended to include a description on the error percentages that were added by each one of the atmospheric parameters that has impact the UV irradiance. As a result, my suggestion to the authors is to include an analytical and quantified list of the atmospheric parameters that affects this time transferability of UV irradiance observations and discuss the magnitude of these impacts.

On page 13, line 387, the trend analysis needs to be performed with reliable monthly averages, so filter the data as to represent mean values with minimum missing data (e.g. at least 20 days of data per month).

I recommend also the authors to renew the reference list throughout the paper with updated and more recent results.

At line 20 of the Abstract maybe the authors want to say "variability" instead of "viability"?

At line 187 change the last letter of the word "room" with "t".

The RMSD is the same magnitude as the RMSE, so for the normalized RMSD use NRMSE or change the RMSE to RMSD as to not confuse the reader.

At line 380 what is the AAOD? Add a description before using any abbreviation.

At line 425 What are the "TEMPO and GEMS"? Add a nomenclature and abbreviation table for the whole document.

In Figure 5 change the x axis from 0 to 400.

In Figures 6 and 15 add grid lines.

In Figure 8 change the x axis borders from 0.0 to 2.5 (now its until 3.0). Add also some

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in plot statistics (e.g. median or mean) and discuss in detail the form of the different distributions of plots a and b.

In Figure 10 add horizontal grid lines.

Finally, in Figure 11 place plot b below plot a and increase the aspect ratio as to cover the whole width. Then, at x axis place the SZA steps every 4-5 degrees as to describe better these interesting plots.

The overall analysis merits publication and is able to forward the use of Earth Observation techniques in order to measure or estimate with high accuracy the UV irradiance levels. I strongly believe that after the above revisions the paper could be published in the Atmospheric Chemistry and Physics journal.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-720>, 2018.

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