Atmos. Chem. Phys. Discuss., 14, C8596–C8600, 2014
www.atmos-chem-phys-discuss.net/14/C8596/2014/
© Author(s) 2014. This work is distributed under
the Creative Commons Attribute 3.0 License.

Atmospheric Chemistry and Physics Discussions

Interactive comment on "AOD trends during 2001–2010 from observations and model simulations" *by* A. Pozzer et al.

A. M. Sayer

andrew.sayer@nasa.gov

Received and published: 29 October 2014

This is not a full review, but rather a short comment on the SeaWiFS and MODIS data used in the paper.

First, the authors are using MODIS Terra Collection 5.1 data. The new and improved Collection 6 dataset is not yet available for the Terra platform the authors are using (we are expecting, at present, that Terra reprocessing will be complete around the end of 2014), but Aqua data (2002 onwards) are available from at the present time (I realise Aqua does not cover the start of the time period the authors use). Datasets from both sensors can be obtained from http://ladsweb.nascom.nasa.gov/data/. The Deep Blue

and Dark Target land/ocean algorithms have been improved between the two versions, and there are non-negligible differences in some regions. I thought I would link to the following papers for the authors' information:

- Levy et al. AMT (2013), doi:10.5194/amt-6-2989-2013. This paper describes the Collection 6 Dark Target land and ocean products. Figure 1 here is a good summary of seasonal changes in AOD patterns, and Figure 20 shows the results of changes to the definitions of the Level 3 products (which the authors are using in this study).
- Hsu et al. JGR (2013), doi:10.1002/jgrd.50712. This paper describes the Collection 6 Deep Blue algorithm (as well as the most recent reference for SeaWiFS over land). One big change from Collection 5 is that spatial coverage is now extended to all cloud-free snow-free land pixels, so it is more spatially complete and complementary to the other datasets the authors are using now. I would also like to correct an error in the paper: on P26630 lines 14-16 the authors state ' South Arabia shows a significant increasing trend, although this is not shown directly by MODIS, as no aerosol retrieval is possible over bright surfaces, such as deserts and ice'. It is true that the Dark Target dataset the authors use does not cover this region, but this statement could be misleading to some readers because Deep Blue data are available in the Collection 5 dataset as well (although the second half of the mission was missing in Terra because of calibration issues which have since been addressed for Collection 6), within the same data files the authors are using, and cover bright surfaces like these. So adding Deep Blue here would fill in this gap.
- Sayer et al. JGR (2013), doi:10.1002/jgrd.50600. This provides a validation of the above Collection 6 Deep Blue dataset (global/regional and also some comparisons to Collection 5 Deep Blue).

ACPD
14, C8596–C8600, 2014

For SeaWiFS, on page 26628 the authors state that they are using version 3. Is that correct? The current version is version 4, and only version 4 has been distributed (at least as far as we know, I could be mistaken!) for the past year or more. The filenames contain a string indicating the version (i.e. 003 or 004), and the version is also contained inside the files in the metadata. I would suggest that the authors check. If possible, we encourage the use of the latest versions of our datasets.

SeaWiFS version 4 has a few updates which result in slightly different results as compared to version 3, and a slightly better correspondence to AERONET, although the overall algorithm philosophy has not changed much (so the broad-scale algorithm and validation studies still stand). There is no version 4 dataset/validation paper at present, so I thought I would write about the changes here, although note that some documentation on version 4 is also available from http://disc.sci.gsfc.nasa.gov/daac-bin/DataHoldingsMEASURES.pl? (then select 'Consistent Long-Term Aerosol Data Records over Land and Ocean from SeaWIFS' from the list).

Specifically, over land we updated the aerosol optical models used in some regions and seasons to correct some of the biases we had found in our validation analyses (e.g. the Sayer et al. 2012 paper the authors cite). This affects retrievals in South America, central and southern Africa, and South-East Asia, mostly leading to an increased AOD in version 4. I'm not sure how this will alias into trend analysis; it is mostly the extreme high-AOD events which are affected by this change.

Over ocean we fixed a minor bug (which reduces noise slightly over the open ocean but does not change average values much), and improved our turbid water mask screening (which leads to a more significant drop in AOD near to coastlines and in shallow water regions). I expect that the better turbid water mask should make any

ACPD
14, C8596–C8600, 2014

trends in coastal waters easier to detect because there are fewer artefacts. This turbid water improvement is something which we are quite happy with but doesn't show up so strongly in AERONET/MAN comparisons, because of the locations of AERONET sites. I'd also like to mention that the version 3 turbid water screening was reasonable, it is just because biases from unflagged turbid water are fairly large and positive that it shows up to a greater extent when you aggregate data to Level 3.

I have attached a figure I'd made a while ago summarising the differences between our versions 3 and 4 in a climatological sense (differences between versions 3 and 4 seasonal mean AOD). In this figure the rows indicate season. The columns are (left to right) version 4 AOD, version 4-version 3 AOD over land, and version 4-version 3 AOD over ocean. Note the different colour scales for the columns.

Some of the areas where things are different in the most recent data versions (from MODIS and SeaWiFS) include those where the authors identify trends (e.g. their Figure 2 compared to Figure 1 of the Levy paper I mentioned, or my attached SeaWiFS maps), so it would be interesting to see if and how their results change using the current versions.

The authors should please feel free to contact me if they have any questions or would like any assistance with the MODIS or SeaWiFS data-we are happy to help! Thanks, Andrew Sayer.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 26619, 2014.

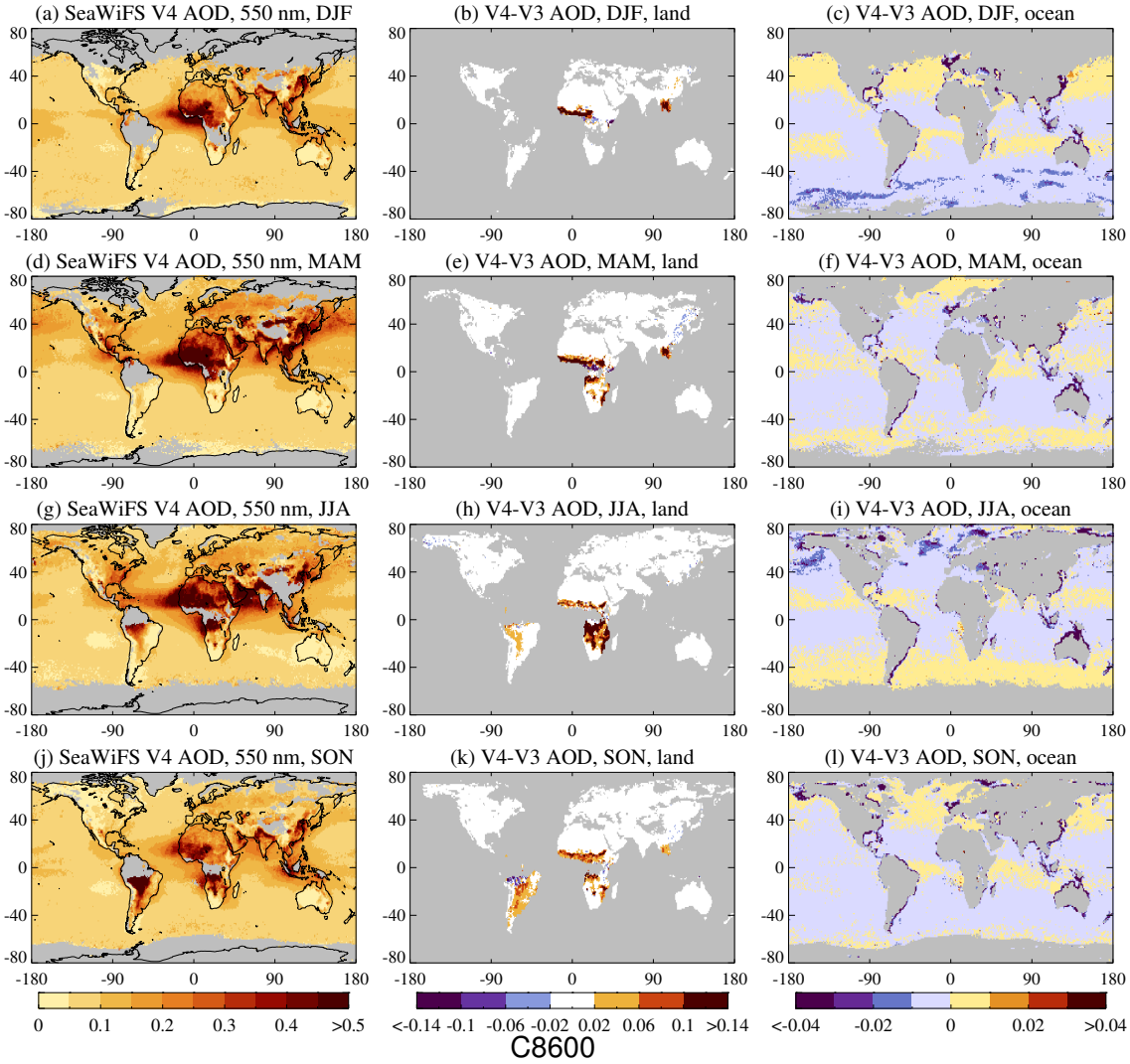

Fig. 1.

ACPD

14, C8596–C8600, 2014

Interactive Comment

CC BY