

Authors' response to Anonymous Reviewer 2's comments on "Validation of the GRAPE single view aerosol retrieval for ATSR-2 and insights into the long term global AOD trend" by Thomas et al.

The Authors are grateful for the reviewer's very helpful suggestions and the effort they have put in reviewing this paper. Their specific comments and corrections are addressed below and are included in italics for reference.

1. The results of all parts entirely concern aerosol over the ocean. Both the title and abstract should reflect this clearly. It would be better to remove discussion of the land surface elements of GRAPE almost entirely as they serve only to confuse and distract, and replace with a sentence or two and a reference.

The title and abstract have been modified to reflect the ocean-only nature of the paper. The paper has been altered to make it clear from the beginning that only results over ocean are being discussed.

2. Abstract (and later figure 3, results section, conclusions) state a "correlation of 0.79" with AERONET. Which correlation measure here: Pearson's r^2 or r , or some other?

The correlation used is Pearson's r . This has been made explicit in the manuscript.

3. Line 94: retrieval of aerosol from "near-nadir satellite radiometers"- unclear exactly what this means.

By "near-nadir satellite radiometers" the authors are referring to imaging instruments, that measure reflected solar and/or emitted thermal radiation from the Earth's atmosphere in a limited number of wavelength bands and have a viewing geometry centred (or close to) nadir. The text has been modified to clarify this point.

4. Line 155: report error of AERONET in measured AOD of < 0.01 : Need to clarify the meaning of this - at a certain wavelength, with/without temporal or spatial averaging?

The error estimates provided by Holben et al. are for the AOD given by a single "triplet measurement" and relates to all wavelengths for which AERONET provides AOD. It is dominated by calibration changes in individual photometers from the AERONET reference instruments (which are believed to provide AOD estimates within 0.005). Thus, this uncertainty won't be greatly effected by temporal averaging of the AERONET data. This has been clarified in the text and the error estimate modified to read 0.01 – 0.02 (which better reflects the values given by Holben et al.)

5. 165- : A little unclear what satellite data is being compared. Is it the mean of derived aerosol from AATSR over a 40x40km area? Is this weighted by uncertainties in the retrieval?

The instrument used is ATSR-2, not AATSR. The value compared to the AERONET AOD is indeed the mean retrieved AOD over an area within approximately a 20 km radius of the AERONET site. In this case the mean was not error weighted – over a small area error weighting has very little impact on the derived mean. The manuscript has been modified to clarify this point.

6. 195 onwards - & Figure 3: It would be helpful to provide a table showing the performance over the various AERONET sites used. Also, presumably the OA retrieval method provides an error estimate – it would be interesting to compare the error estimates provided with actual error distributions as compared with AERONET. Is it possible some of the bias (0.08) is due to undetected cloud?

Both of the suggested additions have been made and the possibility of cloud contamination as a cause of the bias is now included in the discussion.

265: Eq 3, missing division line

This problem doesn't appear in any of copies of the paper examined by the Authors' (Postscript and PDF).

A final point is comparison of the regional and global datasets (e.g. Fig 5) – are the data weighted to give equal area, after gridding, or do the results show a simple average of gridcells?

The data shown in Fig 5 and Fig 7 are simple averages of the grid cells that lie within the region (either global or the regions shown in Fig 6). The data have not been normalised by area.