

Interactive comment on “Advancements in the Aerosol Robotic Network (AERONET) Version 3 Database – Automated Near Real-Time Quality Control Algorithm with Improved Cloud Screening for Sun Photometer Aerosol Optical Depth (AOD) Measurements” by David M. Giles et al.

Anonymous Referee #1

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It is a great effort in transparency of the quality control procedures, as well as automation and objectivity. However it can be sometimes too specific and the applicability to other AOD networks difficult. The novel approach in Section 3.2.2 is of special interest and would deserve a paper by itself. Similarly, the efforts in section 3.3 are a valuable contribution to any AOD network, although sometimes too specific approach reduces the applicability of the method. I recommend the paper is published after minor revision.

Specific comments:

I miss some references in the introduction, for instance articles or web links to the list of contributing networks (lines 65-68), or some references about the Cimel instrument, especially the new 318 Model T (lines 83-84).

L103: Why is level 2.0 data provided within 1 month after calibration post deployment? Is there still any manual supervision?

L135: this is not completely true in all cases. For instance, at very low solar elevations, the air mass uncertainty and the contribution of aureole light within the instrument field of view can be very large and impose limitation to the application of the Beer law and the Kasten formula. This is actually discussed in line 335. Where can these effects be identified in the uncertainty equation 2?

L141, eq 3: is this the actual way of computing AOD, or do you use independent air mass for each component in the Beer law (eq. 1)? There is a contradiction with line 199, where the use of specific ozone air mass is indicated.

L160: this is a vague assessment of the pressure value used for Rayleigh correction. Do you have some reference where actual pressure and NCEP pressure are compared for different locations, seasons, elevations, etc.? Or maybe the effect is not so critical?

L191: there are more recent comparisons of AERONET and GPS-based water vapor retrievals.

L202: please provide quantification of the uncertainty: what spectral channels, what AOD uncertainty.

L226: please provide uncertainty of the calibration factors for the reference instruments and the field instruments.

L249-252: the discussion about various Cimel models is difficult to follow for a non-specialized reader. I would suggest adding some reference or providing the information

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in a more general way.

L353. Isn't this test redundant with the usual temporal filter in the cloud-screening algorithm?

L362: check nr. 2 is missing?

L395: $AOD_{1020} > 0.0$: is this correct?

L415: Holben is misspelled.

L467: AERONET database comprises much more than AOD. Maybe saying "AERONET AOD database" is more precise.

L557: almucantars use fix set of azimuth angles, not scattering angles, therefore catching the halo or sun dogs is rather difficult. Why not using scattering angles instead? Maybe this is possible in the new Model T.

L566: what is hybrid scan?

L583: why may some angles not be available? Do you use right-left average value in almucantars or some right-left symmetry threshold to accept the angles?

L600: unnecessary "(" ?

L610: did you check how the fitting could be affected by incorrect pointing? Could cloud inhomogeneity yield to incorrect Sun tracking and incorrect aureole slope or curvature evaluation?

L759: do you remove all data affected by clock shifts or only data at large air masses? Have you quantified this effect for slow changing air mass (e.g. around noon or at high latitudes)? Maybe it's possible to retain some data within the prescribed AERONET AOD uncertainty of 0.01-0.02.

L1030: multi-day?

L1064: change "arctic" to "polar"

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L1254: GAW-PFR network could be listed here

For the future, do you plan to apply any similar method for quality control of sky radiances and inversion products in V3?

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