

Interactive comment on “An overview of meso-scale aerosol processes, comparison and validation studies from DRAGON networks” by Brent N. Holben et al.

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Reviewer 2:

Thanks to Reviewer 2 as issues were found the certainly needed correction or clarification.

A good point is made to address the methodologies required and subsequent uncertainties to make meaningful comparisons. Given that reviewer 1 rightly wanted to paper to de-emphasize the comparisons in situ vs RS and emphasize more the validations of satellite and model which I did, I feel that going into the details of the methodologies

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is beyond the scope of this overview paper. I would hope that Reviewer 2 agrees with this slightly redirected manuscript.

The reviewer suggest Table 3 have papers and /websites added. All campaigns are referenced on the AERONET web page and thus I added that link to the table caption. Were was little room in the table to add URLs or emails.

Page 2 line 18 is too optimistic for automatic instruments referring to the 0.01 accuracy estimate. We stand by our statement of 0.01 estimated accuracy as these data are manually screened in V2 and a fairly sophisticated algorithm for screening will be used in V3 that is expected to achieve the ± 0.01 accuracy.

Page 2 line 19: remove repetition of 'such as'. Done.

Page 2 line 21: Mention the QA control procedures for AOD. I've added Manual quality assurance assessment.

Page 2 Line 31: Question regarding QA of inversions. I've added the Holben et al, 2006 that describes in inversion QA criteria.

Page 2 L34: Illustrate the uniformity assumption of the atmosphere at 60° SZA. I rewrote/organized the paragraph:

The accuracy of the intensive AERONET aerosol properties (single scattering albedo, particle size distribution and complex index of refraction) is less clear due to larger uncertainties of the inversion retrievals and difficulty in obtaining comparison data from other methodologies. These properties are extinction weighted atmospheric column integrated properties that exhibit different uncertainties than the wide variety of techniques associated with in situ measurements and estimates. The uncertainties associated with in situ techniques are well discussed by Reid et al., (2003) for the size distributions of coarse mode aerosols. The retrieval uncertainties of the column integrated aerosol properties inverted by the Dubovik and King (2000) algorithm are well discussed in Dubovik et al. (2000), however the additional uncertainty of the measure-

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ment techniques are very difficult to assess due to atmospheric variability during the time of observations. The accuracy of the inverted parameters is predicated upon the atmosphere being stable and spatially uniform within the measurement space of the sky radiance measuring radiometer. For example, if we assume that the aerosol is in the lowest 2 km of the atmosphere and the solar zenith angle is 60° , the AERONET observation path would be 4 km long and a horizontal distance of approximately 3.5 km. Thus AERONET retrievals are assuming uniformity in a atmospheric cylinder of 7 km diameter, 2 km vertically and a measurement slant path of 4 km about the surface center point. Quality assurance algorithms and spatial averaging of measured sky radiance distributions have been utilized to minimize this uncertainty (Holben et al., 2006).

P2 L35: Averaging left and right almucantars: Yes this is done among other algorithms/procedures that are detailed in Holben et al., (2006) but I would rather not get into that level of detail.

Table 1: Add Muller add references – Thanks much for raising the Müller references. They are now added to tables 1 and 2. I particularly liked the recommendations made in the 2012 paper that outlines recommendations similar to the DISCOVER-AQ campaigns.

Table 1: The + and – are removed.

P6L20: ‘Bold’ statement has been removed.

P5L16: Clarify statement regarding volume radius inflection point as it relates to non spherical aerosols. We revised the statement to accurately reflect the inversion process to:

Note that the AERONET retrieval scheme of Dubovik and King (2000) report the size in terms of particle radius with the fine to coarse mode limits of 0.0005 microns to the inflection point to 15 microns. The inflection point of each retrieval lies between modes

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varying from 0.44 to 0.99 micron in volume distributions that is composed of discrete particle sizes from a mixture of spheres and spheroids with a fixed shape distribution (Dubovik et al., 2006).

P5L26: The sources of dust was expanded to include volcanic ash. "...ash from episodic volcanic eruptions.)

P7L1: Missing parenthesis were inserted. (Holben et al.,1986)

P12L12: note that hybrid scans have not been published. Done.

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