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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Seven years of measurements of aerosol scattering properties, near the surface, in the southwestern Iberia Peninsula" *by* S. N. Pereira et al.

Anonymous Referee #1

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This paper looks at aerosol particle light scattering measurements over a 7 year period in an interesting location. The paper appears to be motivated by climate considerations, but the analyses really centres on issues that are more local. As it stands now, I think major improvements are necessary to make the results appeal to a broader community. I suggest the following:

Major concerns: 1. What is there in the results that make the publication of seven years worth of observations important? Is there a trend over 7 years and, if so, how is it explained? Add a mean line to Fig 7 to give some perspective on the variance from year to year. Calibrations were done "at least once a year. There needs to be a record

of how it varied to estimate the uncertainty attached to comparing one year to another.

2. Some improvement of the discussion and analysis of the RH correction is needed; see specific comments.

3. The discussion of the coarse particle correction and the influence of coarse particles on the observations needs more attention, as in the specific comments.

4. The backscatter observations are most important for climate considerations. Their inclusion would help this paper.

Specific comments:

Page 13724

Line 2 – how "near the surface"?

Line 3 – "valuable" in what way?

Line 8 – "were" grammar.

Page 13725

Lines 6-7 – how will your data advance a GCM?

Line 8 – "had shown" grammar.

Line 13 – "where mainly incident" grammar.

Line 20-21 – how do neph measurements "quantify the aerosol load" and I would remove qualitative from the sentence as it contradicts the earlier quantifying.

Page 13726

Line 6 – presumably "greater Lisbon"

Lines 21-23 – is the Anderson and Ogren correction sufficiently universal for this dataset? (eg. Marshall et al., J. Applied Meteorol. 2005)

Page 13727

Line 1-2 – calibrations “once a year” seem a little slim. You need to demonstrate that the calibrations did not vary much from year to year. Otherwise the data within any year will be suspect.

Line 11 – I suggest to remove “Usual”. Just say “Temperature, relative humidity and wind speed and direction were also. . .”

Line 17 – “hydrophilic” rather than “non-hydrophobic”?

Line 19 – grammar.

Page 13728

The discussion of the RH influence begins (line 10) with the suggestion that the measurements “are assumed to be performed essentially with the aerosol under dry conditions. . .”. Then you turn about and say that you make a correction for RH. This discussion needs to be clearer.

I have a few comments about the classification scheme you use (Table 1) to separate the aerosol types. I have never seen a clean/bkgd aerosol with a scattering coeff of 60 Mm-1 unless it includes sea salt or dust. Since you have defined a dust criterion, we can keep the discussion to sea salt. You also defined the clean/bkgd as any alpha value, and therefore sea salt effects may be included. But what about clean/bkgd for alpha<1? If there is no sea salt influence then what in the clean/bkgd environment contributes to a scattering of up to 60 Mm-1? Since you have classified trajectories, why have you not used that to improve your classification scheme? You need to better define the clean/background aerosol and include the trajectory information in your RH correction criteria.

Page 13729

Lines 14-15 – Why if the distributions are well described by a log-normal would the

geometric mean values not be a better measure of the average conditions?

Page 13731

Lines 4-13 – Information talked about here is given in the Tables. I don’t see any value in stating it here. Is the anything interesting about these time series? Is there any long-term tendency?

Lines 20-21 – grammar.

Line 29 – something other than “globally” needs to be used; it is misleading.

Page 13732

Line 6 – “and consequently pollution dilution.”

Line 11 –“by far” is unececssary.

Page 13733

Lines 22-24 – From looking at Figure 6, this statement (i.e. “not observed “) is not true for the spring data.

Page 13734

Line 6 – during instead of along.

Line 18 – “global” needs to be replaced or explained.

Line 29 – grammar.

Page 13735, line 28 to Page 13736, line 1 – two “also”s.

Page 13736

What about the M trajectory? It has the lowest overall alpha, suggesting some sea salt influence, which is maybe not so high in intensity but certainly highest in frequency.

As you state, the AF component also has a peak in the alpha distribution at about 0.7

suggesting that there is some direct dust influence. But you then dismiss it. It may not be dominant in terms of alpha frequency, but you need to demonstrate how the scattering frequency corresponds. E.g. the AF scattering freq has a mode about 110 Mn-1. Does that correspond with the lower alpha?

Page 13737

Line 4 – simultAneous.

Line 9 – not true.

Lines 11-12 – what are clean air masses?

Lines 18-19 – “because it is usually transported at high altitudes” does not result from this study.

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