

## ***Interactive comment on “Aerosol characterization in Northern Africa, Northeastern Atlantic, Mediterranean Basin and Middle East from direct-sun AERONET observations” by S. Basart et al.***

**Anonymous Referee #3**

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In this paper the authors have straightforwardly applied a previous although recent graphical methodology for the discrimination of different aerosol types, with an emphasis on the coarse mode contribution related to mineral dust. This method, based on a graphical plot of simulated properties of bimodal size distributions, has been employed for the analysis of the aerosol size properties in a wide variety of AERONET sites located in regions around the Sahara area, including southern Europe, Sahel region, islands west off the African coast and the Middle East.

The manuscript is in general well written and correctly presents an introduction of the

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applied methodology and the main results in the selected AERONET sites. Therefore I recommend it for publication in ACP, although I would like to make some comments and suggest minor suggestions and corrections.

1) I would emphasize that only size properties are studied in this paper, not other radiative and physical properties. This could have been more clearly stated in the title: “Aerosol size characterization. . .”

2) Selecting sites with at least 12 month level 2.0 data coverage is a valid strategy. However, later you have applied a new filter ( $AOD > 0.15$ ). Many sites in the Mediterranean use to have AOD lower than 0.15 during autumn and winter months, so this later criterion would diminish the data coverage really used in the results section (Barcelona could be an example). In further studies, you could consider to apply the temporal coverage filter after the  $AOD > 0.15$  screen.

3) Looking at Figure 2, I miss sites in the Pyrenees region or northern Italy. I think Le Fauga or Ispra sites have more than 12 months of level 2.0 data. On the contrary, there are regions with an accumulation of sites (Middle East, South of France, South of Iberian Peninsula). Figures 5, 6 and 7 would benefit of a more homogeneous distribution of sites. The graphical tools are very useful, but the authors could have chosen key sites in different regions OR even obtained averages for those sites that behave similarly in the same region. In this way the graphs would be clearer. In further studies, the authors could zoom in any of the regions for a more complete and detailed study. But in this size, crowded graphs are sometimes confusing.

4) I wonder if Ångström can be written as Ångstrøm.

5) Page 7711, line 21: Although AERONET uses CE318 radiometers, not all the instruments have the same configuration. Therefore I would not say that the 500 instruments are “identical”.

6) Why using “AdA”? You can better write “ $\alpha d \alpha$ ” at a little higher cost. You

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don't refer to this AdA so often.

7) Page 7713, line 21: I would split the sentence in "Recently...empirical. He discretized...".

8) You sometimes refer to "Figure x" and some other times to "Fig. x".

9) Figures have small scales and labels, sometimes it gets really hard to read.

10) Page 7715, lines 5 – 12: it is difficult for me to see this discussion in Figure 6. Could you use a colour scale? In my hard copy I would say that AGO CIN BAN OUA sites have mostly the same value all year round; DJO and ILO have higher proportions during Autumn.

11) I would not refer to CVR site as a North-eastern Atlantic site. North-eastern sites would be located in higher latitudes.

12) Page 7717, line 15: I think you refer to an "enhancement" instead of an "enhanced".

13) You could consider arranging the plots in Figure 4 following the exact appearance order in the text.

14) Page 7719, line 1: When using instantaneous measurements, summer episodes with very few days of clear skies could bring a large proportion of dots in the plots, as compared to winter days. Therefore I would have chosen to use hourly or daily means for this study. But, could the cluster of points you discuss be due to a single episode?

15) Page 7725, line 13: There is a mistake in this sentence.

16) Page 7727 line 29 to page 7728 line 4: I think this discussion about the seasonality of the dust intrusions is found in other papers. Please cite accordingly (or move it to the results section).

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