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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Extreme Saharan dust event over the southern Iberian Peninsula in september 2007: active and passive remote sensing from surface and satellite" *by* J. L. Guerrero-Rascado et al.

Anonymous Referee #2

Received and published: 21 September 2009

I have not read the comments from Reviewer #1. This can be considered a completely independent review.

The paper by Guerrero-Rascado et al. describes measurements of an exceptional Saharan dust event from the Iberian Peninsula. The manuscript is interesting and well-written, and thoroughly explores the given dust event. I recommend publication. There are some minor revisions that the authors may wish to consider. I give the more important of these revisions first.

More important:

Pg 15683, first paragraph: Some of the assumptions in the CIMEL retrieval should probably be discussed. For example, a bi-modal distribution is assumed (I think). It is not surprising that the different measurement products are consistent with one another given that they are not independent in the retrieval.

Pg 15683, third paragraph: This is where the retrieval assumptions become more important. I doubt that the size distribution for dust is truly bimodal, but that is what is assumed here (again, I think). What are the consequences if the true distribution is not bimodal, but is forced into the bimodal assumption? Can the sub-micron particle population be an artifact of the retrieval?

Pg 15685: It is not clear that the Evora event is statistically significant in the MODIS measurement, but the discussion seems to imply it is.

Pg 15686: Why not show inverted lidar retrievals (i.e., contours of extinction) in Figure 10? You have the capability to compute them, and they are more geophysically relevant.

Pg 15689: What is the "backscatter-related Angstrom exponent"?

Less important:

Pg 15674, Abstract: I am not familiar with the "Iberian Peninsula", but am familiar with Spain and Portugal. I suggest including the country names, and include the coordinates for Granada. The same information could be added to the Introduction on page 15676.

Pg 15674, Abstract: There is no mention of the lidar systems (ground-based or CALIPSO), MODIS, or the use of SBDART. These should be included.

Pg. 15675, line 6: Strange reference style used here.

Pg 15677: Granada is called a "medium-sized" city. What constitutes medium sized?

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It would be more useful to state the population.

Figure 1: The subplots are much too small, and I have to zoom in quite far on the PDF to understand what is going on. That is not going to be possible in the print version. I suggest enlarging the figure, perhaps by spreading it out over multiple pages. This same comment can apply to some of the other figures.

Figure 2: It would be helpful to have Granada marked on these plots.

Pg 15680: You call the dust event “extraordinary”, but that has not been established yet. What makes it extraordinary? This is explained later in the paper, but seems strange to the reader at this point.

Pg 15681: More information on the MODIS analyses are needed. Are daily-average grids used? I assume that they are not the swath data.

Figure 5: Delta is used as a symbol for aerosol optical depth, but this is never explained. I suggest using “AOD” instead, as it is more commonly used.

Pg 15681: The error in the Angstrom exponent is given as 0.2. This appears to be too large considering the random variations in the plot. Is this systematic or low-frequency error instead? A better discussion of the nature of the errors would be useful.

Pg 15683: “...(the ratio between optical depth of the micrometric mode and total aerosol optical depth) ...” I think you meant “coarse mode” here.

Pg 15689: Figure 13 is introduced before Figure 12. This is probably just a LaTeX issue.

Pg 15689: Why do the Klett and Raman profiles not agree? The peak is at very different altitudes for these measurements. I assume this is due to different time intervals for the measurements, but this should be explained in the manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 15673, 2009.