

# ***Interactive comment on “February 2017 extreme Saharan dust outbreak in the Iberian Peninsula: from lidar-derived optical properties to evaluation of forecast models” by Alfonso J. Fernández et al.***

**Anonymous Referee #3**

Received and published: 14 August 2018

The manuscript by Fernández et al., provides an overview of remote sensing measurements of dust during an outbreak over the Iberian Peninsula in February 2017 and compares these measurements to two dust forecast models to evaluate their performance. The manuscript is well structured, clearly explained and the inclusion of the model evaluations provides a useful and important aspect to this work. I recommend that the manuscript be published within ACP after some further information is included, technical corrections applied and English mistakes are fixed.

General comments:

It would be beneficial to include some sort of backwards trajectory analyses for each

of the sites at different altitudes during the dust event.

In many circumstances the written tense is incorrect. Unless a description of a process is ongoing or is general, past tense should be used. The majority of circumstances when something "is" done or somethings "are" done should be replaced with "was" or "were".

Similarly, there are many instances when "the" is not used before a noun. I have indicated this where possible but this should be double checked.

Some more specificity about the performance of the models (at least the NMMB model) should be included in the abstract. Currently there is just a comment saying that the NMMB/BSC-Dust shows a better agreement with the observations than the BSC-DREAM8b model but the reader does not get a sense of the overall performance of each and therefore the abstract does not state whether either of these could be viable in forecasting dust outbreaks in the future.

Furthermore, the discussion and/or the conclusion should make future recommendations based on model evaluation done in this study. Would you recommend the NMMB/BSC-Dust model to be used for future forecasts? Should both be used still? Is further evaluation still required?

An indication of how this dust event differs from normal conditions or other dust events (in terms of magnitude and frequency) would be useful.

Technical corrections:

Line 66. "Actually" is not needed.

Line 77. Are you saying that the high uncertainty degree in aerosol radiative forcing estimates is result of the temporal and spatial variability in dust, or in aerosols in general?

Lines 125-134. A short sentence stating what pristine or typical AOD values within the



region should be given to give a sense of how intense a value of >2 actually is.

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Line 156. It should be "The AErosol and RObotic NETwork (AERONET)..."

Line 175. Also point the reader to Figure 2 where they are shown on a map.

Line 216. This sentence doesn't make sense. As a consequence, the next two sentences are very confusing.

Line 356. RCS should be defined here.

Line 365. "... so a especial attention will be paid to this period.." should be "so special attention has been paid to this period".

Lines 400 - 407. There are 4 circumstances of a missing "the" in these lines. "studies period" (Line 400); "lidar ratio" (Line 401); "Lidar ratio" (Line 404); and "particle and volume" (Line 407).

Fig.6 "LR" should be written as "Lidar ratio" to be consistent with the other x-axes.

Line 437. "were found certainly low" sounds awkward.

Line 441. "that it produced"

Line 444. Include the citation.

Line 446. "22Feb" format is inconsistent with previous notation.

Line 479. "low altitudes" is more appropriate than "low atmospheric levels".

Line 502. "the Barcelona site"

Line 508. These two 30-minute periods are "more representative" of what?

Line 514. "Comprehends" is not the correct word here.

Line 538. what is the "previous one"?

Line 582. Indicate that fractional bias will be "FB"

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Line 647. Indicate that you are referring to Figure 13.

Line 649. I'm not familiar with the use of "nervousness" in a scientific context although I could be wrong.

Line 665. "spreader" should be "are more spread". And it should be Fig 14 rather than 13.

Line 677. Define CoM earlier or just say "center of mass"

Line 688. Explain why "too long aerosol lifetime in the upper layers" is a possible cause.

Line 699 and Line 702. "allows us" or "allows the evaluation of"

Line 747 - 751. This sentence is too long. Break it into smaller sentences.

Line 802 "for instance in Granada" is awkward at the end of the sentence

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