

Interactive comment on “A climatology of dust emission events from northern Africa using long-term surface observations” by S. M. Cowie et al.

Anonymous Referee #1

Received and published: 8 April 2014

The Manuscript entitled “A climatology of dust emission events from northern Africa using long-term surface observations” provides a very good conceptual and a well written study of dust climatology patterns using SYNOP data. I believe that it deserves to be published at the Atmospheric Chemistry and Physics Journal after some minor revisions:

- 1) Introduction Page 3 Line 4: The authors should expand a little more on the radiative effects of desert dust particles and add a couple more updated references.
- 2) Introduction Page 4 Line 16: “. . .produces gusty winds and dust emission. . .” should

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be changed to something like “. . .produces gusty winds which in turn initiate dust emission. . .” just for clarity.

- 3) Section 2.1.1. Page 7 Lines 10-11: What is meant exactly by time resolution? Please rephrase.

- 4) Section 2.1.1. Page 7 Line 22: What is the importance of the ratio of day to night observations? Do you assume that during the night the observation of dust is hindered, therefore biased? Please explain in the text.

- 5) Section 2.2.1. Page 9 Lines 5-13: The main mechanism for the production of small particles that can travel great distances is the saltation bombardment. When the authors define the threshold of wind speed is it for this process? Please expand.

- 6) Section 2.2.1. Page 11 Line 3: End of paragraph. Is there a reference indicating the “. . .fact that emission occurs over a range of wind-speed values.”? Just to strengthen the point made.

- 7) Section 3.1.1. Page 12 Line 12: Can you please add a reference also indicating that the “. . .dust emission is generally more frequent in the semi-arid transition zone between the Sahel and Sahara. . .”?

- 8) Section 3.1.1. Page 12 Line 19: “. . .proximity to the Mediterranean Sea. . .” Please expand a bit how the Mediterranean has the described effect.

- 9) Section 3.1.2. Page 13 Line 27: Please expand on the physical reasons why Dongola and Abu Hamed in Sudan are prominent outliers.

- 10) Section 3.2.3. Page 18 Line 23: “. . .emission thresholds found in the literature. . .” Can you provide some references?

- 11) Section 4. Page 24 Line 17: “. . .Seasonal variations in thresholds are largest in the Sahel and smallest in Sudan.” Can you explain why this happens (a small sentence)?

General Remark: I would like to see if this method can be applied to other desert

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regions of the world (perhaps the Gobbi desert). Can the authors add a paragraph addressing this? I was impressed by the method used and it would be interesting to see the possibilities of applying it to other regions as well.

Figures:

Figure 5: Can the authors create the plot with thicker lines (red, green, blue) so to be more clear?

Figure 7: If the orography is not essential it would be better to omit it from the plot for clarity.

Figure 12: Please write a complete caption like the one on Figure 11.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 7425, 2014.