

Interactive comment on “Harmattan, Saharan heat low and West African Monsoon circulation: Modulations on the Saharan dust outflow towards the north Atlantic” by Kerstin Schepanski et al.

Anonymous Referee #1

Received and published: 26 June 2017

Review of the paper “Harmattan, Saharan heat low and West African Monsoon circulation: Modulations of the Saharan dust outflow towards the north Atlantic” by Schepanski et al.

This study aims at assessing the influence of the main components of the West African Monsoon on the Saharan dust outflow towards the north Atlantic. After a careful reading, I am afraid to request major revisions before to accept this study. Therefore, despite some interesting results to study the mechanism associated with dust outburst, the second part (from section 6) of the study is not clear: the objectives are not well identified, the methodology is not well adapted and some conclusions are too specu-

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lative. For these reasons, I would recommend to deeply modify the second part that includes a clarification of the objectives to the improvement of the methods. The major and detailed comments are provided below.

Major comments

Why the climatology is restrained as the period 2006-2009?

The figures 1 and 2 are done using June-July then in the second part JJAS is considered. This creates some confusions.

Once the dust outbursts for the year 2013 are analyzed, the second part (from section 6) is not clear to me. What is the objective? As I understand, the impacts of the seasonal cycle of the main components of the West African Monsoon are studied. But in West Africa, all these components are governed by a strong and similar (or at least very close) seasonal cycle. For example, the NAFTI index is clearly related to the onset, established and retreat monsoon phases.

Why only the NAFTI and the SHL are specifically analyzed? The monsoon flow is mentioned (Fig. 10) but why there is no analyze of its impact as done for the others components?

The SHL is defined following a method proposed by Lavaysse et al. (2009), where the SHL moves depending the LLAT intensities. The intensity of the SHL is thus one part of its characteristics, and the location of the SHL may have strong impacts depending where it is located. What happen if the longitude or the latitude is chosen? To avoid the problem related to the transitions phases of the SHL in June and September, the mean LLAT over the Sahara could be used.

Detailed comments

p5 l2 double brackets

p6 l7 Chauvin et al. (2010)

p6 l19 10% represents a spatial or temporal detection?

p8 l15-l23 There is no dust coming from outside the domain (Arabian Peninsula)?

p10 l7 and Fig. 2 It could be interesting to compare these results with the climatology (as done for Fig. 1)

p11 last paragraph of section 5 and Fig. 3: Scatter plots are more suitable for validation purposes. Bias, correlation and uncertainties are better represented.

p11 l29 The low NAFTI index value is defined according to the climatology?

Figures:

Fig 1: Add Bodele region in the map, please adjust the color scale

Fig 2: adjust the color scale. Also the change in % is not necessarily well adapted since it overestimates the region with low dust activation.

Fig 3: Please change to scatter plots

Fig 5: Again, I am not convinced by the scales used (in %). This increases the weight of the signal over region with low AOD. The difference is more adapted to me.

Fig 6: Very complicated to understand how this figure is realized. Why the Q25 and 75 of U or V are not simply used.

Fig 7: This figure looks like a simple difference in between the established and the onset (or retreat) phases and do not bring innovative information

Fig 9: Same problem with the scale in %

Fig 12: Why the intensity of the monsoon is not added?

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-309>, 2017.

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