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Comment

Interactive comment on “Discernible rhythm in the spatio/temporal distributions of transatlantic dust” by Y. Ben-Ami et al.

Anonymous Referee #1

Received and published: 4 October 2011

This manuscript examines the spatial and temporal characteristics of dust transport over the tropical and subtropical North Atlantic Ocean using 10 years of MODIS satellite data. Authors found an annual triplet of "transatlantic dust weather", including two distinct dusty periods (the southern route and northern route) and the transition from the northern route to southern route. They also performed cross-correlation analyses and attributed the observed rhythm to the dust source spatial distributions. They found that the Bodélé Depression appears to modulate transatlantic dust patterns about half the time. This is a very interesting study. The results are insightful and could serve strong constraints for models. The paper is very well written. I recommend the paper be published after minor revisions that adequately address the following comments.

The 10-year average AOD spatial patterns are shown in Figure 1. I would suggest

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that they include four panels representing four seasons to show seasonal variations of dust AOD. This would help readers better understand Figure 2. I notice that the dust AOD in the Gulf of Guinea is impressively high. I assume this high dust AOD occurs predominantly in winter (or during the southern-route period). Given that smoke is often mixed with dust (e.g., with smoke over dust as observed during AMMA and DABEX) in this region, can the high dust AOD partly reflect difficulty and uncertainty of using MODIS total AOD and fine-mode fraction to derive dust AOD? How does this uncertainty affect your results about the characteristics of the southern route? They may consider of adding some discussions about this uncertainty.

Other comments:

Figure 2(b): It is not clear to me what they are referring to by saying "...the apparent line near 16W". What does X-axis (longitude of 20 , 40, 60 degree) really mean?

p.23517, line 1: "(Sundar et al., 2010)" should be "(Christopher and Jones, 2010)". Also the full citation in the reference list should be corrected.

p.23519, line 9-10: why may the dust AOD be under or over estimated in occasions of high or low dust loading, respectively? Please explain.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 23513, 2011.

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