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Interactive comment on "Seasonal cycle of desertic aerosols in West Africa: Analysis of the Coastal transition with passive and active sensors" *by* Habib Senghor et al.

Anonymous Referee #2

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General comments

This paper presents an interesting study of the mineral dust aerosol distribution in Western Africa and Eastern Atlantic Ocean. The study is based on the analysis of satellite aerosol products from SeaWifs, OMI and CALIPSO. The authors focus on the seasonal variability of the dust optical properties retrieved over the land and over the ocean. A second part deals with the seasonal variation of the altitude of the dust layer based on CALIOP lidar soundings and meteorological data.

I found that the main interesting point of the paper is Figure (4), which depicts the variation of the advection of mineral dust, can affect the single scattering albedo. However the explanations given by the authors are rather confusing, e.g. L177 "stronger

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Discussion paper

contribution of dust over the ocean than over the continent". This statement is counter-intuitive because dust sources are located over the continent and AOD over the continent is also higher. As well in the conclusion L324, "MAM is being closer to the summer situation": this is not the case for the SSA for which we observe a gradient between land and ocean while the vertical distribution is similar. You must clarify this point. Although it could be interesting to use a different zonal area for summer and winter because the dust transport follows a E-W direction during summer while it is NE-SW during winter as depict by Figure (3).

The paper requires several improvements before publication.

Specific comments

- L44. Clarify this sentence and add relevant references. Explain how the AOD retrieval depends on vertical extent of the dust layer.

- L44. Provide information on the quality level (level 1.5 or level 2) and temporal resolution (daily mean or temporal window around satellite overpass). It appears later in the text that you have used monthly means.

- L65. AE is an optical parameter. Extensive (AOD) and intensive (SSA, AE) parameters are more appropriate.

- L78. Improve the description of uncertainties on aerosol parameters.

- L125. Clarify what is MDOF and what is p(x,y,z). Please refer to Adams et al (2012 and clearly define equation (1) and explain all the terms.

- Figure 1 and related text starting L145. Compare AOD for the same wavelength. You can interpolate the sun photometer AOD at 500 nm from AOD at 440 and 675 nm. Comment the regression coefficients you have obtained. In particular, explain why the regression for M'Bour site is significantly different from the others.

- L165. Correct sentence. The http link must be in the data description section.

- L167 and Figure (2). It is unclear which wavelength you have used for the comparison. Please rewrite Figure (2) caption and avoid unnecessary information on site location. Why did you use daily data rather than monthly data as for the AOD validation?

- Figure 3. It is not possible to read the SSA contour lines. Provide an additional figure with SSA regional pattern.

- L230. How do you use the AE? Please clarify and clearly state this in the data and method section.

- L232. Rewrite sentence and defined correctly which layer you are talking about.

- L240. Explain the link between gravitational settlement and SSA. This whole paragraph is unclear. However it is of highly importance to get your point on the link between the dynamic of the dust transport and the optical properties. Consider also revising L298.

Technical comments:

- Avoid use of "desertic aerosol". Prefer desert aerosol or better mineral dust.

- L42: correct sentence between brackets

- L125: Adam must be outside brackets