

Interactive
Comment

***Interactive comment on* “The seasonal vertical distribution of the Saharan Air Layer and its modulation by the wind” by C. Tsamalis et al.**

Anonymous Referee #2

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General

The paper is well written, contains interesting, original, new information with focus on Saharan Air Layer (SAL) based on CALIPSO observations. But I personally find the result sections 3 and 4 too long. I would appreciate if a more condensed presentation of the results could be given (a factor of two reduction of text amount). All the detailed discussions on seasonal differences could be better summarized. We know already a lot about SAL so that one could keep the text short and one should concentrate on the very new aspects.

Another important point is that there is no SAL base height visible in all the figures, the dust layer reaches the Atlantic Ocean surface according to the CALIPSO observations. This is in contradiction with our knowledge of a lofted SAL which is typically above the

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marine boundary layer, at least during summer. Is that related to erroneous CALIPSO data processing (a bias in the analysis)?

I recommend publication after minor revisions.

Details

Section 1, Introduction:

The introduction is very long and very general. I would prefer to have a short general introduction into the topic (the importance of SAL is well known) and immediately introduce your contribution which you are going to present in this paper. And here one could say what is done so far (e.g., with lidar, LITE, AMMA, SAMUM, SHADE, AMAZON lidar, and other attempts). So the last two paragraphs of the introduction are ok. Here I would explicitly mention the campaigns that contributed to this field of research.

Page 4731, line 5: please add Baars et al., GRL, 2011 (further evidence for smoke transport to Amazonia)

Page 4735m line 22: biases. ... Here one should cite Wandinger et al. (GRL, 2010). Because multiple scattering is the main driver for biases in CALIPSO desert dust observations, I believe.

Sections 3 and 4, is that an artefact of CALIPSO observations that one does not see the marine boundary layer in all the plots? SHADE observation (Leon et al) and SAMUM observations (Tesche, 2011) clearly see the marine boundary layer below the lofted SAL. Why is there no marine boundary layer in the plots? Is that related to the CALIPSO data processing?

Page 4739: there are a lot of SAMUM winter observations that should be included in the discussion (Tesche 2011a,b, Gross, 2011 a,b, Weinzierl 2011).

Page 4740, line 7: Here one should provide references again, Ansmann 2009, Baars 2011.

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Figure 1: If possible, improve the figure, colors are not just easy to distinguish. In figure 1 one can see the marine boundary layer!!!!

Figures 3,4,5,6: Now the marine boundary layer is gone...! Why?

All in all a very good contribution to literature!

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 4727, 2013.

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