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Interactive comment on “Investigating the frequency and trends in global above-cloud aerosol characteristics with CALIOP and OMI” by R. Alfaro-Contreras et al.

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Dear Authors,

I have briefly read over the submitted manuscript out of personal interest and found that the citation to

Peters, K., Quaas, J., and Bellouin, N.: Effects of absorbing aerosols in cloudy skies: a satellite study over the Atlantic Ocean, *Atmos. Chem. Phys.*, 11, 1393–1404, doi:10.5194/acp-11-1393-2011, 2011.

shows up in the Reference section, but it does not appear anywhere in the main text of

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the manuscript and should thus be corrected.

Indeed, the above study focuses on topics thematised in the Introduction and the Method Sections of the submitted manuscript. In particular, Peters et al. (2011) calculated the direct radiative effect of aerosols above clouds by a combination of MODIS, AMSR-E, CERES and OMI measurements. Similar to the methodology applied in the submitted manuscript, the OMI AI was used to sample for absorbing aerosols in cloudy scenes.

Further, I suggest the authors be more cautious with using the term "trend" in their submission. A period spanning not even 8 consecutive years does not allow for a trend analysis in a climate context. As the authors also mention, the tendencies found in the data could simply be explained by measurement artifacts.

Conclusions:

In the last paragraph, the authors speculate "whether or not ACA represents a fundamental climate phenomenon that requires specific monitoring long-term in a potentially-changing climate" (technical: this sentence needs to be rewritten).

I strongly endorse specific monitoring of ACA, as I explain in a short example below:

A non-negligible fraction of the fires occurring during the biomass burning season in southern Africa (about July-October) is considered to be of anthropogenic origin. These fires lead to long range transport of biomass burning aerosol over the stratocumulus cloud decks off the West-African coast and lead to substantial positive TOA radiative forcing, which is even non-negligible when averaged to a global scale (cf. Peters et al. (2011)). Under climate change, agricultural behaviour, biodiversity and circulation patterns may change. This warrants specific monitoring of the ACA situation.

Thanks!

Kind regards, Karsten Peters

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