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Atmospheric
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Discussions

Interactive comment on "Improved cloud screening in MAIAC aerosol retrievals using spectral and spatial analysis" *by* A. Lyapustin et al.

Anonymous Referee #2

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The authors present an improvement for the cloud and snow screening method in the high-resolution aerosol retrieval algorithm MAIAC for MODIS. The paper is well written and has an easy-to-follow structure. Besides some minor revisions I suggest publication of the paper in AMT.

Specific comments:

title: I would suggest to include the words "and snow" to the title ("Improved Cloud and Snow Screening...")

l. 14: It is generally better to use the wording "observations" instead of "measurements", as also AERONET uses radiometers, i.e. the measured quantity is radiance

and not AOD.

l. 27: Please introduce abbreviations (MODIS)

l. 27: "radiance measurements"

l. 29: As also MODIS has some gaps at the equator, it is netter to write "near-global"

l. 44: [here and elsewhere] Please introduce abbreviations (AOT). Moreover in the abstract the wording "aerosol optical depth" (AOD) is used. Please stay consistent (optical depth OR optical thickness) throughout the paper.

l. 45f.: I assume the standard deviation is in AOT units? How does it relate to the general uncertainty of the aerosol retrieval, i.e. is sigma<uncertainty? If so, please justify.

l.51: I assume that mainly false AOT retrievals are rejected? This should be made clear, as also random thinning of the sample sizes might increase correlations, depending on the absolute sizes of the samples. It would be useful, if the respective numbers of observations going into the correlation analysis would be given.

l. 80: Please introduce abbreviations (AERONET).

l. 86: Is \eta = CMF? Please introduce the meaning of "parameter \eta".

l. 90: I assume that the 5μm droplets are used to represent premature boundary layer cumulus? It would be good, if the selection would be motivated (by one sentence or so).

l. 93f.: It would be helpful if the major principle of the snow test (e.g.reflecance ratio) would be given.

l. 102: Is this statement well justified for all aerosol types? What about transported desert dust without large differences in spectral extinction between VIS and SWIR? Does the relevant information then come from the blue bands?

l. 111: Please shortly describe the benefit of the deep blue band and also provide the wavelength (0.412μm) already here.

l. 112: What is 10μm? The effective radius? The mode radius of the lognormal distribution (than the cloud would have rather large droplets)? Why now another droplet radius is used than the 5μm before? Is another type of cloud assumed (e.g. more mature cumulus)?

l. 201: Where do the one quarter come from? How is the sensitivity to other thresholds?

l. 237: Does this mean that the background model always provides the lowest value for \tau_{ij}? It would be worth to justify this test 9 a in little bit more detail.

l. 247f: What are the sample sizes for the respective subsets?

Section 4: The findings are based on two AERONET stations only. It would be helpful if more stations could be included in the analysis. Nevertheless it has at least to be discussed that all results are based on observations from a very small number of stations with very specific environments (while the sample sizes may be sufficiently high).

l. 280: "no" -> "not"

l. 292: [related to general comment to section 4] I would avoid the term "significant" here, as although the improvements may be statistically significant (which has not been tested!), they are based on two specific stations only and thus doe not cover a broad range of environments. For proof of "significant" improvem,ents a higher number of stations covering different environmental conditions would be needed. It can be written in the comnclusions that for such claim a higher number of stations is required without reducing the worth of this analysis and the relevant findings presented in this paper.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 1575, 2012.