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Discussions

Interactive comment on "Evaluation of IASI derived dust aerosols characteristics over the tropical belt" *by* V. Capelle et al.

Anonymous Referee #2

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The paper by Capelle et al provides information on the evaluation of IASI derived dust aerosol properties. It appears that the IASI data have already been shown to give dust properties as published in Peyridieu et al. 2013. The publication of the data and the retrieval method itself is thus not original here. This present study submitted to ACP does not contain new data on science problems associated with dust, something of typical interest for the readers of ACP. While a documentation of the evaluation is useful, I do not think ACP is the appropriate journal and recommend resubmission to a more technical journal, such as AMT. I recommend thus rejection for ACP.

Furthermore the paper still misses several quantifications, which make the work in the presented detail not very useful. It will require major revision. The authors conclude: "The present results demonstrate the usefulness of IASI data as an additional con-

straint to a better knowledge of the impact of aerosols on the climate system.". Sorry to say, I am not more convinced by the results presented here. However, I believer the authors have the data at hand to quantify the bias and provide an uncertainty estimate for the IASI dust related data. I am sure the data will then become useful.

Smaller comments and suggestions for revision:

Quite some editing of the english, inclusion of more comma, removal of vague statements would help the reader.

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"disinterest" I don't think this is the right word..

"have a high impact in the infrared when aerosols more typical of pollution or biomass burning usually have smaller size and affect less infrared radiation." please rephrase

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"the domain remains largely unexplored and is still poorly understood" please omit, a little too general.

p30148

"at 9.30 p.m. LT" explain LT

"except in the presence of a strong, recurrent, local diurnal cycle affecting the free troposphere to which IASI is most sensitive." please rephrase. not clear.

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"The CALIOP mean altitude is calculated in this way in order to avoid the critical influence of the lidar ratio on the estimation of the extinction coefficient (and the optical depth), which might impact a mean altitude estimation" I do not totally agree. I am not convinced the authors make best use of the CALIOP products. In dust dominated regions it should be possible to compare the extinction profile from CALIOP to the dust

occurrence frequency from IASI. I believe this is important to better understand the differences between the IASI and CALIOP profiles. At the very least this discussion needs to be extended to the point that a hypothesis is put forward how the bias would look like. As discussed here and later in the text, it sounds more like an excuse, which leaves the reader with no conclusion.

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vary according TO the characteristics of the terrain

"presence of high relief" => relief ?? orography, terrain is probably meant

"For each site, a month of the period ... " please rephrase

"on a two dimensional plot" not clear. In contrast: what would be a one or even three dimensional plot.

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"To overcome this difficulty, a fit is done, site by site, including all the available items (monthly IASI-AERONET bins) over the period studied, resulting in an IR 10um AOD/500nm coarse mode AERONET AOD "site ratio"." This procedure removes any bias, if I understand the procedure correctly. Firstly, this should be made more clear, outspelled, explained. Secondly, its not clear how the large scale IASI product shall be used, e.g. by modellers, since one would not know which ratio to apply locally. Any recommendation for users? Can this be translated in an error estimate?

p30152

"Here, the test distance has been chosen so that about 7% of the items are eliminated." How much do the IASI results change if the 7% items are included. If one would use the IASI product one would not have the chance to see which 7% of the cases should be removed. Any recommendation for users? How shall the IASI be used as a constraint by climate modellers?

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Results, first paragraph: While it is useful to have an explanation of possible errors, the text as such is rather trivial and not very useful. It may be shortened to 2-3 sentences. However, a quantification of the estimated error in AOD and height would be very useful and would certainly deserve more explanation and text.

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"These parameters varying from one site to another (and, often, from one day to the next), there is no one common factor reconciling the two observation metrics." There is no reason to believe that the ratio is stable at a given site. Dust properties will change with time considerably even at one site. Utilizing one ratio for all sites would be better, since it would be simpler and more reproducible. Unless more sophisticated modelling would be involved.

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"The box and whiskers results (Fig. 5) are significantly degraded / The Taylor diagram for the altitude over sea" please rephrase

AOD discussion: The site ratio used, removes the bias between aeronet and iasi. However, it would be interesting where bias exists, if a best guess ratio of AOD@IR and AOD@500nm would be applied. How big is the bias and thus error in the IASI AOD estimate. Which part of the bias may be attributed to the coarse mode AOD from Aeronet. This has to be discussed quantitatively to make the work more useful.

Altitude discussion: It is not clear which altitude differences exist between the two datasets. Correlation and amplitude do not inform about bias, which is a very basic description for a comparison. How much are IASI and CALIOP disagreeing? Which part of the bias may be attributed as error to both methods. Or ff the two datasets describe different properties, why are they compared at all? I believe the authors can be a bit more quantitative. How does the mean height distribution look like in the two

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datasets, displayed in a histogram?

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refractive index discussion: Please be more quantitative.

tables 2-4 :

If the authors believe that only correlation is of interest, then the correlation columns could be integrated in table 1, saving space. However, one could also argue for more statistical info on the comparison, such as mean, median values from aeronet and from iasi, rmse, mean normalised bias, std. The correlation numbers given are not reproducible, so they are not very informative for further work. Scatterplot for land and ocean data might be useful.

Fig 3,5,7:

It would be more readable if the station identifiers are used on the taylor diagrams.

Fig 4,6,8:

The figure caption is not sufficient. What is really shown here? Ratios? bias in percent? The plot title does not need to explain the plots as box-and-whisker plot.

fig 10:

the amplitude curve is not well explained in the caption. It might be useful to mention in the caption that this is for stations over land.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 30143, 2013.

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