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The authors gratefully acknowledge the suggestions of the two peer reviewers assigned to this manuscript. We further thank the Associate Editor for dutifully working to have competent and constructive reviews for the paper. We thank them for their service to the journal.

Thanks again to all.

Reviewer Comments indented in red
Author Responses in black

> Reviewer #1
>
> 1. Error bars should be added to the plots, such as how large the uncertainty is due to the uncertainty in the input variables?

The main objective of this technical note is to compare single-layer cirrus cloud radiative forcing calculated by the Fu-Liou-Gu radiative transfer model and by the Corti-Peter model. Thus, our objective is pursued by inputting into the two models the same cloud optical properties, the same thermodynamics of the atmosphere and surface albedo. As the input parameters are the same for both models, it follows that the uncertainty associated with these input variables is the same. Differently, the Fu-Liou-Gu model needs much more parameters. Some of them are obtained from atmospheric models, like the ozone or CO_2 concentrations and it is objectively difficult to assign an uncertainty to those variables.

Nevertheless we followed the reviewer's suggestion and added in the manuscript a sensitivity study (Par 3.1) for the common variables, or how the net radiative forcing calculated by the two models changes in percentage with respect to the common input variables (Table 1)

> 2. How does the magnitude of the disagreements between two models compare with these error bars?

See previous answer.

> 3. Missing of validation: validation for this intercomparison study is necessary. ARM data can be used for this purpose where both cloud and radiation measurements are available.

Because of the Corti-Peter model, the intercomparison is done at the Top of the Atmosphere, where no ARM data are available. Its presently unclear whether or not CERES-type analysis could be performed in a manner suggested by the reviewer, given the highly diffuse nature of many cloud samples analyzed. That remains a topic for another study and analysis.

Thank you for your careful reading of the manuscript.

> Reviewer #2
>
> This is a relevant short study pointing out (to my knowledge the first time) the single-layer cirrus cloud radiative effect differences between the Fu-Liou-Gu radiative transfer model (FLG) calculations and the simplified Corti and Peter (CP) model, published in the Corti and Peter 2009 paper (CP2009).

Thank you very much for the positive comment, and for the very thorough reading of the paper. Many positive changes have been made as a result of your comments.

> Due to its simplicity and supposedly quite accurate results, the CP model has in recent years been used in several studies (e.g. Bourgeois et al., 2016, Kienast-Sjörgren et al., 2016).
>
> Lolli et al.'s manuscript take data from 2 years of lidar dataset from Singapore and calculate considerably larger differences between the more advanced FLG and CP radiative models compared to what reported in CP2009.
>
> In general, I am missing a more detailed discussion on the bias sources by the CP model and a more careful comparison with CP2009 (day only vs daily mean conditions).

We appreciate the thought. We've added qualitative interpretation of where such differences arise. We found out that the main problem related to three parameters obtained through a regression analysis and set up as a constant. This is not the case, and probably those parameters should be optimized regarding the specific analysis the model is performing. Those parameters influence both longwave and shortwave calculations. In CP radiative model those values are set as constant. No information more is available. We found out that the results are very sensitive to those variables. Text has been added in Abstract , Par 3.4 and Conclusions.

> The manuscript would increase its scientific significance if a midlatitude dataset, for instance the one published in Campbell et al., 2016, would be added to the analysis (or at least discussed the possible implications for regions outside the tropics, where CP model has also been used).

We agree with the reviewer and have added the analysis from GSFC in the manuscript (Par. 3.4)

> In general, I find this technical note valuable, however, the authors need to address the listed comments/questions before the paper is published in ACP.

General comments/questions:

1.)

Is the Singapore lidar site representative for the tropics? (being an urban site, in a polluted region, etc.) Would the main conclusion change, for instance, when applying the radiative transfer model calculations to other tropical measurement locations of the MPLN network e.g. the Bermudas, Cabo Verde, Doi Ang Khang (Thailand), Douliu (Taiwan), EPA-NCU (Taiwan), Kanpur (India), Ragged Point (Barbados), etc.?

Its unclear exactly how relevant the comment is. As we've now added GSFC, there is a second site from which to consider the model differences. But, of course, they are relative differences. Thus, it wouldn't matter what site(s) we ultimately picked. But, it was a good suggestion adding GSFC to perhaps suppress any ambiguity in our conclusions based on the single-site analysis.

2.)

Please add/estimate the uncertainty of both your absolute cloud radiative effect calculations as well as its deviations from the CP model.

Thanks. A sensitivity study to the input parameters for both models has been done and introduced in the new manuscript (Par. 3.1 and Table 1)

3a.)

I miss a more detailed discussion of differences between CP and FLG models. Lines 183-185 and 207-209 need to be expanded.

Can you somehow test this speculation? Could you remove the longwave absorption above clouds from FLG model (or add this calculation to the CP model) and confirm the hypothesis? Please add or at least comment on the uncertainty estimates of the radiative calculations (see also a related specific comment 7).

We changed completely the manuscript and we introduced the new findings on why those discrepancies arise, in abstract Par. 3.4 and conclusions.

3b.)

Did you explain the reasons for significantly different intercepts in figures 5 and 6?

The intercepts in Fig. 5 and 6 are different because there is a bias introduced by the three parameters obtained through a regression analysis. This is now stated in the text.

lines 175-185: I don't understand the interpretation of the different intercept parameter. Please rephrase. Are the lines 183-185 referring in general (that

is – not only intercept parameter) to differences between CP and FLG models or do they refer to the intercept parameter only?

The text has been changed accordingly. Now lines 183-185 are part of another paragraph making the manuscript clearer.

4.)
CP2009 uses the daily mean conditions to asses their radiative transfer model. Would taking into account both day and night data decrease the bias/bring your results closer to the bias of up to 20% as stated in CP2009? Consequently, can you comment/calculate how would differences between CP and FLG radiative model calculations behave during night?

Taking into account only nighttime means to compare only the LW outgoing radiation. We believe that the reviewer is right, and we add this intercomparison to the manuscript to check if the bias is more evident in some bands with respect to the others (Figure 7)

5.)
What is the additional information we gain by always having 2 years of data shown in Figures 1-4 in separate panels? One figure where both years are shown separately can be to my quick judgment followed by a combined histograms for both years. whether 2 years of data are enough to get a reasonable "climatological" values? Why the authors didn't use the whole available Singapore lidar dataset?

We agree that grouping the pictures is saving space giving the same amount of information. Nevertheless, due to the barplot properties under MATLAB, grouping the pictures is generating confusion.

Those two years investigated were the best/most complete years in the archive, due to instrument failures/swapouts. We appreciate the thought.

Specific comments:

1. Please state your definition of cirrus clouds in a condensed form for the convenience of the reader

Done

2. line 50: 1 W m-2

Done

2. line 67: Bourgeois et al., 2016 does not appear in reference list

Added

3. line 110: How much can GEOS-5 biases influence the results?

Actually there is no influence in using GEOS-5 model or actual radiosounding data, as the same temperatures are inputted in the two models

4. line 157: "This is particularly evident over ocean at 20sr..." Why?

This is a direct consequence of Figure 6, as we can notice a larger bias between the two models (the discrpance between blue and red lines). As a consequence results are shifted with respect to the COD (CRE with a COD = 0.4 for FLG has the same effect of COD = 0.2 for CP)

6. line 203: in in

Fixed

7. line 214: "...given lower computational demands…" Can you quantify that?

CP model analyzes one year dataset in less than 5 minutes while FLG needs > 24 hours. The info has been added in the manuscript

8. lines 218-219: this is a strong statement for a study that analyzes only 1 site!

We agree that the statement is strong, but now there is evidence from a second site too

9. Please expand figures 1-4 in y-direction, so that one can better read out the values

We expanded the scale, but the format of the picture is standard

10. Use a reasonable number of digits after the dot for the NET RE value in figures 1-4, and use them consistently with those stated in text.

Fixed

11. Figure 1: top and bottom panel do not have the same upper y-axis limit

Fixed

12. Could you briefly comment on the net negative daytime TOA CRF cooling effect for the thinnest cirrus clouds as observed in Campbell et al. 2016? Why you do not/cannot see that from your dataset?

This is a direct consequence of the existence of a meridional gradient in cloud radiative effect. Being close to the equator, even the thin cirrus cloud are keen to warm the system earth-atmosphere.

Thank you again for your comments and careful scrutiny. We appreciate your consideration.