

Co-Editor Decision: Reconsider after minor revisions (Editor review) (03 May 2017) by Ulrich Schumann

We appreciate and thank the Editor for his considerable effort and care in the complex review of this paper.

Comments to the Author:

Thank you for submitting the paper. I am glad to see that the ACRIDICON measurements are scientifically useful.

Sorry for the long time it took to come to a decision on this paper.

The ACPD version of your paper got mixed ratings (poor to good) ; one reviewers suggested rejection, the two other asked for major revisions.

Unfortunately, none of these reviewers was ready to review the revised paper.

That caused the large time delay.

I got a short review from a new reviewer (reviewer # 4), recommending acceptance subject to technical corrections.

I also looked through the paper, again, myself.

In addition, I informally and confidentially discussed my tentative decision with one of the previous reviewers.

I also addressed several times a second previous reviewer but got no response.

Based on this limited input, I decide as follows:

The paper is accepted subject to minor revision to be checked by me, the co-editor, including reactions to the reviewer #4 and the following recommendations:

Abstract, line 43: please delete "more confidently and" because the paper also shows up various difficulties to verify the relationships.

A: Ok. Changed

Lines 14 to 152: Please avoid the term "it is the first study that" because this claim was not part of the ACPD paper and, hence, was not available for public discussion, and I am not in the position myself to judge that this is indeed the first study.

Instead start the point "a" as follows." It validates the ..." and similar for points b and c.

A: Ok. Changed

Line 251: I know of a recent Nature paper by Moore et al. (2017; doi: 10.1038/nature21420) that could be cited in connection with ACCESS-II by now. Please check for available references for ECLIF and DACCIAW and provide explanations to all abbreviations used.

A: Ok. Changed. The explanations of abbreviations are corrected now.

Line 268: "For a long sequence of measurements at cloud base (> 20 s) these uncertainties become negligible." Please add an explanation for why the uncertainties get smaller for a longer sequence. I do not see that the velocity measurement errors are purely random. Hence, I have doubts that this sentence is strictly correct. Unless you have good arguments, I suggest deleting this sentence.

A: Ok. Deleted.

Line 257 and 284: write 125°C and 0°C without blank before °C.

A: Ok. Changed

Line 507: why is there a blank after "measured particle number". Is there a symbol missing? Or should the blank be deleted?

A: The blank is deleted.

Line 606: I missed to understand where you introduced "novel" parametrization: I thought the parameterizations are as suggested earlier. Hence, I ask to skip "novel" or to provide a good explanation to me.

Line 607, for reasons given above, I ask to skip "It is the first time that these" and adjust the remainder of the sentence accordingly (there are neither new nor old parametrizations). An alternative could be to call the "novel" ones "recent".

A: Ok. Change "novel" to "recent".

Line 633: The last sentence should be changed in consistency with the changes recommended for the abstract. I am still not sure that you got much more confidence in the usefulness of the parameterization but got more evidence to quantify the application range and the uncertainties of the models. You may adjust your wording to this impression, or change otherwise, or omit this sentence.

A: We omit this sentence.

Line 1128, Caption Figure 5. I assume the reference to Figure 3 needs to be replaced by reference to Figure 4.

A: Ok. Thanks.

Referee number 4 comments.

Braga et al., use airborne measurements during the ARCRIDOICON-CHUVA campaign to verify and further the applicability of the recently proposed satellite retrieval algorithm for CCNC below cloud base. Their validation involves an in-depth cloud probe comparison. As well as a comparison between observed cloud properties and previously proposed cloud parameterizations for predicting cloud droplet number concentration based on updraft velocity and CCNC as a function of supersaturation.

Specific comments:

Line 216: "article losses" should be, "particle losses"

A: Ok. Changed.

Line 217: consider adding a comma after the parentheses so that it is "issue), the"

A: Ok. Changed.

Line 217: make droplets singular, it should read "cloud droplet concentration"

A: Ok. Changed.

Line 248: replace "the" to "in", the sentence should be "up to 20 μm in size"

A: Ok. Changed.

Line 292: Consider moving "maximum" before uncertainty so that it read, "an overall maximum uncertainty of 16%"

A: Ok. Changed.

Line 298: Please specify the probe used for the DWC to make the sentence a bit clearer

A: Ok. Changed.

Line 342: The word "data", is plural, please change "is" to "are"

A: Ok. Changed.

Line 342: please remove the extra "used" so that the sentence reads "The data are the same as used for the"

A: Ok. Changed.

Line 533: There should be a space between "Ndt" and "and"

A: Ok. Changed.

Line 575: The texts suggests that dividing by a factor 1.3 for this case helps brings the values closer together. However, in this case not dividing by 1.3 would actually keep the values closer. Please clarify this or note that this is an exception since the division works well for the majority of the remaining flights.

A: We don't agree. The decrease of 30 % is essential to bring the values closer in every case. Actually, it is not a factor of ~ 1.3 but 30 % (we have corrected it in the text now), i.e., a factor

of 0.7. In this case, without applying this factor the difference is 289 cm^{-3} , while applying the factor the difference is 160 cm^{-3} (almost the double).

Line 615: Consider replacing “was favorably compared” with “compared well”

A: Ok. Changed.

Line 627: Remove the period after Nd

A: Ok. Changed.

Line 628: Consider changing “in cloud” to “in-cloud”

A: Ok. Changed.

Line 1163: Please remove the “(left)” and “(right)” as they are described at the end of the sentence.

A: Ok. Changed.

Figure 7: Please make the Cumulative probability axis the same bold as the other axes in the figure

A: Ok. Changed.

Figure 15: Are the correlation coefficients for both probes .97? In the text it says greater than .90

A: Ok. We have changed in the text to 0.97.