

Review of “comparing calculated cloud microphysical properties of tropical convective clouds at cloud base with measurements during the ACRIDICON-CHUVA campaign” by Ramon Campos Braga et al.

Braga et al., use airborne measurements aboard HALO from a CCP, CAS-DPOL and CCN counter to derive cloud drop size distributions (DSDs) and cloud water content from various instruments via an inter-comparison. In this study parameterizations for liquid cloud formation in tropical convection are validated, but for instance comparing the directly measured cloud drop concentrations (N_d) near cloud base to inferred values that are derived by combining the cloud base updraft velocity, CCN vs SS (supersaturation) spectra. In addition, N_d from cloud base was also compared to drop concentrations (N_a) derived by assuming adiabatic expansion for vertical evolution of cloud drop effective radius above cloud base.

Overall, this paper presents a good summary but it lacks a significant scientific finding or discovery. Rather it is verifying previous formulated parameterizations, which is valuable. However, the authors could do a better job of comparing the differences they observe between the parameterizations validated here with previous studies.

Perhaps the paper can be re-worked to demonstrate the novelty of the work, which is lacking in the current version of the manuscript. Specific comments below should help achieve this. After such revisions have been made, the paper maybe considered for publication.

There are small editorial issues and some grammatical errors throughout the manuscript, of which I have pointed out a few, but will leave it to the authors to check that more carefully upon submission of the revised version.

Specific comments:

Line 29: Why not introduce CWC here like all the other acronyms in the abstract?

Line 46: “pursue” replace this word with something more suitable like “cloud microphysical models aim” to reproduce or “The goal of cloud microphysical models is to reproduce....”

Line 137 “account” should be “accounted”

The discussion in line 132 to 137 can be expanded upon to make the paper more scientifically novel. State in more detail what was unique about these measurements, are the convective clouds here unique? Related to this but later in the paper, are the results obtained here the same as other convective regions in the world? Could the authors comment or discuss this? If indeed this is the case, that the results are similar to other locations of convection globally, the authors may consider discussing this point and stressing this aspect.

Line 149: should read “Manaus City” not “Manaus city”

Line 193-194: Delete “was used additionally considering” and Line 194: add “was considered” after 10%. In total the sentence should read “For the CDP sample area of 0.22 mm^2 , an uncertainty of about 10% was considered (Molleker et al., 2014).”

Line 205: Delete extra periods

Line 267: “maximal” should be “maximum”

Line 269: should “probes” have an apostrophe after it i.e. probes’? it sounds like it is being used in the possessive.

Line 297: Why these specific flights being used (AC08 and AC20) for the CWC, why not data from the entire campaign? Also, why not use the same flights as were used in the effective radius comparison (line 278)?

Line 309-314: Why compare only with one hot wire probe when three of them were on board the aircraft?

Line 319: insert “the” before “hot-wire”

Line 320: Can you make it clearer that this is a decreasing number concentration with *increasing* effective radius

Line 322: insert “the” ahead of “CAS-DPOL” in general the grammar is really poor from lines 320-325, please rectify

Line 326-333: Why not consider using only particles less than 40 microns in your CWC comparison?

Line 406: replace “greater than or equal” with the symbol “ \geq ”

Line 471-479: Are these values presented here similar to literature values from other locations in the world? Can there be a comparison and discussion of this?

Line 520: Figure 14a shows the LWC? The N_d that is stated in Figure 14a is also mentioned here in Line 523, not sure why the reference to Figure 14a is needed here.

Line 530-534: The scaling of 1.3 works quite well, perhaps mention it here since this is a new data set.

Line 558: Here the authors should make a case for why their work was novel, interesting or what is new about their work.

Line 570-574: Was there any doubt about the validity of the parameterization prior to this study? What is new about the work here other than the fact that the measurements were all taken during this campaign on one/the same aircraft?

Figures

Fig 4: Consider editing the plot so that the legend matches the sub-plot where the quantities are shown

Fig 4 (lower left panel for CWC): Why is it necessary to have a log scale? The data just cover one order of magnitude and are all squeezed to the bottom half of the panel. There is no need for the scale to extend to 10. And no need for a log scale either. This artificially downplays some of the differences between the probes.

Fig 6a and 6b: is it necessary to have zeros in front of the micron sizes, i.e. 05 instead of 5. Also, can both scales be made linear for consistency and clarity? It is hard to compare presented in the manner here.

Line 1134: Italicize “m”

Fig 12 (all panels): Shouldn't N_d be in red?

Fig 13 (line 1190): reference to Fig 7-8 is not consistent with text, should be Figure 11 and 12