

Atmos. Chem. Phys. Discuss., referee comment RC2
<https://doi.org/10.5194/acp-2021-80-RC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on acp-2021-80

Anonymous Referee #2

Referee comment on "Cloud droplet formation at the base of tropical convective clouds: closure between modeling and measurement results of ACRIDICON-CHUVA" by Ramon Campos Braga et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2021-80-RC2>, 2021

This manuscript showed closure results of measured and predicted cloud droplet number concentration for variable updraft speed during ACRIDICON-CHUVA campaign of 2014 where role of updraft speed, hygroscopicity and aerosol size distribution is discussed. Better closure results are obtained when k was assumed to be 0.1, updraft velocity is low and aerosol size distribution is unimodal. CCP and CAS-DPOL are used to measure cloud droplet size distribution and UHSAS with CPC for aerosol size distribution. Updraft speed is measured using Rosemount model 858 AJ probe. Overall the results could be a valuable contribution if they are backed up by proper justification. One of the major point of concern is the lack of reasoning when there is an agreement or disagreement in the closure results. It reads more like a report lacking scientific understanding of the results. I recommend the publication only if the authors improve the discussion part and add previous relevant studies for comparison and show why their approach is better than the earlier studies.

Specific Comments:

- Line 66: Height of the cloud base?
- Line 63-64: Purpose of using two probes: CCP and CAS-DPOL.
- Line 84 and 186: How is the uncertainty of 30% is estimated?
- Line 103: What will be the effect of size dependent hygroscopicity is assumed for external mixing state.
- Line 133: Why there is a deviation between measured and modelled N_d at low w ?
- Line 129-130: What is the implication?
- Line 105: Why collision and coalescence are not considered? Is there any measurement

constraint or it is not important to consider?

- Line 147: Under which specific conditions, there will be decrease of Nd due to entrainment of additional aerosols?
- Line 155: Why is it assumed that bimodal size distribution is due to marine air? Are there any evidences of size dependent chemical composition?
- Line 182-183: The sensitivity analysis of Aitken and accumulation mode to total Na and Nd should be included in this study as this is one of the highlight of this manuscript that represents scientific advancement.