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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The biomass burning aerosol influence on precipitation over the Central Amazon: an observational study" *by* W. A. Gonçalves et al.

Anonymous Referee #2

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Summary

The authors attempt to show the impacts of biomass burning aerosols (BBA) on precipitation characteristics in the Amazon. The study evaluated the effects of BBA on precipitation for wet season/dry season and for stabile and unstable atmospheric conditions. Better understanding of this relationship would be an important scientific contribution, especially in the critical region of the Amazon. However, the concepts and results are poorly described, which makes it difficult to understand the significance of the results presented in the paper. Also, the language is not fluent and sentence structure needs significant improvement to better understand the study. The following

comments provide a summary of concerns with the paper.

Comments

1) Page 18880, line 8: "instability degree" should be "degree of instability". Note that this type of poor language discussion was observed throughout the paper, which made if very difficult to understand the significance of the results

2) Page 18880, line 14-15: "investigation" would be more appropriate than "clarification"

3) Page 18881, line 9: Which aerosols act as CCN? The BBA? Please be specific

4) Page 18881, line 9: "high concentration" would be more appropriate than "great formation"

5) Page 18881, line 11: Doesn't polluted environments impact the collision and coalescence process limiting the ability to form precipitation size particles?

6) Page 18881, line 14, "observations" instead of "evidences"

7) Page 18881, line 15-16: What do the authors mean be essential factor? Do you mean this is the primary mechanism for precipitation generation during high BBA conditions? If so, please clarify

8) Page 18881, line 18: "convective, ice phase clouds"

9) Page 18881, line 26: "content"

10) Page 18881, line 28: "understanding" would be more appropriate than "clarifications"

11) Page 18882, lines 1-7: This discussion is not coherent. It seems like the authors want to explain that the study will focus on understanding the relationship be between BBA variability in the Amazon and physical attributes (size, duration, etc.) precipitating cells This needs to be rewritten to provide a better understanding of the goals of the

study

12) Page 18882, lines 20-21: Please be specific on what the MAAP instrument measures

13) Page 18882, line 27:"ice nucleation impacts on the cloud . . ."

14) Page 18883, line 4: ". . .CCN in mixed phased clouds have been shown to correspond to BC concentrations"

15) Page 18883, line 10: What do you mean by "international negotiations"?

16) Page 18883, lines 11-28: The description of the radar data is very poorly written and very confusing. Details are as follows: What is detection domain? Is it a sampling area? What is characterizing screening effects? Is it beam blocked sectors? What is clutters? Is it ground clutter? What is identifications? Do you mean investigations? Why mention that you didn't use the initial VPR if you used the physically based method by Kirstetter et al. (2013)? If you mention the original VPR method, it must be described. What is the reflectivity data extrapolated to a CAPPI on the surface? This radar processing discussion needs significant amount of clarification

17) Page 18883, line 29: How is VIC calculated? It was not defined in the paper

18) Page 18885, line 3: "temporal sampling frequency" sounds more descriptive than "same sampling time"

19) Page 18885, lines 9-10: This sentence is very confusing. Do the authors mean that the high frequency sampling of the EUCARRI datasets provides adequate observations for the study?

20) Page 18885, line 17: How were RF and IRF normalized? Please define

21) Page 18885, lines 25-26: Doesn't the "frequency" of intense precipitation increase?

22) Page 18886, lines 1-2: This sentence doesn't make sense. Do the observations

indicate that as the large scale precipitation decreases in area, the convective intensity increases?

23) Page 18886, lines 3-14: An elevation rise of 160 m seems very small to generate significant orographic precipitation. Are the authors positive this increase in reflectivity over this terrain feature is not an enhancement due to ground clutter? The authors need to demonstrate that this is an enhancement of convective activity. How far is the feature from the radar? Please provide more detail

24) Page 18887, lines 1-13: This discussion is poorly formulated. Please just state the test. As mentioned before, the impact of terrain needs to be further explored

25) Page 18888: lines 6-8: What do the authors mean by this statement? Suppression of stratiform and connective rain occurs in stable conditions?

26) Page 18888, line 13: "grow" is better than "grow up"

27) Page 18888, lines 20-29 to pages 18889, lines 1-5: This discussion is not coherent. What test was applied? What opposite affect exists? What do you mean by punctual? Did this test exclude all precipitation that was observed over the EUCAARI site? If so, why? This discussion needs to be written to understand the test and outcomes of the testing of this hypothesis

28) Page 18889, line 8: what does "spread out" mean? Does in mean increase in areal extent?

29) Page 18889, line 17: What does "stretching" mean?

30) Page 18889, line 22: How was IF index calculated?

31) Page 18890, lines 14-19: This discussion of duration analyses is very confusing. Why was it inclusive? Are the authors trying convey that cells inside the study area provide no useful information, but all cells, except for merger and splits, provide interesting statistics? If so, please explain why?

32) Page 188891: lines 25-26: Couldn't the increase in rain cell sizes be a coincidence even though there positive relationship with increase in BC? This relationship needs to be investigated further even though the results are statistically significant

33) Page 18891, lines 16-18: What does "...throughout theoretical simulations which are not completely parameterized" mean?

34) Page 18891, line 20: "stratification" seems more appropriate than "component"

35) In Figs 4 and 5, the change in RF and IF for different BC concentration is very small ($\sim$1 % or less). Are these changes meaningful? Does that represent an observable difference that could be physically observed?

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 18879, 2014.