

Interactive comment on “Overview: Precipitation Characteristics and Sensitivities to the Environmental Conditions during GoAmazon2014/5 and ACRIDICON-CHUVA” by Luiz A. T. Machado et al.

Anonymous Referee #2

Received and published: 1 March 2018

This paper uses satellite and in situ data from two recent field campaigns to provide an overview of precipitation characteristics in the central Amazon, and their sensitivity to environmental conditions including time of year (wet vs dry season), aerosol concentrations, land-surface type and topography. The paper describes the complex interactions between different processes in the region, particularly through their impact on cloud microphysics, in a way which is only made possible by these new measurements. While the broad scope of the paper means that each aspect cannot be explored in a lot of detail, it still provides interesting results while also showcasing the potential of these

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new datasets for further work. The paper is well organized and mostly well written (some grammar issues aside), and I recommend it for publication after addressing the following fairly minor comments.

General comments

Language:

While the paper is perfectly readable and understandable, there are minor grammar errors throughout – these do add up to quite a large number, which is why I haven't listed them below. I would encourage a thorough proofread by a native speaker.

Introduction:

This is quite long (about a quarter of the whole paper), although it is very comprehensive. I don't think it's a major issue, but worth pointing out.

Methods:

Given one of the aims of the paper is to showcase a new dataset, it is really lacking in contextual information, including where exactly the whole experiment is taking place. If the instruments are all exactly collocated simply the latitude/longitude might be ok, but I would strongly encourage you to include a map somewhere, showing the location of the instruments (particularly if placed at different locations), as well as the flight paths. This would also allow you to add some much need context. I would suggest including land surface type, topography and maybe potentially mean winds/some other climatological data. State more precisely in the abstract where the experiment is taking place (i.e. not just 'Central Amazon Basin', but 'in the vicinity of Manaus' or something like that).

Land surface results (3.2.2/3.2.3): while these results are interesting as a very general overview, I think it is difficult to draw particularly strong conclusions from them. Firstly, I'm not sure in Figure 8 there really is 95% confidence that the results are different; the test assumes all data points are independent, which will clearly not be the case. The

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most obvious example is the ‘urban area’, which accounts for only 0.5% of points – presumably these points are all clustered together, and likely to be highly autocorrelated. Even if the differences were significant, potential confounding factors are not considered at all by the authors. For example, topography and land surface type could be correlated in some way, in which case it wouldn’t be clear which factor was really driving the differences. Finally, the explanation of physical mechanisms is sometimes inconsistent. In particular, p14, L24-26 states that the urban heat island over Manaus will drive convergence and enhanced rainfall, while reduced latent heating will decrease rainfall over non-forest. These statements are interchangeable – cities have reduced latent heating, and the non-forest will be warmer, so why do they have opposite feedbacks?

Minor comments

P9, L18-19: “Figure 1 clearly reveals. . .” Looking at figure 1 it looks to me like the only bin where the wet season is higher is the lowest one (and marginally, the second), which represent $RR < 5$.

P11, L20: “This result suggests. . .the wet season” I don’t quite understand this sentence.

P13, L14-15: “During the dry season. . .mostly by drier days”. Might be useful to add a short comment as to why? Presumably this is because biomass burning is more likely to occur on dry days? More broadly, some comments on what the different sources are for the aerosol you measure would be useful.

P13, L19: What was the significance level? I think it’s fine to discuss the results even if the significance is below 95% if they are still physically consistent, but there is still a difference between, for example, 80% significance and no correlation whatsoever.

P15, L21-28: if clouds were at different heights over forest and non-forest, could your fixed-height measurements simply be a reflection of what part of the cloud you were measuring, instead of the clouds having different microphysical properties over differ-

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ent surfaces?

Figure 1: it would be nice to have error bars (these could replace the squares and circles). I would only refer to the 'T3 site' in the caption if its location is defined in the text (not just with a reference).

Figure 6: It would be helpful to state in the caption roughly what ZDR, KDP and horizontal-vertical correlation refer to physically (e.g. ice orientation for ZDR).

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-990>, 2017.

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