

The Green Ocean: Precipitation Insights from the GoAmazon2014/5 Experiment

Summary

The authors explore some of the precipitation events during the wet and dry season of the GoAmazon experiment, and try to decouple the aerosol/thermodynamic characteristics of the precipitation in each regime, and whether or not and the extent to which the precipitation exhibits an oceanic "flavor," as the Amazon basin is often dubbed the "Green Ocean."

The debate about aerosol vs. thermodynamic effects, especially with regards to the intensity of convection and the DSDs of convective regimes continues to rage, and the authors rightly note that the two effects are tightly coupled and it is difficult to disentangle the effects from each other.

Still, this is thorough investigation and a nice summary of the precipitation tendencies of the convection over the Amazon, and provides insight into the meteorological and instrumental goings-on of the GoAmazon campaign. I have one minor point to pick about the CAPE/CIN statistics presented. I also add a thorough list of line-by-line comments but they are largely about writing and style. Overall, very minor revisions.

Decision: Accept, with minor revisions.

Comments

Major Comments:

With particular regard to the statistical analysis in lines 17-23 on page 13, as the distributions of CAPE and CIN are not normal distributions, I feel like a lot of detail is lost in presenting the mean and standard deviations alone. Especially if I am to accept the comparisons made throughout this paragraph, when the differences in MUCAPE (for example) for the different subsets are only a few hundred J/kg/K apart, but the standard deviations are over a thousand, or for the MUCIN, where one standard deviation away from the mean is of the opposite sign, I find those comparisons to be shaky. Could perhaps you show us histograms of the distributions themselves? Or instead present quartiles, or 10%, 90% quantiles? I feel like those would be more representative of these populations.

The figures in general are beautifully done. I think Figures 10, 13, and 15 might be easier to read if presented in one or two vertical columns, and the plot space of each panel increased. Similarly, it would be nice if the plot space of Figure 4b/c could be increased, as currently the detail of the blue contours is completely lost.

Throughout the text, there is a propensity to attribute verbs to the figure titles, as in "Figure 2 plots. . ." or "Figure 2 overlays. . ." While I take no issue with the instances in which you say "indicates," I reacted very strongly to the other instances where you are attributing action words to the figures themselves. I found it to be very distracting, and I suggest revising this throughout the text.

Minor/Line-by-Line Comments:

1.16 "to better inform" is a split infinitive, and while manuals of style say that it has become perfectly acceptable to split an infinitive when justifiable, there are several of them throughout the text. Perhaps diversifying the verbiage a little throughout the manuscript would help with the readability. This is a pedantic point, and you can keep the phrasing as-is, at your discretion.

2.4 Suggest " . . . *improving model capabilities* introduces *new challenges* . . ."

2.7 do "observations" and "modeling" need to be capitalized?

2.7 "were motivated"

2.10 "*future improvement of GCMs*"

2.11 "low-level barrier" when talking about circulation and dynamics is making me think of dynamic phenomena and not observation obstacles - can you rephrase?

2.22 "are" does not agree with the subject "perspective" - this entire clause could use some rearranging for clarity.

2.24 Suggest " . . . *regional characteristics* of convection over the Amazon *that spans oceanic* . . ."

2.26 Suggest " . . . *but may also experience a range of thermodynamic and aerosol* . . ."

2.29 I believe the sentence should read "*the prevalence . . . is underappreciated . . .*" but also, the second clause of this sentence is confusing, suggest rephrasing.

2.34 Suggest "in order to identify" instead of "towards identifying"

2.35 Suggest "trends" instead of "adheres"

2.35 Suggest adding more text to "*oceanic, maritime to continental characteristics*." Maybe something like " . . . precipitation sampled in the Amazon basin trends more towards ocean, maritime characteristics, and when it trends towards possible continental characteristics." This might sound redundant but I had a hard time understanding where the logic of this sentence was going.

- 3.9** Suggest "... and the possible effects of the Manaus, Brazil pollution plume."
- 3.10** Suggest removing "a" from "a continuous convective cloud ..."
- 3.13** Suggest removing "... useful for future hydrological applications" I understand you are putting in the motivation for that section, but to say it here disrupts the flow of the sentence.
- 3.23** Suggest "a period"
- 4.27** Suggest "the number concentration". Also the phrase "particles condensation nuclei" is confusing.
- 4.29** suggest "other supplemental materials"
- 5.3** suggest "values of"
- 5.5** suggest "... potentially a 3 or more factor of difference ..."
- 5.30** onwards - suggest potentially writing coefficients as italicized letters, either by themselves, or with -coefficient, but the quote marks are awkward.
- 5.33** sensitivity to what?
- 6.4** "... basic interpretations of the significant changes ..."
- 6.11** "similarly"
- 6.14** why the hyphen in "higher-relative"
- 6.18** "Figure 2 plots ..." this is the first instance of the Figure-verb issue I discussed above. I won't point out each of them, but this is an example of what I struggled with. I suggest instead something like "In Figure 2, we plot summary dataset scatterplots overlaid with dual-polarization relationship fits."
- 7.16** Suggest "... convective environments that favor enhanced evaporation, cooling and subsidence, which are less capable of sustaining ..."
- 7.28** why is "For" capitalized in "For example"?
- 8.5** what is less influenced? What is the object of this clause?
- 8.10** I'd suggest just saying "higher extreme parameter spaces" instead of saying "select" and then saying what it is anyhow.
- 8.30** suggest removing comma after "loosely"

9.10 suggest "The results in Figure 6 . . ."

9.25 Suggest " . . . *included modest convective diversity, including congestus clouds, and clouds with maritime, continental, and deeper convective properties (those supporting additional graupel growth).*"

9.27 suggest " . . . *conditions than what is observed over the Amazon.*"

9.31 suggest " . . . *limitations for imposing BR concepts when characterizing . . .*"

9.33 can you put "*herein TM*" within the parentheses?

10.4 suggest "either" instead of "belonging to"

10.14 suggest " . . . *as is similar to . . .*"

10.18 " . . . *having corresponding stratiform DSDs (or, the absence thereof) . . .*" seems contradictory. If having a corresponding stratiform DSD is indicative of TM oceanic characteristics, why then would also its absence?

10.22 you say "adjacent" and then describe "transitional" - are they the same? and if so, can you pick one?

11.4 "*a bright band signature*"

11.18 suggest removing "*are those that*"

12.2 Suggest excising the sentence "*A more practical . . . GoAmazon2014/5.*" it's awkward here.

12.14 the letters in "convective available potential energy" don't need to be capitalized.

12.16 suggest removing "that" from "*studies that indicate*"

13.1 suggest " . . . *drops, and toward parameter spaces . . .*"

13.3 "*though they do support*"

13.4 perhaps change title to "Role of Pollution **in** Oceanic Signatures" ?

13.12 suggest "The *rightmost panels of Figure 15 show a composite mean . . .*"

13.16 remove ", *respectively*"

13.17-23 Here is the paragraph in which I struggled with the presentation of representative statistics.

14.5 "*One explanation . . . is that more prominent . . . contributions are acting within these convective columns . . .*"

14.16 "*. . . suggest that cleaner aerosol conditions are associated . . .*"

14.31 suggest "*. . . wind directions, and therefore should not be as influenced . . .*"

14.33 suggest "*(e.g., local sources)*"

15.19 "*. . . explanations for why these outliers cluster . . .*"

15.29 suggest "*. . . initiation and subsequent precipitation . . .*"

15.33 change "were" to "was"

15.35 suggest "tended to be associated"

16.11 suggest removing "properties"

16.16-onward - use caution with throwing the word "storm" around. You haven't defined what a storm is, and I'm guessing you don't mean a thunderstorm. You don't use this word until this last section. I'd suggest saying "event" from here onward, just to be safe.

16.22 "*. . . continental behaviors as seen in previous studies . . .*"

16.26 swap "Consulting" with "Considering"

16.28 remove "radiosonde" - the balloons aren't doing the forcing (although that would be some wild micro-scale meteorology!)

16.29 suggest "*character of the congestus*"

16.30 suggest "*segregating by wind direction*"

17.3 "*a topic of future consideration*"