

General Comments

The manuscript titled “The evolution of warm rain in trade-wind cumulus during EUREC⁴A” by Gary Lloyd et al. is based on aircraft and ground-based measurements of cloud and aerosol conditions during a wintertime field campaign conducted on or near Ragged Point, Barbados during 2020. It concludes that cloud depth is associated with thermodynamic profiles influenced by large-scale and local dynamics, the maximum intensity of precipitation is influenced by cloud mass area, and aerosols influence cloud microphysical properties in pristine aerosol regimes. The research is well within the scope of the journal. The findings are novel and worth publication.

Issues arise in the authors’ writing style. The writing is, at times, convoluted and difficult to comprehend. The paper would be improved by simplifying sentence structures. Prepositional phrases, while useful, may complicate language and obscure the readers’ understanding of the text. The authors also make statements about unreported data at several points throughout the text. Statements about data cannot be supported if data are not provided. I recommend that the authors include unreported data in the supporting information, reference existing literature in which the data they refer to is reported, or remove statements about unreported data entirely. I would recommend the editor reconsider the manuscript after major revisions by the authors.

Specific Comments

1. Line 9-10: Please rewrite this sentence to make it more concise.
AC: We have modified this sentence.
2. Line 10: This is the first reference to EUREC⁴A in the abstract. Please explain what the acronym stands for.
AC: We have defined the acronym.
3. Line 12: This is the first reference to HALO in the text. Please explain what the acronym stands for.
AC: We have defined the acronym.
4. Line 18-19: The sentence refers to “greatest intensities” but does not explain what the intensities are for. It does not follow from the previous sentence. Please explain what intensities you are referring to here.
AC: We have re-written this sentence to make it clearer, but the absolute values and relationship we found is described in the main text and in figure 17.
5. Line 41: This is the first reference to EUREC⁴A in the manuscript. Please explain what the acronym stands for.
AC: We have defined the acronym.
6. Line 45-47: Please rewrite this sentence to make it more concise.
AC: We have altered this sentence.
7. Line 63: This is the first reference to ICON in the text. Please explain what the acronym stands for.
AC: We have defined the acronym.
8. Line 81: This is the first reference to SAFIRE in the text. Please explain what the acronym stands for.
AC: We have defined the acronym.

9. Line 85-86: Please rewrite this sentence to make it more concise.
AC: We have re-written this sentence to make it more concise.
10. Line 105: The sentence refers to “these” clouds. Please specify which clouds “these” are. Shallow cumulus clouds?
AC: This has been properly defined as shallow trade wind cumulus clouds.
11. Line 123: This is the first reference to CDP in the text. Please explain what the acronym stands for.
AC: Acronym defined.
12. Line 123: This is the first reference to GOES in the text. Please explain what the acronym stands for.
AC: Acronym defined.
13. Line 140: Please reference Marsden et al., 2016 in the bibliography.
AC: We have added this reference.
14. Line 141: This is the first reference to GRIMM in the text. Please explain what the acronym stands for.
AC: We believe GRIMM is actually the surname of the creator.
15. Line 145: This figure does not contribute much to the manuscript. Please remove.
AC: We would like to keep this figure as a useful record of the overall instrument setup at the ground site.
16. Line 171: Would it be possible to organize the plots by high and low aerosol periods and adjust their PCASP N scales accordingly? For example, Jan 26, Feb 5, and Feb 13 are low aerosol conc days that could have the same scale and organized into the same column and Feb 2 and 9 (morning and afternoon) are high aerosol concentration days that could have the same scale and could be organized into a different column. This might make a greater point about the differences between high a low aerosol concentration conditions that you observed during the campaign. This is simply a suggestion to potentially improve reader comprehension.
AC: These have been reorganized and the x axis fixed for low and high cases for comparison.
17. Line 172-174: There is no mention of the subplot letters in the caption, though they are included in the figures. Please revise the caption such that each subplot has a corresponding subplot letter.
AC: This has now been defined in the caption.
18. Line 172-174: It is not clear which Feb 9 subplot represents morning measurements and which represents afternoon measurements. Please specify
AC: This is now stated on the figure and in the caption.
19. Line 187-189: This statement cannot be proven without data provided. Please include the data in the SI or manuscript, a reference to the data in pre-existing literature, or remove statement completely.
AC: We have removed the statement and the subsequent figure as the paragraph did not fit well with the flow of the paper. This change may help with the convoluted nature of the paper.
20. Line 211: Please explain what type of clouds “fish type patterns” refers to.
AC: These are defined visually due to their fish like structure on visible satellite imagery. We have referenced the original paper that classified the different cloud types.

21. Line 221-223: Can you provide a value for this comparison? Perhaps average median CTH in low and high aerosol concentration conditions? Currently it is difficult to see this point from the figure alone.
AC: We have calculated the difference in CTH between the two aerosol regimes and stated this in the paper. The difference is ~ 300 m.
22. Line 237-238: This is not a complete sentence. Are you referring to the type of air mass that might be associated with a particular CTH? Please revise.
AC: We have removed this sentence.
23. Line 263: Please explain what type of clouds “sugar” refers to.
AC: We have defined this at the end of the paragraph. Sugar is described in Stevens et al. (2022) as a dusting of very fine-scale clouds with small vertical extension and little evidence of self-organisation (by cold pools or gust fronts).
24. Line 267-269: This statement cannot be proven without data provided. Please include the data in the SI or manuscript, a reference to the data in pre-existing literature, or remove statement completely.
AC: We have removed this statement.
25. Line 283-285: This statement cannot be proven without data provided. Please include the data in the SI or manuscript, a reference to the data in pre-existing literature, or remove statement completely.
AC: We have removed this statement.
26. Line 324-325: Please provide descriptions for cloud types that have not yet been mentioned (gravel and flower).
AC: We have now included a proper description in the introduction of these types of clouds rather than simply referencing the original paper that defined them. We hope this helps the reader to better picture the varying structures observed during the campaign.
27. Line 412: Cui et al., 2023 is not actually referenced in the manuscript. Please reference in the manuscript or remove from bibliography.
AC: Reference removed.
28. Line 425: Gemayel et al., 2016 is not actually referenced in the manuscript. Please reference in the manuscript or remove from bibliography.
AC: This is now corrected and included in the manuscript.
29. Line 451: Marsden 2018 is not actually referenced in the manuscript. Please reference in the manuscript or remove from bibliography.
AC: This is now corrected and included in the manuscript.
30. Line 466: Royer et al., 2023 is not actually referenced in the manuscript. Please reference in the manuscript or remove from bibliography.
AC: This has been removed from the bibliography.

Technical Corrections:

1. Line 9: Add comma after “In this paper”
AC: We have added this.
2. Line 21: remove “the” before “daily weather”
AC: We have removed ‘the’.
3. Line 24: remove “names that describe”
AC: This has been removed.

4. Line 32: remove “determination of the”
AC: This has been removed.
5. Line 33: replace “to the” with “and”
AC: This has been replaced.
6. Line 36: remove “even to this day”
AC: This has been removed.
7. Line 37: Add comma after “However”
AC: Comma added.
8. Line 39: remove “the” before “cloud drops”
AC: ‘the’ removed.
9. Line 39: Add comma before and after “for example”
AC: Comma added.
10. Line 42: remove “in the case”
AC: Removed.
11. Line 42: Add comma after “However”
AC: Comma added.
12. Line 51: remove “the” before cumulus clouds
AC: Removed.
13. Line 52: remove “need to”
AC: Removed.
14. Line 64: Add comma after “Interestingly”
AC: Added.
15. Line 65-66: remove “the reasons were that”
AC: Removed.
16. Line 69: Add comma after precipitation
AC: Comma added.
17. Line 70: “Cloud Condensation Nuclei” should not be capitalized
AC: Capitalization removed.
18. Line 81: replace “the” with “there” before “was a significant variation”
AC: Replace.
19. Line 83: remove “surprisingly”
AC: Removed.
20. Line 88: “Giant and Ultra Giant” should not be capitalized
AC: Capitalization removed.
21. Line 106: remove “total”
AC: Removed.
22. Line 126: remove “both”
AC: Removed.
23. Line 126: Add a comma after “cloud”
AC: Added.
24. Line 126: remove “particle”
AC: Removed.
25. Line 130: “Particle By Particle” should not be capitalized
AC: Capitalization removed.
26. Line 143: Add a comma after “EUREC⁴A”

- AC: Comma added.*
27. Line 143: Add a comma after “wind speed”
AC: Comma added.
28. Line 144: Remove comma after “temperature”
AC: Comma removed.
29. Line 149: Remove “period”
AC: Removed.
30. Line 151: Remove “science”
AC: Removed.
31. Line 158: Add a comma before “respectively”
AC: Comma added.
32. Line 67-69: This is a run-on sentence. Please separate into 2 sentences. I suggest the first end at “whole” and the next sentence start with “However,”.
AC: This has been separated into two sentences.
33. Line 188: Remove “to be generally excellent”
AC: Sentence removed as covered in specific comments.
34. Line 234: Abbreviate “February” to “Feb” to be consistent with the rest of the manuscript
AC: February changed to Feb.
35. Line 282: remove “observed to be significantly”
AC: Removed.
36. Line 283: Add a comma after “For example”
AC: Comma added.
37. Line 287: Please explain the abbreviation “ R_{eff} ” in the manuscript.
AC: This has now been defined in the manuscript at the start of section 6.
38. Line 319: Add a comma after “summarise”
AC: Comma added.
39. Line 329: Remove comma after “result”
AC: Comma Removed.
40. Line 356: Add a comma after “Later”
AC: Comma removed.
41. Line 357: Remove “in the project”
AC: This has been removed.
42. Line 360: Remove “swell”
AC: Removed.
43. Bibliography: Please make sure the bibliography is in agreement with journal guidelines.
AC: Formatting checked.