

Earth Syst. Sci. Data Discuss., referee comment RC2
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Comment on **essd-2021-459**

Anonymous Referee #2

Referee comment on "EUREC⁴A observations from the SAFIRE ATR42 aircraft" by Sandrine Bony et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-459-RC2>, 2022

This paper describes a very valuable data set on cloud and other atmospheric properties acquired during the deployment of the French Safire ATR42 aircraft in the framework of the EUREC4A campaign out of Barbados in early 2020. In the first part the flight strategy is outlined in detail while the second part gives an overview of the measurements and the available data sets. The paper is very well written and the descriptions of the flight strategy and the data set are mostly concise yet sufficiently detailed. For the more extensive parts of the data published elsewhere respective references to more complete discussion are given. The first part laying out the flight strategy and giving the meteorological context of each flight is very helpful for the interpretation and further use of the data. The data is well structured with extensive meta data and accessible in a database. I recommend the paper and data to be published after addressing a few very minor points.

Throughout the paper acronyms should be spelled out at the first use more consistently. In addition, a table of acronyms might be useful to guide the reader. Instrument names could also be listed together with a reference to a published characterization if available.

In some sections the typesetting of mathematical symbols in italics needs to be cleaned up.

P20/I303f: From the wording of the sentence it is not entirely clear if the calibration parameters for the Licor humidity data were assumed to be constant for all flights or if this was also verified.

P22/I351: The sentence seems incomplete. "...often appear dark because the choice was made..." Do the authors mean the choice of exposure time?

P25/I386: Platform should be spelled in English (maybe give the French name in the parenthesis).

P25: Where the time series of the in-situ data synchronized to the ATR GPS time accounting for potential plumbing delays due to different lengths sample lines?

Sec 3.4: How was the size calibration of the aerosol and could instruments performed? Was the stability of the calibration checked in the field after each flight?

P29/Fig 10.: The authors should consider reporting also (or exclusively?) the median to describe the statistics of the various quantities. Using the mean but an 10-90 percentiles seems inconsistent and given that the distributions are not Gauss-distributed the median is more meaningful.

P44/I784: I am not sure "diagnosed" is the right word here. Maybe "derived" or "deduced"?

I786: see above.

P45/Fig 18, middle panel: Should the lines be drawn in different colors? It might be good to include the cloud-only case also into the legend of the middle panel for clarity.

P48/Fig 19: It is not clear what the different colors indicate. It would be good to add a legend to this plot or use a consistent color scheme for all panels.