

Acquistapace et al. describe in this paper the deployment, operation and data processing of two radar systems (W-band cloud radar and micro rain radar) on the research vessel Maria S. Merian during the EUREC4A campaign in early 2020. They describe the setup of the radars on a stabilization platform and the correction of measured Doppler velocities, both for times when the stabilization platform was operational and when it was stuck in an arbitrary position.

The manuscript is well written and clearly structured. The data set is easily accessible. I have a some comments and would recommend publication after addressing those.

We thank you the reviewer for the nice description of the paper.

General comments regarding the data:

It would be nice, if the data for ship motion was published along with the latest version of the radar data. Now, users have to access different data sets. And this also adds the danger of possibly using outdated radar data that are published along with the ship motion data (<https://doi.org/10.25326/156>) and could confuse some users.

Is there a way to access ship location information to use together with the hourly data?

What would users need to do if they want to know where the Maria S. Merian was located for a specific hourly data file?

The data for ship motion that have been included in the old dataset version contain the terms that we calculated for deriving the correction to the mean Doppler velocity, namely for each radar bin, the  $E_p$  vector, the time delay, the rotational velocity, the translational velocity, the course velocity and the wind velocity in the ship reference system. We also stored the correction term obtained from those and the denominator in the correction formula (see Formula 5). We did not include them in the latest version of the dataset because such data are not supposed to be used, and they could have created more confusion. They do not include the ship position, which is published on the AERIS data portal and publicly available at 1s resolution at this link [https://observations.ipsl.fr/aeris/eurec4a-data/SHIPS/RV-MARIASMERIAN/dship/msm\\_089\\_1.tsg](https://observations.ipsl.fr/aeris/eurec4a-data/SHIPS/RV-MARIASMERIAN/dship/msm_089_1.tsg)

To facilitate the data usage, we included the lat/lon information on the position of the ship in the daily dataset files ([https://observations.ipsl.fr/aeris/eurec4a-data/SHIPS/RV-MARIASMERIAN/wband\\_radar/final\\_dataset/daily\\_intake/](https://observations.ipsl.fr/aeris/eurec4a-data/SHIPS/RV-MARIASMERIAN/wband_radar/final_dataset/daily_intake/)), where the lat/lon have been interpolated on the radar time resolution (3 s). The same was done also for the MRR data (<https://observations.ipsl.fr/aeris/eurec4a-data/SHIPS/RV-MARIASMERIAN/mrr-pro/>), but in this case the data were interpolated on 1s time resolution.

The dataset was created with the following concept: daily files (for both MRR and Wband) are the easiest to open, visualize and contain all the radar variables and the ship position that are of immediate interest for users. They are the main way to access the data and pick the case studies of interest. Once identified the exact hour of interest, radar interested users can open the specific hourly file if they are interested in deep advanced radar variables. In fact, all radar moments are stored in the daily file, and the hourly radar files contain in

addition only radar specific variables (full Doppler spectrum, sensitivity limit, mean noise level). For this reason, they are only for specific radar use. We hope to have clarified better the data structure.

Specific comments regarding the manuscript:

Figure 3: it is a bit unclear to me, what this figure should convey. The processing steps that are shown in the figure are not easily understandable by just looking at it. A lot of necessary information is given in the figure caption. One could think about adding these additional information from the caption also into the figure itself. The order in which the steps are mentioned in the caption does not match the order in the figure. I would suggest to either expand this figure a bit so that the processing steps are understandable by only looking at the figure or to remove the figure and expand the respective text section to thoroughly explain the processing steps. In the current state, the processing is a bit hard to follow between the figure, the caption and the text.

We thank the reviewer for the provided suggestion, which we took since we totally agree with the expressed opinion. We removed the figure and we expanded the text to describe the MRR data processing chain.

Line 157: "computer in a sealed container", what is the meaning behind this? What does the computer do? Is the information necessary? Also, does it have any impact that the container is sealed?

The computer is controlling the stable table behavior. It is positioned in a sealed container because, since it is standing outside, right under the stable table, it might be damaged by the atmospheric conditions. The information is necessary for future deployments, to properly install the equipment. The container does not impact the functioning of the computer.

Section 2.3: What are the limits of the stabilization platform compensation? I.e. maximum roll and pitch angles that can be compensated? Was this relevant during this campaign?

The report on the stabilization platform provided by Coulter et al, 2016 (<https://doi.org/10.2172/1253916>) describes the behavior of the table. In particular, the dimensions of this table allow for  $\pm 30^\circ$  of pitch and  $\pm 25^\circ$  roll, but as other tables, such extremes cannot be reached simultaneously (see Figure 2 in the report). The report also describes how the table responds to different sea conditions. Figure 4 shows that the observed conditions during our campaign were in the range of the conditions sampled in the testing phase, documented in the report. Therefore, we are confident that the table could work in a manageable regime of sea motions during EUREC4A.

Figure 5: this figure is hard to read in the current state. The ship's drawing in the background distracts from the coordinate axes plotted on top and is not necessary to understand the different rotation angles when the figure is first mentioned. I understand, that this figure is referenced later as well as an example on how the coordinate system is defined with respect to the ship. Could this figure be split into two figures for the different purposes?

We agree with the comment of the reviewer and we modified the figure

Line 193: "... time lag  $\Delta T$  that varies with time between 1 and 4 s" is the variation

systematic (e.g. linear increase over the measurement duration)? Or are these random variations?

The variations we observed are quite random.

Line 214 and following: was the time correction done for each time step individually or was this applied to longer intervals?

The time correction was done for each time step individually. In particular, for each chirp time step. Within one time stamp of the radar, that takes 3 s, there are intermediate chirp times. The correction was applied to each chirp time stamp.

Line 373: "... cloud system identifiable as a flower type ..." It might be helpful for the reader to add a reference describing the different cloud organization names here.

Added, thanks for the comment.

Line 513: what is psi? If this is the yaw angle and the difference between psi and heading can be something other than zero, I don't understand why heading and yaw are used interchangeably in other parts of the manuscript (e.g. l167 (p9, second paragraph, third line), l523).

Psi is the yaw, and the difference between psi and heading is none. We have been erroneously using two terms because people use both. We will stick to yaw and remove the heading in the whole manuscript. Thanks for the comment.

Line 547, line 552: what is  $t_{fin}$ ? Should it be  $t_{final}$ ?

Yes, thank you, it is a typo and we corrected.

Figure A1: The vertical lines in A) and B) are only barely discernible or not at all. Maybe using another colormap (something like the ones used for the other figures in the manuscript) would help? The authors switch between lower case and upper case letters for the different figure parts between the figure itself and the figure caption and even within the figure caption.

Thank you for the comment, we updated the figure based on your suggestions.

#### Technical corrections

Line 8: hydrometeors -> hydrometeor

corrected

Line 33: time -> temporal

corrected

Line 35: setup -> setups

corrected

Line 127: add lat, lon as coordinates to the text

corrected

Line 188: I don't understand the use of the word "preliminary" here.

Removed, thanks for noticing

Line 475: "in agreement with what reported in" -> "in agreement with what was reported in"

corrected

Table 3: unit [deg C] not italic

corrected