

General comment by the authors to the Reviewer #1:

We thank the reviewer for the time and effort in reading the manuscript and for the constructive comments and suggestion which we in the following address point by point (our answers are marked with blue font color and the modified text are in italic blue).

Reviewer #1

The TRiple-frequency and Polarimetric radar Experiment for improving process observation of winter precipitation By José Dias Neto et al. The authors present a two-months long dataset of collocated triple-frequency radar observations of clouds and precipitation collected at the Julich Observatory. The main focus of the dataset is on the triple-frequency observations of ice clouds. The dataset is of definite scientific interest and the accompanying article should be published after minor modifications.

Comments:

1) My main suggestion to the authors is to include a table with the list of the events and their description. Since this is a dataset article, such table is definitely needed. The table should also include information such as duration of events, precipitation rate, ground temperature, etc.

A: Thanks for this very good suggestion that has been also raised by reviewer #3. We included a table in the new section 4 including the information about the weather conditions for each day of measurements. The table contains the following variables: temperature at 2 m (maximum and minimum), precipitation rate (maximum and mean), accumulated precipitation, liquid water path (maximum and mean) and column integrated water path (maximum and mean). This table also contains the duration of the main weather events classified in four categories (non-precipitating ice clouds, stratiform rain, rain showers and shallow mixed-phase clouds).

Minor comments:

2) p.4. line 22 "Unlike for the pulsed radars, the JOYRAD-94 range resolution is not fixed, but depends on the gate distance as a consequence of the use of different FMCW chirp settings for different heights."

I would like to suggest that you reword this sentence. A range resolution of a FMCW radar can be selected in a more flexible manner than for a pulsed system, but it does not mean it is not fixed.

A: We agree, we have reworded the sentence according to the reviewer suggestion.

The FMCW system allows the user to set different range resolutions for different altitude by acting on the frequency modulation settings (chirp sequence).

3) p. 7. line 4 "Our relative calibration approach follows the previous triple-frequency study by Kneifel et al. (2015))"

You are using reflectivity matching at the top of ice clouds to mitigate calibration mis-matches and differential attenuation in rain, melting layer and ice clouds. Can you elaborate more what kind of impact this approach will have on DWR observations, because this approach implies that the specific attenuation is the same for all range gates. That also means that in some cases the attenuation is overestimated, while in others is underestimated. How important is this mismatch for melting layer and ice cloud measurements?

A: This is a good point that we had partly covered in our previous section 3.4, and we agree with the reviewer that this approach has an impact on DWR observations. For this reason, we have extended our discussion in section 3.5 of the reviewed manuscript. Specifically, we use the Ze profile from Ka band as our reference in the ice part of the clouds because of multiple reasons listed in section 3.5 (best sensitivity, relatively calibrated with disdrometer, larger dynamic range at high altitude). Unfortunately, we are not able to correct for the attenuation produced by hydrometeors because we do not have any information of their distribution along the profile. Assuming that attenuation is always larger for the higher frequencies and taking the Ka-band as reference point we have to accept that all the reflectivity values at the top of the cloud might be

underestimated. Concerning the reflectivity difference, our approach ensures correct DWRs at the top of the cloud while the computed DWRs result to be increasingly underestimated at lower levels.

4) p.16. lines 12-13 "The first triple-frequency signatures from ground-based radars (C,Ka, W band) were presented by Stein et al. (2015) for two case studies."I guess you meant S-band and not C-band.

A: Corrected