Earth Syst. Sci. Data Discuss.,
https://doi.org/10.5194/essd-2018-142-RC3, 2019

Earth System Science Data Discussions

Interactive comment on "The TRIple-frequency and Polarimetric radar Experiment for improving process observation of winter precipitation" *by* José Dias Neto et al.

Anonymous Referee #3

Received and published: 11 February 2019

The paper describes a dataset composed of radar observations collected at vertical incidence at three different frequencies (at X, Ka, and W band). The "level 2" data are available through the ZENODO platform in netcdf format, while original data should be obtained through the corresponding author. Many studies on multiple wavelength radar techniques have been published in the recent years to show the potential of such techniques for improving retrievals of clouds and snow properties. Since collocated measurements at multiple frequencies are not common, the publication of the dataset is welcome. Examples presented in section 4 highlight the potential of this dataset. Therefore, I recommend that the manuscript should be accepted after minor but mandatory revision. The language of the manuscript is quite poor, but I am

confident that after a thorough revision by the author, it can be improved. In the following there is a list of comments/recommendations: 1) The manuscript presents a two-month dataset that authors (in the conclusion) consider a "long-term" one. I am not sure whether "long-term" is appropriate or not. However, it is relevant to add a description of what is in the two-month dataset (how many rain events, snow, a description of main events) 2) KiXPol: the X-band radar implements the STAR-mode and LDR measurements are not possible. However, other measurements, such are the copolar correlation coefficients are useful at vertical incidence. Moreover, since the antenna is rotating, also second order moment of dual polarization measurements can be used. I think that, to be considered as completed, KiXPol data set should include reflectivity, dual-pol, and Doppler measurements (of course, if collected during the experiment). The manuscript reports "Using a pulse duration of 0.3 μs, we set the radial resolution down to 30 m which is close to the resolution of the other radars". Actually, the radial resolution corresponding to 0.3 μs is 45 meters. 3) JOYRAD-35: As I understood, all the radars are calibrated by the manufacturer. The 35GHz radar, maybe the most popular instrument of this class, comes with a 2dB bias due to receiver losses (as per communication from the manufacturer). Then the verification of the calibration with a disdrometer shows a further 4 dB underestimation. One can preliminarily use a bias determined by the comparison with disdrometer to analyze data, but, after all, the radar should be inspected. Moreover, the sensitivity declared in Table 1 is not the same resulting from Figure 6. 4) JOYRAD-94: note not all the FMCW radars have variable range resolution. 5) "Inter radar calibration": What is presented is not a radar calibration, but it is a method to normalize data from different radar to make them comparable in the ice part of the cloud. Therefore, the title of the section is misleading. Actually, JOYRAD-35 was the only system that underwent a calibration and a calibration problem was highlighted. What about the other systems? I think that working with three different systems, calibrating accurately each of them before a campaign is mandatory.

Interactive comment on Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2018-142,

2018.

C3