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Open Access Earth System Science Data Discussions

Interactive comment on "Precipitation at Dumont d'Urville, Adélie Land, East Antarctica: the APRES3 dataset" *by* Christophe Genthon et al.

Anonymous Referee #3

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The paper describes a rare data set describing Antarctic precipitation with the help of different in-situ and remote sensing measurements. The data are available for download at Pangea and will certainly be of high interest for the community. However, the description of the data (available for download at Pangea) needs clarification and should be more precise and better structured before the paper can be published.

MAJOR COMMENTS

In the beginning, it is unclear what the data set really consists of. Is it about a field campaign which I understood to be a subset of APRES3 (program also including satellite data) but then the title of the paper is not correct. Is the X-Band data part of the data set? If yes, what was its actual operation time. A time line with the different instruments should be given which also provides information on data availability, e.g. start and stop,

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any interruptions? For clarification Table 1 should be moved to the beginning and either be expanded or another table added to provide more details on data availability, resolution and uncertainty.

In general, I am missing a clear summary about the data, e.g. resolution (temporal, spatial, spectral), scanning routine, uncertainty, level of processing/quality control. A section on available output and data processing might be appropriate. I am still left with questions like the noise level of the MRR, the exact binning and the exact conversion of K-band radar reflectivities to precipitation? This is important as no reflectivity data are provided. Why not?

It was not that easy to downloaded the different data streams and I could not find all necessary information, e.g. is time stamp the beginning or end of the measurements? Why is the time array for MRR so complicated?

MINOR COMMENTS

Who organized, financed (acknowledgement?) and performed APRES3?

Abstract should also clearly say which data are presented.

L27: " Antarctica is the poor cousin of global precipitation observation and climatology building efforts." Not really true as Antarctica is part of the globe, also other desert areas are challenging...I recommend a simple statement on the challenges.

L37: not only in situ but also ground-based remote sensing (as you will demonstrate later) is needed. Maybe you can cite Maahn et al., JGR, 2014 about the Cloudsat blind zone to substantiate the statement.

L45-L50: a reference is needed about gauge problems for snowfall

L67: When did the intensive observation campaign took place? What was different there? Timeline?

L76: What are the data?

L77: "Further work is ongoing to address the calibration, verification and validation of meteorological and climate models and of satellite remote sensing techniques with the data." What is the difference between verification and validation? Maybe say which part is related to measurements, retrievals, model, satellites?

L87: Altitude above mean sea level?

L106: Say that MRR is vertically staring

L110: Say that most Ze-S relations for radars have been derived for 10, 35 GHz or 94 GHz and therefore the measured equivalent radar reflectivity at 24 GHz is first converted to (how?). There is little information on the uncertainty of the derived product - I know it is difficult but people need to be aware.

L124: resolution of the matrix?

L134: Souverijns et al 2017 not 2014

L137: The subsection 2.2.3 has meteorology in the title but nothing is said about it? As the data are part of the described data set a short summary (table) should be provided.

L139: What does definitely mean? - nothing can be sublimated?

L142: Is the container lower than the building? Though a figure is shown in a different publication a sketch or a reproduction of the figure would be helpful to better understand the setup.

L 146: The structure of this section is not obvious. Details on MRR range gates are given together with examples but why is the precipitation time series shown at the beginning and at the end?

L150 : The numbering of the provided MRR bins and range resolution are not clear. How are the vertical ranges exactly defined? Why is height 741 chosen? Why are just the upper two? bins so noisy? The minimum detectability should only slightly increase with altitude. What is the minimum detectable

reflectivity anyhow? âĂĺMaybe provide 2D histogram as Kneifel et al., 2011 https://link.springer.com/content/pdf/10.1007%2Fs00703-011-0142-z.pdf.

L155: why not explain: "..2017a] as visible by the accumulation of the Pluvio in the time periods between snowfall events.

L166: From Figure 1 one could derive also 17 % as the 60 vs 52 mm are accumulated over this time.

L326: Make clear that this is no article or letter-

Figures: The quality is in general poor - a different graphics format might help.

Figure 3: Which time period?

Figure 4: Why is the Pluvio not shown? Why not show this overview figure first and make an inlet for the short period shown in Fig. 1?

LANGUAGE AND GRAMMAR

Abstract: " a result evidenced thanks to the profiling capabilities of precipitation radars" -> as derived from profiling radar measurements.

L26: "to verify the current precipitation in the models are still in demand" I don't think verification is possible.. -> to raise confidence in precipitation simulations.

L 39: water equivalent

L42: genial

L54: for and An ...

L66: Hypothesis should be substantiated by calibration and validation

L94: "..including THE relation with precipitation" L98: METAR acronym

L102: radars are key ingredients of APRES

L180: spell out acronym pdf - by definition it is a "mean"

L217: skip the first part. "Because a significant.."

L225: Data availability in the middle of the sentence

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