

Comment on essd-2021-204

Anonymous Referee #1

Referee comment on "10 years of temperature and wind observation on a 45□m tower at Dome C, East Antarctic plateau" by Christophe Genthon et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-204-RC1>, 2021

Thanks for this paper that describes a 10 year observational dataset from a tall tower instrumented at 6 levels at Dome Concordia Antarctica. Here are the comments, suggestions and recommends I have for this manuscript:

- A minor point, ten years does not quite make a climatology which should be 30 years, but it is understood this all the data you have. (see below for comment on wind data amount...)
- Line 25 - "See data availability section" is not needed in the abstract.
- Line 37 - Please consider adding a reference to Lazzara et al paper and use more recent State of the Climate reference:
 - Lazzara, M.A., G.A. Weidner, L.M. Keller, J.E. Thom, J.J. Cassano, 2012: Antarctic automatic weather station program: 30 years of polar observations. *Bull. Amer. Meteor. Soc.*, **93**, 1519-1537, doi:10.1175/BAMS-D-11-00015.1.
 - Clem, K. R., S. Barreira, R. L. Fogt, S. Colwell, L. M. Keller, M. A. Lazzara, and D. Mikolajczyk, 2020 (in review): Atmospheric Circulation and surface observations [in "State of the climate in 2019"]. *Bull. Amer. Meteor. Soc.*, 101, S293-W296, doi: 10.1175/BAMS-D-20-0090.1
- Line 30-33 - add e.g. to the references- as there are many more...
- Change "manned" to "staffed" in line 42
- Line 43 - Why is the Ricaud referenced as 2020b when you haven't reference a 2020a?
- Line 51 - Capitalization of Layer before ABL
- Line 76 - Add the word "since" before "grown..."
- Line 87 has unclear English awkward phrasing
- Minor note to the authors, British Antarctic Survey testing shows less frosting on the non-marine version of the RM Young than the marine version of the RM Young. This is the sensor used successfully in other AWS networks in Antarctica, with less frosting than the marine version. It is true frosting will continue to happen, but there is little that can be done at remote AWS sites for this problem.
- Line 122 - add "radiation" before "shielding"
- The averaging of data over 30 minutes does not match WMO standards (see WMO publication #8 for the standards outlined there). This is unfortunate as it can overly smooth out the wind observations and temperature and pressure less so. However, being on the Antarctic plateau, at the top of Dome Concordia, it is likely the data is not

overly impacted, however it should be noted some place (in the metadata especially!) that this is 30 minute-averaged data and it is not standard practice, as data rarely is averaged over a such a long period.

- Line 163 - Dome C AWS data is available before 1984 (albeit with gaps)...starting as early as 1980.
- Line 170- 175 - other AWS are located in this area over the years per poster by Fons et al.. and these other AWS did exist at some point during this time frame....
 - <http://amrc.ssec.wisc.edu/outreach/posters/images/fonsAMOMFWposter.pdf>
- Line 203-204 - Is this the warmest ever at every level all on the same day? Would it be over different days for different levels? Perhaps a table of extremes, means, etc with dates would be helpful? This is different than the Appendix table 1 and maybe just a nicety, but would be interesting to document?
- Figure 5 could use some clarification in title/legend... description is ok...but something that denotes these are differences from the lowest level of the tall tower and these other AWS.
- In Figure 7 - am I correct that this is not "model" but observation levels ?
- Line 299 - How is any of the data quality controlled? (beyond the winds listed here) This is not addressed.
- So wind is less than ten years....making only temperature a 10 year record (?)
- Line 362 - English phrasing?? Perhaps this sentence needs to be broken up into two different ones to better explain what is happening here. I get the gist of it, but it wasn't clear to me, and I ended up re-reading it several times.
- Line 396 - say "respectively " at the end of the sentence.
- Line 430-435: What is the possibility of the ERA5 assimilating Dome C II AWS? (Likely high given it has been used in ERA-I and other reanalysis models...)
- Line 470-475 - Minor note - why the funny marks around "coreless", etc.?
- Line 493 - spelling error "tosoverestimate"
- Line 496 - replace "less good agreement" and just say "less agreement"
- Line 532 - Was the AMRC data collected quality controlled data used?
- Minor note, some references doubled spaced others not ?
- As a general question - How are the different levels cross calibrated or was that not done for this instrumentation set?
- Why talk about other papers not written yet?? Just say what is covered in this paper??