

Interactive comment on “Antarctic atmospheric boundary layer observations with the Small Unmanned Meteorological Observer (SUMO)” by John J. Cassano et al.

Anonymous Referee #2

Received and published: 8 January 2021

This is a very nice, well written and informative summary and data collection of atmospheric profile measurements over Antarctica with the unmanned aerial system SUMO (Small Unmanned Meteorological Observer) that can in my opinion be accepted for publication with some minor changes. My main criticism is the formatting of the figures presenting the data (Figs 3-6) that are not really high scientific standard and should be improved. They are in addition partially hard to read e.g. due to rather small labels. I also strongly suggest to include readable legends, which would also make it unnecessary to have excessive figure captions listing different colors that further hampers the figure readability.

C1

Some other minor comments that could be worth considering: Line 76: here would be a suitable location for the general and primary SUMO reference Reuder, J., P. Brisset, M. Jonassen, M. Müller, and S. Mayer, The Small Unmanned Meteorological Observer SUMO: A new tool for atmospheric boundary layer research, *Meteorologische Zeitschrift*, 18, 2, 141-147, 2009

Line 176: there is another comprehensive paper on the Bonin method applied on SUMO measurements that also includes a few stable situations Båserud, L., J. Reuder, M. O. Jonassen, T. A. Bonin, P. B. Chilson, M. A. Jimenez, and P. Durand, Potential and limitations in estimating sensible heat flux profiles from consecutive temperature profiling by RPAS, *Boundary-Layer Meteorology*, 174(1), 145-177, DOI: 10.1007/s10546-019-00478-9, 2020

Line 186: it is not completely clear to me if the descent was always continuous or if there were also cases of stepped descent?

Lines 250-254: has this bin averaging also been applied for the stepped profiles? If so, does this make sense as the constant height circles will lead to very heterogeneous distribution of number of measurements per bin?

Figure 3: I could not find that “DALR” in the legend was defined before; maybe just mention “dry adiabatic lapse rate” in the caption?

Figure 3d: x-axis label should read “relative humidity” not “temperature”

References: several inconsistencies in the formatting of journal names (abbreviated/not abbreviated)

Table A1: I suggest to include information on: - Stepped/continuous profiling - Flight duration - Number of profiles performed during one flight (if applicable)

Interactive comment on Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2020-284, 2020.

C2