

Earth Syst. Sci. Data Discuss., referee comment RC1
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Comment on **essd-2022-174**

Anonymous Referee #1

Referee comment on "Enhanced automated meteorological observations at the Canadian Arctic Weather Science (CAWS) supersites" by Zen Mariani et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-174-RC1>, 2022

General Comments:

This is an Earth Systems Data Science paper that outlines observations collected at the Canadian Arctic Weather Science (CAWS) Supersites. This article is appropriate to support the publication of a data set. The data is significant and very useful to the Arctic scientific community. This was a very nice assessment and overview of the two supersites and the instrumentation. Great explanation and reasoning for why such Arctic measurements are needed in these remote, harsh Arctic environments. Your reasoning is reasonably broad and includes model validation and rescue effort impacts – two very important reasons for improving and continuing to collect Arctic measurements. I appreciate your noting these different and important needs for collecting data. This was also nicely highlighted in the special events that were notated at the end of the manuscript and tied everything together. Is there any hope of continuing these measurements beyond the identified June 2022 for Whitehorse, and partial continuation at Iqaluit?

Specific Comments:

- Do you have issues with the automation of the sites (such as, instruments freezing or accruing ice that might bias the measurements)? If so, how much delay is there between post processing the data and making it publicly available to forecasters?
- Have you considered the datagram structure for organizing and displaying instrument/facility metadata more broadly? A datagram would nicely format the instrument content of the tables and also the images from Figures 2, 3 and 5. (Morris, S., & Uttal, T. (2022). Datagrams: Diagrammatic Metadata for Humans, *Bulletin of the American Meteorological Society*, 103(5), E1343-E1350. Retrieved Jun 23, 2022,

from <https://journals.ametsoc.org/view/journals/bams/103/5/BAMS-D-21-0219.1.xml>)

- Have you considered putting the data from these two super-sites into the IASOA data portal? (<https://psl.noaa.gov/iasoa/home2>)
- I see that you have installed some cameras onsite to determine weather conditions and to visually check the instruments. Do the resolution on the cameras allow for assessment of the radiometers and whether they have snow/ice on the domes. I see that you have installed an icing detector near the radiometer suite, but images might also be helpful. Also, are the images available in a dataset somewhere as well? Might be a nice additional dataset to assess how well instruments are holding up against the Arctic conditions and maintaining clear optical lenses/domes.
- Do site techs ever visit the sites to clean the instruments (radiometers) if needed? Is there a set schedule or if there an identifier in the data (or cameras) that initiates a site visit?
- Have you looked at the D-ICE experiment publication, with respect to maintaining clear domes from ice/snow/rime/etc. for the radiometers? (Cox, C. J., Morris, S. M., Uttal, T., Burgener, R., Hall, E., Kutchenreiter, M., . . . Wendell, J. (2021). The De-Icing Comparison Experiment (D-ICE): a study of broadband radiometric measurements under icing conditions in the Arctic. *Meas. Tech.*, 14(2), 1205-1224. doi:10.5194/amt-14-1205-2021)
- Do you have a rotation schedule for instrument calibrations? I understand that techs are not on-site, but how often would someone go out to verify measurement accuracy (like with cleaning radiometer domes, etc.).
- Have you considered installing a tracker near the radiation suite? They do need much more maintenance and attention, so might be difficult considering these are automated sites.
- Is there any discussion about including ground heat flux plates or thermistor measurements at the sites? This might be a nice addition to round out surface energy budget terms, like conductive heat flux. Similarly, turbulent fluxes would also be a nice addition (though these would require more power and would transfer data at a much faster rate, so infrastructure might not allow for this).
- Have the quality control or post-processing techniques been posted in any reports that you could reference? Are you doing any post-processing or quality control efforts to the data before it gets posted to the portal or is the data mostly raw?

Technical Corrections:

- In Figure 1 the orange squares are difficult to decipher/locate on the maps. Including overlaid arrows on the maps with short captions/acronyms could help to better determine the locations.