

Comment on **essd-2022-174**

Anonymous Referee #2

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-RC2>, 2022

The manuscript presents monitoring data from two meteorological superstations located in the Iqaluit and Whitehorse of Canada, which are located in Provincial/Territorial capitals and are economic hubs for the region. Both sites act as transportation gateways to the North and are in the path of several common Arctic storm tracks. And more importantly, they are also uniquely situated in close proximity to frequent overpasses by polar-orbiting satellites. The manuscript is generally well organized and clear to me. As a researcher focusing on the permafrost dynamics, I appreciate the authors' considerable efforts for meteorological monitoring in the Arctic. I present my major concerns as follows,

- The introduction section should be re-organized. The reasons why the observation data was needed are not presented. Besides, the authors did not summarize any previous works on the meteorological observations at the Canadian Arctic weather science. And the necessity of both sites and their representativeness need to be clearly stated.
- Figure 1 should be clearer. The current remote sensing images are too large in scope, resulting in key information (meteorological station locations) not being highlighted enough. I suggest the authors to use red square instead of orange square. In addition, it would be better for the study area overview map to include latitude and longitude information.
- In Section 2: The author should describe the underlying surface conditions of the two superstations separately.
- A separate section should be added to the manuscript to describe the rules for data storage, such as the way to note different levels of data quality and missing values in the data storage file (Boiker et al., 2018).
- The context includes too much content on the observation instruments while the the accuracy, quality and duration of the observations is not clear.
- The author introduced only short period in sample of Meteorological Data during High-Impact Weather Events, which were Iqaluit blizzard: November 23 2018 and Whitehorse blizzard: Dec 16-17 2019. If the continuous observation for both sites especially from 2018 to 2021 could be presented, the manuscript will be expected to receive greater concerns. 5. It can be seen from Tables 1 and 2 that various monitoring data have time series of more than 3 years, but the Figures in the manuscript select a certain period when displaying the time series of various monitoring data. Authors are

advised to present a complete presentation of the monitoring data. In addition, did the authors find some interesting patterns of variation based on the time series of the various monitoring data? If so, please present them appropriately.

- I don't understand the classification method for the light precipitation, moderate precipitation and heavy precipitation, please add this definition. How to obtain credible precipitation type? Such as rain, snow, sleet. In general, different discriminating methods have different credibility in certain regions, the method in this manuscript should be explained clearly. In addition, the precipitation type that mixed was used in some figures, what are the differences between sleet and mixed?
- Are the thermistors shifting during the monitoring period? Are they calibrated every year or at a constant frequency in lab? Modern sensors and transmitters are electronic devices, and the reference voltage, or signal, may drift over time due to temperature, pressure, or change in ambient conditions.
- The text in all the diagrams in the manuscript is very small and not conducive to reading.