Review comments

Manuscript information:
Title: Special Observing Period (SOP) Data for the Year of Polar Prediction site Model Intercomparison Project (YOPPsiteMIP)
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General Comment:

This paper provides meteorological observation data related to the YOPP project at seven sites in high-latitude regions. The data are being provided as a proposal for a unified data format and usage. Under the recent global-scale climate change, continuous meteorological observation data at high latitudes, where the environment is severe and local anthropogenic influences are relatively less likely, is of great scientific value. Therefore, this paper and its accompanying data set are worthy of publication and being open.

However, in publishing this paper, some of the information necessary to ensure data availability is missing. This point cannot be ignored when considering the paper's position as a data description paper. In order to publish this paper, it is necessary to add such information and revise the manuscript so that readers or data users can understand the usability of the data appropriately.

The following Specific Comments (Major and Minor Comments) are mainly suggestions for related revisions, but these are not individual comments but requests for consideration of revisions throughout the paper. Based on these comments, please revise the paper to make the data more accessible to readers and users of the data. Other easy revisions are listed as Technical Corrections; please consider revising these as well.

Specific Comments:

[Major Comments]

1. Information on the environment in which the observation equipment is installed should be added.

Photographs of the observation equipment and its location should be included to show the conditions at the observation site. The installation and surrounding environments are important factors

in meteorological observation data. Depending on the environment, the interpretation of the data may change. In this manuscript, each meteorological observation site is described a little in the text, but that is not enough. Please include photographs of the observation equipment in the text, Appendix, or Supplement.

In addition, Fig. 2 should be replaced with a clearer photo or image for the same reason. The photo in Fig. 2 hints at the cover information around the installation site but does not provide other important information, such as the specific surface cover type or topographic information. The reader needs to interpret the meteorological data, so the figure should be changed to include such information.

2. Please describe the QC, even briefly.

Related to Major Comment 1, without a description of the environment in which the data was processed, data users cannot determine whether they can fully rely on this dataset. In an appropriate observing environment, a simple QC can make the dataset more complete, but in a complex or harsh observing environment, the reliability of the dataset will depend on how carefully the QC was performed. Although there is a brief description of the QC method in this manuscript, it should be explained more carefully in this paper (rather than just citing the method) due to the aim of data description papers. Since it is difficult to judge the usability of the overall dataset at present, authors should describe how the QC was performed, even briefly, along with a description of the surrounding environment (also related to Major Comment 1).

3. Lack of information on observation sensors and data processing

Whether or not information on the type of meteorological sensor is specified is an important aspect in interpreting the validity of the observation data, along with information on the observation environment. Depending on the characteristics of the sensor, the observed data may not faithfully reflect the surrounding meteorological conditions. The lack of easy access to the list of observation items and sensors used at different sites is a major obstacle to the main goal of organizing observation data at the super sites in a unified manner. Although information is provided in fragments in the text, it would be easier for readers to read if the information were systematically organized in tables.

In addition, there is a lack of information on the sensor installation environment. For example, whether the air temperature sensor is installed in a forced or natural ventilation shelter, whether the shelter heating effect is corrected for natural ventilation, whether the humidity is corrected in a sub-freezing environment, whether the flux measured by the eddy correlation method eliminates the influence of the surrounding environment, etc. It is important to specify whether or not the data set has been corrected for the factors mentioned above in addition to QC to ensure data availability.

[Minor Comments]
- L55 Polar prediction

   What prediction?

- L128 super site

   Is "super site" defined somewhere? If not, mentioning "super site" every time is redundant, so it should be rewritten as just "site".

- L128 the Canadian Arctic Weather Science (CAWS) project

   Please add a brief description of the purpose of the CAWS project.

- L135, 149 etc. roughness length

   What is the intention of including roughness length? Roughness varies greatly depending on the surface condition (snow cover, vegetation, bare ground, etc.), so simply showing the average roughness value has less meaning. If there is an intention, please modify it so that the intention is clear; otherwise, consider deleting it as it is redundant.

- L139 average monthly precipitation

   It should be stated in terms of annual total precipitation rather than monthly average precipitation. Temperature and precipitation amounts as climatic values are important and valuable data, and their inclusion is strongly recommended. However, they are generally presented as annual mean temperature and total precipitation as climate values. It is acceptable to include monthly averages, but it would be better to include them as additional information to the annual precipitation totals.

- L251 snowfall of 60.3 cm

   Would this "snowfall of 60.3 cm" be 46.6 mm w.e. in water equivalent? It should be stated in terms of water equivalent to describe precipitation as a climatic value. That information can be listed if the authors want to list the snow depth.

- L296 The radiation flux observations were processed using the eddy correlation and bulk method

   This statement is inappropriate since the eddy correlation and bulk methods are related to heat fluxes due to atmospheric turbulence and have nothing to do with radiation. I did not fully understand the author's intention to refer to the heat balance method, but please correct this part.

- L374 (such as snow/frost deposition...)

The content of the parentheses is too long and instead impairs readability. I request that the text be revised.

- L403 assessed by the site scientist/data quality office

I do not understand what is intended by this expression. Please revise the wording specifically to describe it more.

- Table1

It is difficult to understand what "Measured Variable" means, starting with "All" in "Measured Variable" at Whitehouse and Iqaluit, "Total precipitation of water" at other sites, "all wind", "all radiation", "all wind," and "all radiation" and so on, at other locations. Please consider correcting the element names, including correcting the terminology pointed out in the Minor Comment to L280.

- Table3

(1) Please cite the H-K table or add a brief explanation in the caption. The explanations of figures and tables should be in a style that can be understood to some extent without reading the paper by looking at the figures and captions.

(2) Please correct the superscripts of the units in "Measured variable" as they are not superscripted.

(3) Please explain what you mean by "EC" and "bulk" in the Table for the method of Flux measurement.

- Figure1

Please increase the resolution of the figures in both (a) and (b). Also, it cannot be understood what the 1000 km scale in (b) means. In the notation of figure (b), the distance in the figure should not be constant. The scale should not be notated on such a diagram. Please delete it.

- Figure3–6

Please include the time step of the data in the caption. Daily? Hourly?

- Figure3

I do not understand what the mean and spread indicate. Please add an explanation.

Technical Corrections:

-L55 Jung et al., 2014

I could not find this reference in the reference section.

- L148, L217, L281, L292 "/s"

-> "s^{-1}"

- L198 NOAA

  Since "NOAA" has already appeared in L178, there is no need to write the official name in parentheses.

- L237 The CAnadian Network...

  I understand the intention of capitalizing the first letter of the abbreviation, but it should be "Canadian..." as the official name.

- L243, L253, L264, L309, L384, L392, L407, L412, L413, L417 "&"

  -> "and"

- L280, L292 wind

  Does it mean "wind speed and direction"?

- L280, L292 pressure

  Does it mean "atmospheric pressure"?

- L301 "/m^2"

  -> m^{-2}

- L301 "µV/W/m^2"

  -> µV/(W/m^{-2})$^{-1}$

- L327 CMPI6

  CMIP6? Please confirm and correct if necessary.

-L357 Huang et al., 2023b; 2023a

  -> Huang et al., 2023a; 2023b

- L367 missing_value

  -> "missing_value"

  I understood that "missing_value" is a flag indicating a missing value. I think it is better to enclose it with " in the text to distinguish it from a flag with a proper noun role and an ordinary word.

- L394 Cook et al. (2008) と Fuehrer and Friehe (2002)

Cook et al. (2008) and Fuehrer and Friehe (2002) were not on the list of cited references. Please add them.

- Reference

Formatting is not standardized. For example, the following points. Please again check the submission policies and correct them to the prescribed format.

(1) The format of "doi" is not unified.

(2) The word [dataset] is not written in the dataset's reference.

(3) The following points should be corrected as required.

- L413 Younkin & Long, 2004

-> Is 2003 wrong? Please check.

- L413 Maturilli, 2020a, 2020b, 2020c, 2022

-> Maturilli (2020a, 2020b, 2020c, 2022)

- All Tables

(1) The caption of the Table should be written at the top of the Table. Please modify it.

(2) The Tables do not include vertical lines. Please remove the vertical bars and modify them to a refined appearance.

- Table2 "&"

-> "and"