

Hydrometric measurements in peatland-dominated, discontinuous permafrost at Scotty Creek, Northwest Territories, Canada - Changing Cold Regions Network (CCRN) Special Observation and Analysis Period (SOAP)

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Response to Anonymous Referee #2 Comments

10 **Authors' Comments are in bold and denoted with 'AC'.**

Summary: This brief communication is an interesting and highly suitable contribution to Earth System Science Data (ESSD). The paper is generally well-written and figures are very clear and entirely appropriate to illustrate key aspects of the dataset. This report provides guidance that the authors should consider in revising their
15 manuscript.

Authors' Comment (AC): We thank Anonymous Referee #2 for their positive comments. Individual comments are addressed below and changes are tracked in the revised manuscript.

20 General Comments:

1) One requirement for publication in ESSD is the inclusion of clear statements on the limitations of the datasets, which are lacking in the paper. For instance, what are the operating range, accuracy and precision of the instrumentation used? Are there gaps in the datasets and was in-filling performed on these gaps (if any)? Was there any quality control/analysis performed on the data? In any case, information on the limitations of the
25 observational data should be included in a revised paper.

AC: Gaps in the datasets have been detailed with the description of the data in the revised manuscript. Given the length of the data gaps, no attempt has been made to in-fill these gaps – this has now been specified in the manuscript. Greater detail pertaining to instrumentation precision and accuracy has now been incorporated into Table 1. The data were checked for quality control and any calculations or

corrections applied to the data are mentioned with the description of the data collection. A statement clarifying this is now on Page 3 Lines 9-10.

2) Similarly, the journal requires the datasets to be openly accessible to warrant publication. While the datasets reported in this paper are indeed available in an online data repository at Wilfrid Laurier University, there is an embargo on the data until 31 May 2019. Is it therefore too soon to publish this article when the data are not readily accessible? This is particularly a concern if one wishes to verify the quality of the datasets, which should be deemed sufficient to warrant publication.

AC: The datasets are currently available to be accessed through the Wilfrid Laurier University Library Research Data Repository. Access to the data is granted following registration for log-in information. As we understand, this aligns with the Earth System Science Data journal Repository Criteria, which specifies that “a usual registration to get a login free-of-charge” may be in place to gain access to the data. Our datasets may be accessed via this process at any time including during the specified embargo period. This simple registration was put in place to monitor use of our data and facilitate the potential for collaborative research.

3) The journal requires statements on the author contributions and competing interests, as well as a special issue statement, prior to the Acknowledgements.

AC: Statements on Author Contributions and Competing Interests have now been included prior to the Acknowledgements. We understand from the Manuscript Preparation Guidelines that a Special Issue Statement will be included by Copernicus.

Specific Comments:

1) P. 1, lines 1-4: The title should better reflect the datasets described in this paper. Perhaps the title should thus be modified to “Hydrometeorological measurements...” or “Micrometeorological measurements...” Further to this, is the second part of the title necessary? If so, then the en dash should be replaced with “during the”.

AC: As suggested, the title has been changed to “Hydrometeorological measurements in peatland-dominated, discontinuous permafrost at Scotty Creek, Northwest Territories, Canada during the Changing Cold Regions Network (CCRN) Special Observation and Analysis Period (SOAP)”.

2) P. 1, line 15: Change to “1 October”.

AC: Changed.

3) P. 1, line 26: Replace “dramatic” with “substantial” or another similar word.

AC: Replaced with “substantial” as suggested.

4) p. 2, line 16: Use “terrain” in the singular form.

AC: Corrected.

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5) p. 2, line 32: Delete the commas after the months.

AC: Deleted.

6) P. 4, line 7: Change to “All data were”.

10 **AC: Corrected.**

7) P. 4, line 18: Revise to “these data have”

AC: Corrected.

15 8) p. 5, lines 1-5: At what depth are the ‘deep groundwater temperatures’ being measured? How to they compare to the depths of the soil temperatures reported in Section 3?

AC: The depths at which deep ground temperatures were measured at these disturbed sites are now specified in this section (Page 5 Lines 6-10).

20 9) P. 5, lines 11-12: How was the partitioning of the precipitation into its liquid and solid component achieved? Is this based solely on a 0°C threshold?

AC: Precipitation type was determined based on hydrometeor temperature as described by Harder and Pomeroy (2014). This information has now been included in the explanation of wind undercatch calculations on Lines 14-16 on Page 5 and this reference has been included in the reference list.

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10) P. 5, line 13: Was there only one snow survey conducted or multiple ones prior to snowmelt? On what dates were these snow surveys conducted? What were the average snow depths/snow water equivalents during the snow surveys? What is the precision of these snow measurements and possible sources of errors? More information on this component of the hydrometeorological datasets is needed.

30 **AC: Snow survey data presented here was collected 23-24 March 2015 just prior to snowmelt. Greater detail of the snow depth and snow water equivalents measured across the fen, bog and peat plateau land covers has now been provided in this section on Pages 5-6.**

11) P. 5, line 21: Revise the text to: “were recorded at 30-minute intervals and were corrected...”

AC: Changed as suggested.

12) P. 5, line 27: Change to “3 May”.

5 **AC: Changed.**

13) P. 6, line 1: Change to “were related”.

AC: Changed.

10 14) P. 6, line 4: Change to “are presented”.

AC: Changed.

15) P. 6, line 8: In what format are the datasets archived? What metadata are available with these files?

15 **AC: The archived datasets are tab-delimited files, which can be dealt with using Microsoft Excel. Each of the four datasets contains a metadata worksheet defining the data columns, applicable units and other pertinent information. Greater detail on the dataset files is now provided in the Data Availability section.**

16) P. 7, line 15: Update this reference with an article number or page range if possible.

AC: The page range has now been added to this reference.

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17) P. 7, line 31: Update the status of this reference if possible.

AC: The status of this paper has not changed.

18) P. 9, line 1: The journal may require all authors on this reference be listed here instead of “et al.”

25 **AC: The full author list has now been included in this reference.**

19) P. 9, line 6: Add the paper number for this article.

AC: The paper number has been added and the page range removed for this reference.

30 20) P. 10, Table 1: Consider adding the operating range, precision and accuracy of each instrument to the table.

AC: This information has been incorporated into Table 1.

21) P. 14, Figure 3: How well do the water content reflectometers operate in frozen ground? What may be the source of the spike in ground heat flux at the bog in spring 2015, or are these spurious measurements?

AC: A sharp decrease in liquid volumetric soil moisture content indicates the onset of soil freezing. Liquid water soil content of frozen soils typically ranges from 0.15 to 0.2 (Connon et al., 2018). This has now been specified on Page 4 Line 33 to Page 5 Line 1.

The ground heat flux data was checked for quality control. The large spike in the bog ground heat flux in spring 2015 is attributed to the loss of the insulating snowpack during the spring melt period. The spring peak in ground heat flux coincides with the observed substantial increase in volumetric liquid soil moisture back to saturation following ground thaw and infiltration of snowpack meltwater. The large spike in bog ground heat flux is also observed in all other years of available data during the spring.