Data Paper

Tadao Inoue, Kazuyuki Saito, Go Iwahana, Hiroki Ikawa, Hirohiko Nagano, and Robert Busey. Spatiotemporally continuous temperature monitoring using optical fibers (Loop 2) for ground surface and subsurface with various vegetations on a flat area with slope surface in the internal Alaska from 2016 to 2019. Polar Data Journal. 2025, 9, p. 14–29. https://doi.org/10.20575/00000060.

(Received 9/11/2024; Accepted 2/5/2025)

1st submission

Editor Start Date: 9/16/2024

Editor Stop Date: 12/8/2024

Reviewer #1: (9/20/2024–11/17/2024)

Reviewer #2: (10/23/2024–12/5/2024)

Handling editor comments to the Author: Ryu Uemura

Thank you for submitting your manuscript. Two reviewers acknowledged the fundamental importance of your dataset. Please revise your manuscript according to the comments of the two reviewers. As reviewer #2 suggested, please clarify the measurement areas. In abstract, it seems you measured the temperature along 5.4 km cable, but in the figure and text it appears to measure only within the four quadrat areas. I also think that a conceptual schematic illustration will be helpful for readers.

Reviewer #1: Anonymous

The background of the observations, methods, data processing techniques, the format of the published data, and data validation are sufficiently described to meet the requirements for publication. Below, I suggest only minor comments for your reference in making revisions.

Line 30: 20 cm --> 0.2 m (Since all other descriptions use meters as the unit, consider using meters here for consistency.)

Line 37: temperature --> air temperature

Line 38: temperature --> air temperature

Line 68: 65.123E --> 65.123N

Line 80–81: The context uses "the latter is... the former is..." but reversing to "the former... the latter" seems more readable. If there is no specific reason to maintain the current order, consider switching the order.

Line 86: 4.0mm --> Add a space between the number and the unit.

Line 112: 20 cm --> 0.2 m

Line 197–198: MN --> MM (If the format is 'Month"Month', it seems that "MM" would be correct.)

Line 243: temperature 1.5 m --> temperature at 1.5 m

Reviewer #2: Mamoru Ishikawa

The first 3 paragraphs in '1. Background & Summary' could be re-organized in order to clarify why this measurement is significant/groundbreaking/required.

L40–41, where? Global?

L42–43, this sentence could be in Line41,

L145, What's "The segments"?

L177–179: duplicated expression consider reorganization.

L187–188: Unfinished text

Better to provide some illustration showing physical background/principle of this measurements. In my reading it was not clear where this system measure, around entire around cable (5.4km) or just quadrad area?

Figure 2(b)–(d): show the scale

Figure 4 Do you have any correlation between your measurements and thermistor-based measurements?

Authors Response:

We appreciate the concise and detailed comments from both the reviewers. We feel the revised manuscript is much clearer and readable.

Response to reviewer #1:

We appreciate your useful comments for improvements. We revised the manuscripts to reflect all the raised comments and suggestions except for the one regarding “Line 197–198”.

Line 30: 20 cm --> 0.2 m (Since all other descriptions use meters as the unit, consider using meters here for consistency.)

Line 37: temperature --> air temperature

Line 38: temperature --> air temperature

Line 68: 65.123E --> 65.123N

Line 80-81: The context uses "the latter is... the former is..." but reversing to "the former... the latter" seems more readable. If there is no specific reason to maintain the current order, consider switching the order.

Line 86: 4.0mm --> Add a space between the number and the unit.

Line 112: 20 cm --> 0.2 m

Line 197–198: MN --> MM (If the format is 'Month"Month', it seems that "MM" would be correct.)

Line 243: temperature 1.5 m --> temperature at 1.5 m

Line 197–198 in the original submitted manuscript.

The file-naming convention was PFRR_Loop2_DTS_YYYYMMDD_HHMN.csv, where YYYY, MM, DD, HH, and MN denote the year, month, day, hour, and minute of the record in ASCII, respectively.

Abbreviations which we used here correspond to time units as below:

YYYY ==> year

MM ==> month

DD ==> day

HH ==> hour

MN ==> minute

Here, MN denotes minutes. Thus, we left the lines unchanged.

Thank you very much again for your suggestions.

Response to reviewer #2:

We appreciate your useful comments for improvements.

The first 3 paragraphs in '1. Background & Summary' could be re-organized in order to clarify why this measurement is significant/groundbreaking/required.

L40–41, where? Global?

We added a phrase “at many high-latitude sites” to the end of the sentence as below:

==> In recent years, the thickness of the active layer has increased at many high-latitude sites.

L42–43, this sentence could be in Line41

The second paragraph in '1. Background & Summary' provides a general explanation on active layer’s functions in a boreal forest, we think the sentence (Line 41) should belong to the paragraph. To make it clear, we added 'Generally,' at the beginning of the sentence.

To clarify the motivation of this measurement, we also added the next sentence at the end of the first paragraph of '1. Background & Summary'.

“Therefore, understanding the dynamics of the active layer, including its temperature, is important to understand the state of permafrost and is also necessary to investigate the response of the Arctic region to global warming.”

L145, What's "The segments"?

We added the following sentences at the end of '1. Background & Summary.'

“Although it is a single cable with a length of 5.4 km, the area where the cable was installed can be classified according

to their characteristics relating to spatial locations and vertical positions (i.e. surface and subsurface), so for convenience we have conceptually divided the cable into segments and given a name to each segment (e.g. A_u01) which are indicated in Figures 2 and 3, and these names were also given to all data points as "Segment Name" in the observation point-location information file (Section 4, 1 (2) and Table 2)."

We also modified line 144 to clarify by adding a phrase "in the quadrats" as below:

"The segments in the quadrats were flagged to distinguish between the ground surface and subsurface …"

We also added the following sentences at the end of Fig. 2's caption.

"The single cable of 5.4 km long was conceptually divided into segments according to their characteristics relating to spatial locations and vertical positions (i.e. surface and subsurface) for convenience and given a name for each segment (e.g. A_u01)."

L177–179: duplicated expression consider reorganization.

We simplified as below:

"The vegetation types were classified into eight categories."

L187–188: Unfinished text

We revised it as below:

"ASCII files (ASCII) for each period in DTS_temporal_info_v1.csv listing the temperature data (in °C) according to the order in DTS_spatial_info_v1.csv are the core of the data."

Better to provide some illustration showing physical background/principle of this measurements.

==> Considering the limitation on the number of figures, we added reference No.4 (namely, its Figure 2) to Line 83 of the original submitted manuscript to refer to the physical background and principle of this measurements.

In my reading it was not clear where this system measure, around entire around cable(5.4km) or just quadrad area?

We added a phrase "through the entire cable" to L57-58 of the original submitted manuscript as below:

"The temperatures were continually recorded through the entire cable at 0.5 m and 30 min spatiotemporal resolution from July 2016 to February 2019."

Figure 2(b)–(d): show the scale

We added the mention on the scale in the caption of Figure 2 as below:

"Quadrats are special area where the fiber-optic cable was installed both on the surface and 0.2 m under the ground (i.e. subsurface) to detect the temperatures in the active layer. A quadrat was set up in a square shape with each of four sides approximately 30 m long and one diagonal line."

Figure 4 Do you have any correlation between your measurements and thermistor-based measurements?

We intend to examine comparison with the thermistor-based measurements installed at the quadrats in an analysis paper for the next step.

Thank you very much again for your suggestions.

2nd submission

Editor Start Date: 12/27/2024

Editor Stop Date: 1/6/2025

Handling editor comments to the Author: Ryu Uemura

In response to the reviewer2's comment, you responded "Figure 4 Do you have any correlation between your measurements and thermistor-based measurements?

We intend to examine comparison with the thermistor-based measurements installed at the quadrats in an analysis paper for the next step."

I think that this temperature comparison is a kind of "Technical Validation", which is essential for data journal.

Please add a simple comparison to validate your data set.

Authors Response:

We appreciate the insightful comment from the editor and the reviewer #2. Please find our response below.

Response to the Editor:

In response to the reviewer2's comment, you responded "Figure 4 Do you have any correlation between your measurements and thermistor-based measurements?

We intend to examine comparison with the thermistor-based measurements installed at the quadrats in an analysis paper for the next step."

I think that this temperature comparison is a kind of "Technical Validation", which is essential for data journal. Please add a simple comparison to validate your data set.

We agree with the reviewer's suggestion. We added a simple comparison with thermistor-based measurements for additional dataset validation (ll. 266–274) and showed in Figure 4 d)–f). We also added related explanation of the observation equipment and measurements in ll. 135–144.

After the original submission, we recognized a period of suspicious measurements of DTS (namely, between October 8, 2018, and November 9, 2018). In this re-revised manuscript, we additionally described this period in ll. 130–133 and updated the validation analysis (i.e., Figure 4).

Thank you very much again for your suggestions.

3rd submission

Editor Start Date: 1/28/2025

Editor Stop Date: 2/5/2025

Editorial Office’s note

Calculate checksum date: 3/26/2025

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