Data Paper

Kazuyuki Saito, Go Iwahana, Hiroki Ikawa, Hirohiko Nagano, and Robert Busey. Spatiotemporally continuous temperature monitoring using optical fibers (Loop1) in the internal forest areas in Alaska for the period from 2015 to 2016. Polar Data Journal. 2023, 7, p. 58–71. https://doi.org/10.20575/00000049.

(Received 2/2/2023; Accepted 7/14/2023)

1st submission

Editor Start Date: 2/3/2023

Editor Stop Date: 4/27/2023

Reviewer #1 (3/7/2023–4/5/2023)

Reviewer #2 (3/27/2023–4/27/2023)

Editor comments to the Author: Ryu Uemura

Followings are my editorial comments.

1. Please add scale bar in the upper panel of Figure 2.
2. In fig. 3, RED bar means successful? or NOT? Please describe clearly the meaning of color.
3. Please use degree sign to denote degree-C. It seems that the authors use a superscript of "o". For MS Word, you can use degree sign by selecting the menus, insert special character. Please correct this wrong "degree" in all figures and text.
4. L.64 SIO2 -> "2" should be subscript.
5. L.67 isn't -> is not

Reviewer #1: Anonymous

The manuscript entitled "Spatiotemporally continuous temperature monitoring using optical fibers (Loop1) in the internal forest areas in Alaska for the period from 2015 to 2016" by Saito and coauthors provides data and its instrumental descriptions of the fiber-optic distributed temperature sensing system, which has been installed and operated in an Alaskan forest. Though I am not familiar with the system, it seems to provide valuable data with spatially and temporally high resolution. The data and manuscript are worth to be published in the data journal but some descriptions would be revised for better readability.

Abstract

Descriptions of what the big goal is, what the features and advantages of this sensor are, and an overview of the results obtained are appreciated.

English

There are some grammatically strange descriptions. For instance, in Line 35, the sentence says "Taiga region reveals spatial heterogeneity" but I believe it should be "Studies have revealed spatial heterogeneity of Taiga region". I would not point out further but such incorrect descriptions should be revised carefully.

1. Line 46: It sounds strange "huge-scale (Earth's) warming climate in limited-local (taiga) regions".
2. Title of Chapter 2: What the parentheses mean?
3. Line 56: Coordinate seems too detail to describe the set up. This could resolve an 1-m scale while the system extends longer than 2 km.
4. Line 73: What does "section 7" mean? Does this mean the chapter of this manuscript? or of some other study? Confusing.
5. Line 184: I think it is not a usual statement.
6. Figure 1: 0'0"s are not necessary for the inset figure. Add the horizontal sections #1~#5. What solid and dashed lines mean?
7. Figure 2: Add a scale. For the mid-right panel, add vertical and horizontal (approximate) scales. Is "Backscattering" the notation of which panels? Upper or lower panel? (Lower right) of the figure caption seems that for the middle right panel. No explanation is found for the lower right panel. The figure caption is merged in the figure (not editable). Detailed descriptions are appreciated about how the wave data of lower right panel can be converted into temperature data.
8. Figure 3: Which color denotes the data obtained? Red or white?
9. Figure 4: Figure title seems January 1st but the caption states "January 10th". I cannot understand "the number of observations of the day" means. Does this mean an interval of 30-min? If so it should be stated more straightforward.
10. Table 1: I cannot understand what numbers of Julian day mean.

Reviewer #2: Anonymous

I found that the manuscript was well written. I found nothing to correct.

Authors Response:

We would like to thank the handling editor and the reviewers for their time and enthusiasm, and for providing detailed and useful comments, which have helped to improve the quality and readability of our manuscript. In the following, we provide point-to-point replies to the issues raised and requested by the editor and reviewer and describe how we responded and revised the manuscript.

The comments of the editor and reviewers are written in bold, the extracts of the manuscript in italics with changes highlighted in blue and line numbers referring to the revised manuscript.

Response to Editor;

1. **Please add scale bar in the upper panel of Figure 2.**

We added a scale bar in the corresponding Figure, which is now labeled as Figure 2 (a).

2. **In fig. 3, RED bar means successful? or NOT? Please describe clearly the meaning of color.**

We added a description of the meaning of the colors of the bars as *"Successful observations are shown in red"*.

Note that the figure is now indexed as Figure 4, considering the order of appearance in the text.

3. **Please use degree sign to denote degree-C. It seems that the authors use a superscript of "o". For MS Word, you can use degree sign by selecting the menus, insert special character. Please correct this wrong "degree" in all figures and text.**

We revised both the text and figures to use the degree sign.

4. **L.64 SIO2 -> "2" should be subscript.**

We revised it accordingly.

5. **L.67 isn't -> is not**

We revised it accordingly.

Response to reviewer #1;

The manuscript entitled "Spatiotemporally continuous temperature monitoring using optical fibers (Loop1) in the internal forest areas in Alaska for the period from 2015 to 2016" by Saito and coauthors provides data and its instrumental descriptions of the fiber-optic distributed temperature sensing system, which has been installed and operated in an Alaskan forest. Though I am not familiar with the system, it seems to provide valuable data with spatially and temporally high resolution. The data and manuscript are worth to be published in the data journal but some descriptions would be revised for better readability.

Abstract

Descriptions of what the big goal is, what the features and advantages of this sensor are, and an overview of the results obtained are appreciated.

We revised the abstract to include the description of the ultimate target and goal of the project along with specific features, advantages, and shortcomings of the equipment, and to specify the significance of the results.

English

There are some grammatically strange descriptions. For instance, in Line 35, the sentence says "Taiga region reveals spatial heterogeneity" but I believe it should be "Studies have revealed spatial heterogeneity of Taiga region". I would not point out further but such incorrect descriptions should be revised carefully.

We have the entire text, captions, and legends checked by a native English speaker with a doctorate degree, revised accordingly.

1. **Line 46: It sounds strange "huge-scale (Earth's) warming climate in limited-local (taiga) regions".**

We meant to express the impacts of global warming on the local regions, but agree that it is confusing. We removed the word "Earth's" from the text, which now reads "*to assess the impacts ~~of Earth~~'s warming climate*[10,11] *in taiga regions*"

2. **Title of Chapter 2: What the parentheses mean?**

We had failed to remove the parentheses from the provided template. We removed the parentheses from the title.

3. **Line 56: Coordinate seems too detail to describe the set up. This could resolve an 1-m scale while the system extends longer than 2 km.**

Thank you for pointing this. We realized that the coordinate numbers are too detailed and were way off. We revised as the following: *"The Poker Flat Research Range (65.12° N; 147.49° E, 210 meters above mean sea level)."*

4. **Line 73: What does "section 7" mean? Does this mean the chapter of this manuscript? or of some other study? Confusing.**

It was a typographical mistake and should have cite the equation (1) in *"section 5"* of the manuscript (Line. 164 in the revised manuscript). We revised the text accordingly (similarly, Line. 78).

5. **Line 184: I think it is not a usual statement.**

We agree. We revised as *"There are no competing interests with this study."*

6. **Figure 1: 0'0"s are not necessary for the inset figure. Add the horizontal sections #1~#5. What solid and dashed lines mean?**

We removed 0'0"s from the figure (Figure 1).

We interpreted that the second and third issues were meant for Figure 2. We added a legend for the horizontal sections 1~5, which explain the solid and dashed lines. We revised the caption as *"Figure 2: a) Installation information of the Loop1 fiber-optic cable in 2016 at Poker Flat Research Range. Horizontal sections of the cable sensor are delineated by different lines. Numbers in white denote the tube sections. Colors show the surface cover types." (Figure 2)*

7. **Figure 2: Add a scale. For the mid-right panel, add vertical and horizontal (approximate) scales. Is "Backscattering" the notation of which panels? Upper or lower panel? (Lower right) of the figure caption seems that for the middle right panel. No explanation is found for the lower right panel. The figure caption is merged in the figure (not editable). Detailed descriptions are appreciated about how the wave data of lower right panel can be converted into temperature data.**

We revised Figure 2 and its caption to add the panel indicators (a to d), added a horizontal scale in Figure 2a and a vertical scale in Figure 2c, revised the caption for Figure 2d. Since the description on conversions of the backscattered signals to temperature is described in section 5 1), we added this notion in the caption for Figure 2d.

The revise caption now reads *"Figure 2: a) ...Colors show the surface cover types. b) Photo of the DTS equipment (AP SENSING N4386B). c) Schematic diagram of fiber-optic cable deployment for the horizontal and tube (vertical) sections. d) Explanatory diagram of the Raman backscattering. See text and equation (1) in section 5 for the methodology to derive temperature information from the backscattering."*

8. **Figure 3: Which color denotes the data obtained? Red or white?**

We added the following description of the meaning of the colors of the bars in the caption. *"Successful observations are shown in red"*. Note that the figure is now indexed as Figure 4, considering the order of appearance in the text.

9. **Figure 4: Figure title seems January 1st but the caption states "January 10th". I cannot understand "the number of observations of the day" means. Does this mean an interval of 30-min? If so it should be stated more straightforward.**

We revised the date as "January 1, 2016." The number of daily observations is provided because observations are not always successful for reasons described in the text. We added an explanation as *"successful observations"* in the caption, as well as a description in the text *"The observations were also interrupted by occasional power outage, leading to failures of observations for the entire section. Despite auto-recovery of the measurements after the outage, intervals of successful observations may be longer than scheduled (i.e., 30-minute)"* (Lines187-189 in the revised manuscript) to clarify this.

Note that the figure is now indexed as Figure 3, considering the order of appearance in the text.

"Figure 3: Daily summary of the DTS observations on January 1, 2016. The daily average is shown in blue, and the range is in red. Sectioning of the cable for inter-tubes (#1 to #5) and tubes (tb1 to tb4) are also shown. The figure in round parentheses in the figure title denotes the number of successful observations on the day."

10. **Table 1: I cannot understand what numbers of Julian day mean.**

Julian day (JD) is used to count the elapsed days (with the fraction of a day as a decimal number), primarily by astronomers. Although we used the original JD numbers in the original manuscript and the data files, which starts at noon on January 1, 4713 BC, we realized it is easier to shift the origin to January 1, 2015, in this dataset. Therefore, we revised the numbers shown in Table 1 and added an explanation in section 4, 1. (1) (Lines 106-107) to clarify this. *"Here, the date denotes the elapsed date, with the fraction of a day, from January 1, 2015, beginning at noon, Alaska Standard Time."*

Response to reviewer #2;

I found that the manuscript was well written. I found nothing to correct.

We thank very much for your time and favorable evaluations.

2nd submission

Editor Start Date: 7/10/2023

Editor Stop Date: 7/14/2023

Reviewer #1 (7/13/2023–7/14/2023)

Editor comments to the Author: Ryu Uemura

As reviewer#1 suggested, the resolution of the figures is bad and characters are blurred, please improve them in the process of publication.

Reviewer #1: Anonymous

The manuscript seems to be well revised. I think that this can be acceptable for the publication.

Note: The downloaded pdf file contains coarse resolution figures but I believe this can be improved through the production.

Editorial Office's note

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