[ESSDD]

Interactive
comment

Interactive comment on "A synthesis dataset of permafrost-affected soil thermal conditions for Alaska, USA" *by* Kang Wang et al.

Anonymous Referee #3

Received and published: 3 July 2018

Overview:

This analysis provides an assessment of soil temperature, soil moisture, air temperature and snow depth data collected across Alaska, at depths up to 1 meter and over a time span of 1997 to 2016. The manuscript describes the processes used to harmonize the data; the harmonized data are presented in a resulting dataset posted through the Arctic Data Center. The dataset provides a useful contribution to the Arctic community and is especially relevant for model development. The manuscript itself could use more refinement prior to publication.

General comments:

Although the discussion appears focused on trends, the manuscript would benefit from

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Discussion paper

some analysis and discussion of interannual variability observed in the data.

Is it possible to calculate the start and end of the annual frozen period (where soil temperature is less than 0 degree C) from the compiled dataset? If so, please include this in the results and discussion, in addition to the freezing and thawing index.

A brief description of vegetation and soil type should be included for all sites, as well as mean annual thaw depth.

Specific comments:

Abstract.

Line 2. Some of these temperatures are at or above 0 degrees C and near-surface soil temperature and soil moisture are also included in the compiled dataset. Perhaps refer to these data as representing active layer and permafrost.

Line 6. Add a comma to 1327 meters for consistency.

Line 8. I don't think it necessary to have the paragraph mentioning missing data here, in the abstract. This is more a point to be made in the discussion and conclusion section.

Introduction.

Line 26. Remove "of" prior to "allow".

Line 35. Change "These technical validation would be useful for proving data harmonization and reusing these data" to "These technical validations are useful for data harmonization and future re-analysis of these data"

Section 2, Page 3.

Line 10. "Hydra" probe instead of "Hydro" probe?

Section 2, Page 5.

Line 11. Use "it is" instead of "it's"

Section 2.2, Page 5.

Line 14. You define QC here but do not consistently abbreviate quality control past this point. Do so for consistency, or just use "quality-control" instead of QC.

Line 22. Was bias introduced when applying linear interpolation to ground temperatures? The use of linear interpolation needs to be justified.

Line 32. Add another sentence or two to describe the Frost index in more detail. Provide an example of how the resulting index values might be interpreted.

Section 3.1, Page 8.

Line 12. Southeast boreal or southeast mountain tundra?

Line 13. In which year was the 1.5 m depth recorded?

Line 17. I do not think the note in parentheses is necessary.

Section 3.2, Page 10.

Line 1. Change "while" to "that". Add "was" before "mainly".

Lines 10 & 11. Change Smith Lake to SL2 and SL3.

Section 3.2, Page 13.

Lines 5-6. These sentences are not necessary.

Figure 1.

Move the legend for the pan-Arctic permafrost inset to the right-hand side of the inset map. Increase the font size – otherwise some will not be able to read this. Increase the font size for the main legend.

Figure 2. Why show only snow depth? Why not also show soil moisture, air and ground

temperature? Indicate spatial locations where the "trend" analysis shows significant change or no significant change (I realize that locations having >= 10 years of data may be limited, but it is still helpful to see these on a map). Color code by p value?

Interactive comment on Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2018-54, 2018.

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