

Dear Dr. Yi,

Thank you for your revised manuscript “Characterizing permafrost soil active layer dynamics and sensitivity to landscape spatial heterogeneity in Alaska” (tc-2017-87 version 3). You have addressed the reviewer’s comments and with minor revisions the manuscript will be ready for publication.

P1 L 15: “~50 m” becomes “~ 50 m resolution”

P1 L26: “permafrost active layer conditions.” AL is by definition above Pf. Also, it would be good to add some text about the framework and future development perspective. Sentence becomes something like “active layer conditions and refinement of the modelling framework across a larger domain.”

P3 L31: After the first sentence in this paragraph, please include a line about the small differences you find between the 8-day and daily time steps. Add Figure R1 to your supplementary materials, and refer to it. The caption for the figure will include a component of your response to Reviewer 1.

P6 L14: “backscatter measurements acquired” becomes “backscatter measurements (~ 50 m resolution) acquired”

P7 L2: “SM and snow density” becomes “SM, and snow density”

P7 L9: high, baseline and low SOC” becomes “high, baseline, and low SOC”

P8 L30: “~1km” becomes “~ 1 km”

P9 L23 and throughout: Search and replace “in-situ” with “in situ”

P11 L31: “accumulated degree” becomes “accumulated thawing degree”

P11 L3: “MODIS LST degree” becomes “MODIS LST thawing degree”

P12 L8: “MODIS LST degree” becomes “MODIS LST thawing degree”

P13 L18: “indicated” becomes “indicate”

P14 L11: Please cite Zhang, T.: Influence of the seasonal snow cover on the ground thermal regime: An overview, *Reviews of Geophysics*, 43, RG4002, 2005.

P14 L18: “(50-m)” becomes “(~ 50 m)”

P15 L15: “(Due et al. 2015; Bartsch et al. 2016)” becomes “(Due et al., 2015; Bartsch et al., 2016)”

P15 L21: “(Liston and Sturm 1998, Gisnas et al 2016)” becomes “(Liston and Sturm, 1998; Gisnas et al., 2016)”

P15 L27: “(Jorgenson et al 2006, Osterkamp et al 2009, Grosse et al 2011)” becomes “(Jorgenson et al., 2006; Osterkamp et al., 2009; Grosse et al., 2011)”

P15 L32: “(~50m resolution)” becomes “(~ 50 m resolution)”

References: Carefully review and write out all journal titles that have been abbreviated.

Supplementary materials: Please add in references cited beneath Table S1 and in the Caption for Figure S3.

Throughout the text, tables, figures and captions, both in the main document and the supplementary material: Carefully ensure that units are reported in a similar manner. In many cases units are reported as cm, but in others units are reported correctly in m (Page 13 Lines 18 to 24 are a good example of this). Some figures show units in m, but most report units in cm. I suggest changing cm to m and centimetre to metre throughout, adjusting the reported numerical value accordingly. I recognize that this is tedious, but will make for a better read.

Throughout the text, tables, figures and captions, both the main document and the supplementary material: Thin spaces should be used before and after the following mathematical symbols: \pm , $=$, $<$, $>$, \leq , \geq , $+$, $-$, \div , \times , \cdot , \approx , \sim , \cap , \int , \prod , \sum , and $|$.

Throughout the text, tables, and figures, both the main document and the supplementary material: Thin spaces should also the unit symbol from the numerical value, and this applies to the degree Celsius (e.g., “10 °C”). The exception is for degree, minute, and second for plane angle (e.g., “coarse resolution ($\sim 5^\circ$)”). Please carefully review the text, figures, captions, and tables in the main document and the supplementary material and correct as necessary.

Throughout the text, tables, and figures, both the main document and the supplementary material: For consistency, please do not use mixed units. E.g., change 10 m/s to 10 m s⁻¹. This notation change is most often required in figures for such things as axis titles.

