Supplementary Material for

Permafrost-wildfire interactions: Active layer thickness estimates for paired burned and unburned sites in northern high-latitudes

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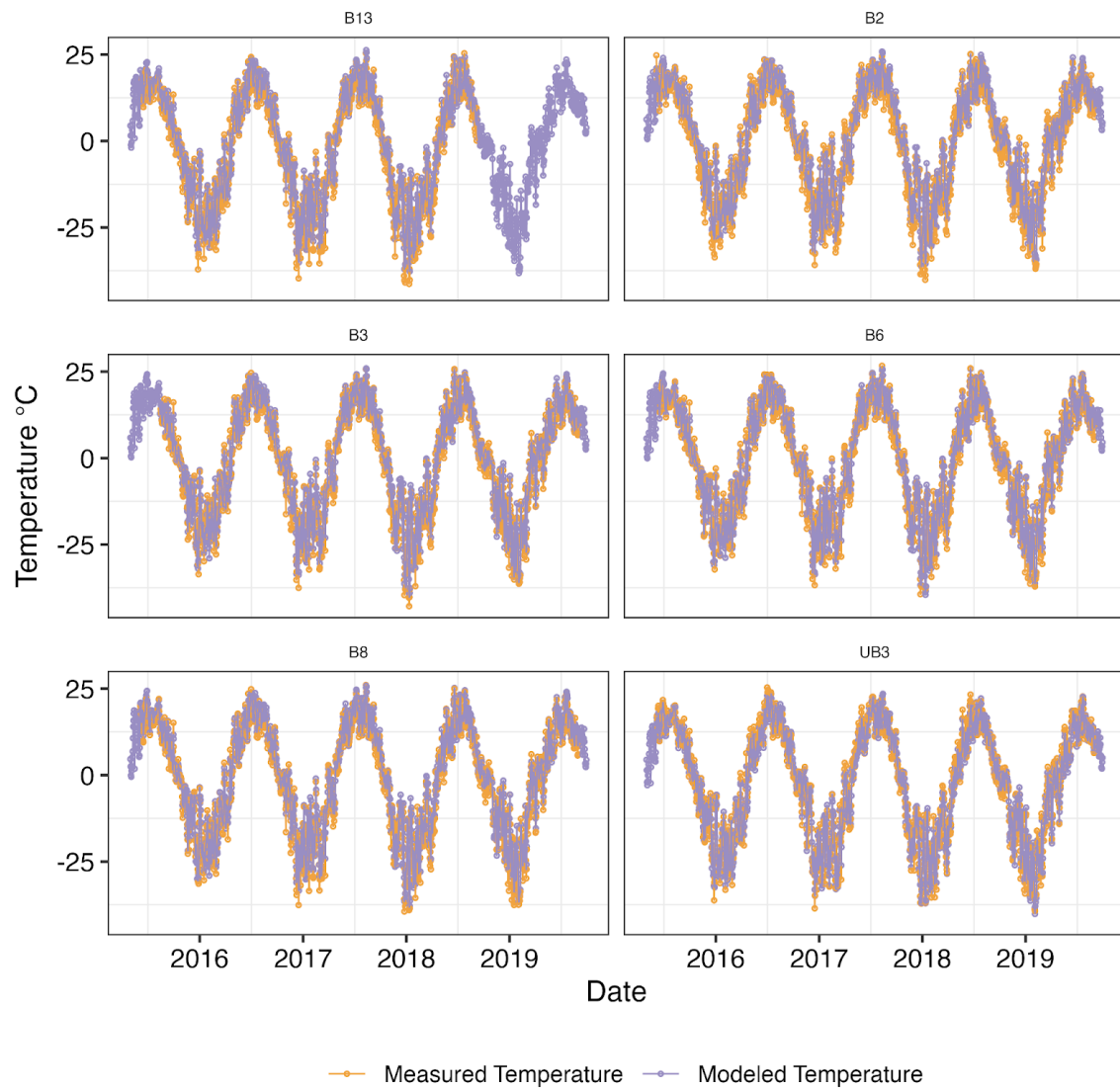
Figure S2. Daily air temperature between 2015 and 2019 from field measured and coarse resolution ERA5-Land data (modelled temperature) from six field sites in the Northwest Territories, Canada.
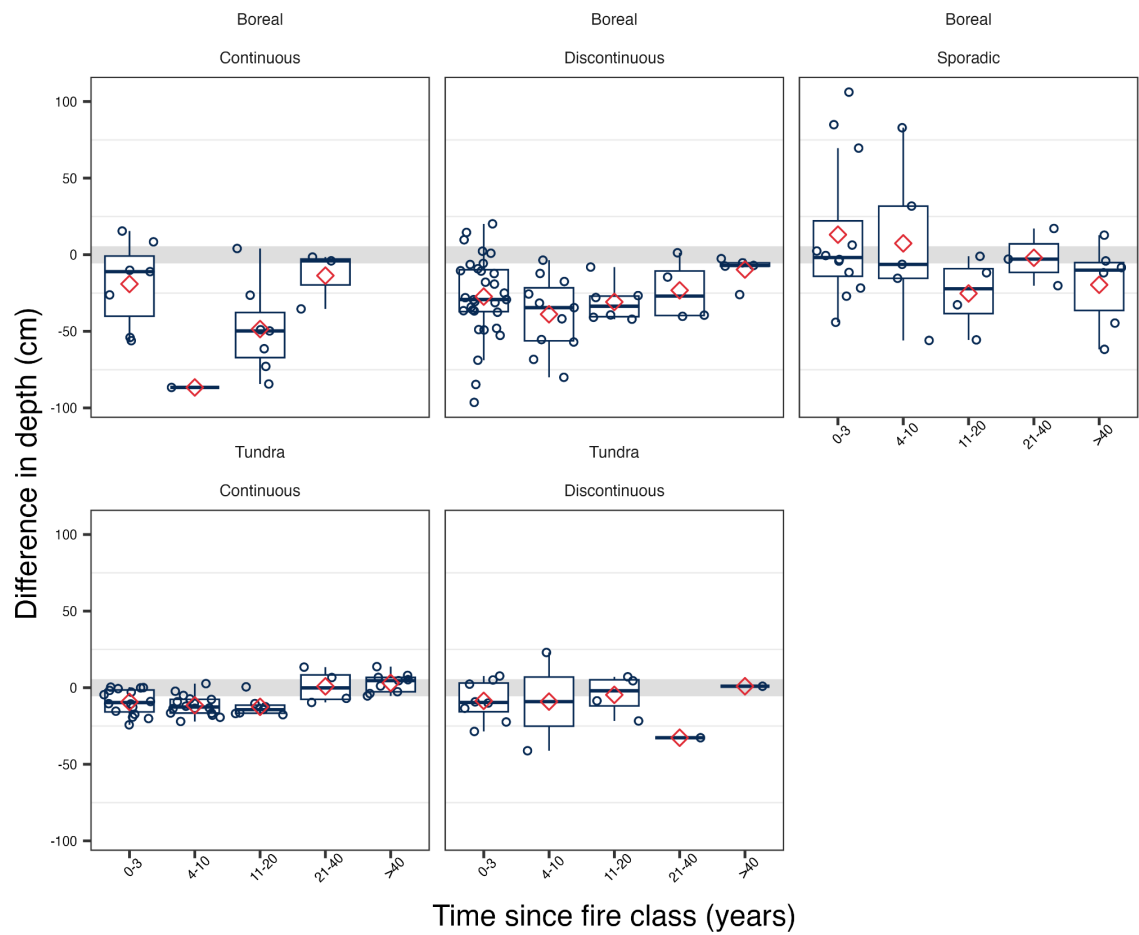
Figure S3. Boxplots of aggregated estimated ALT for burned and unburned sites by biome and permafrost extent. Individual estimated measurements were aggregated by site pairings assigned by contributors. Points represent mean estimated ALT for burned (orange) and unburned (blue). Both y- and x-axis vary by plot with time since fire classes across the x-axis and depth along the y-axis.
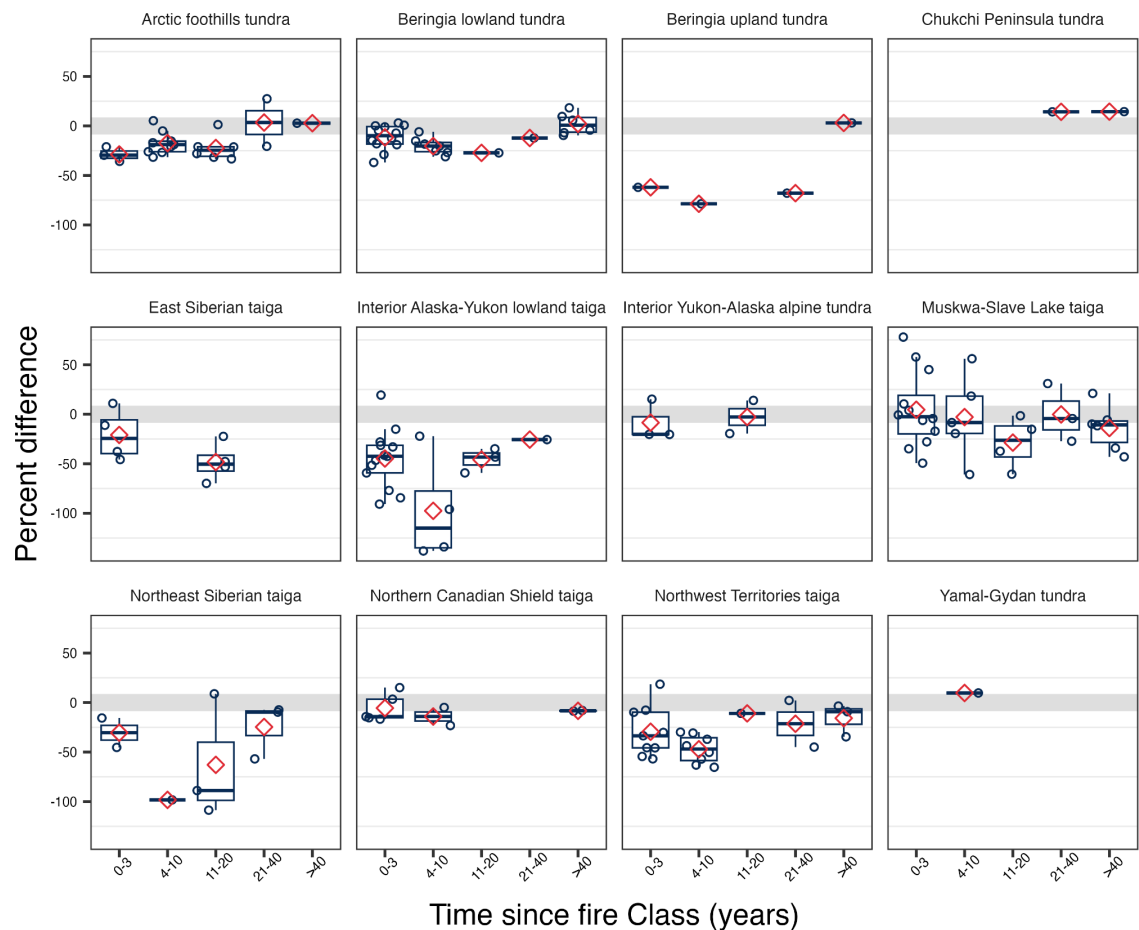
Figure S4. Percent difference in estimated ALT between burned and unburned paired sites in the years following wildfire. The percent difference is calculated (unburned-burned)/((unburned + burned)/2) * 100. Negative values indicate that the burned sites have a thicker active layer than the unburned site, while values around zero show little difference in ALT, and positive values indicate that unburned sites have a thicker active layer than the burned ALT. The red diamond indicates the mean based on paired burned-unburned and then aggregated by time since fire class, permafrost extent, and ecozone. The boxes and whiskers show the split in quantiles.
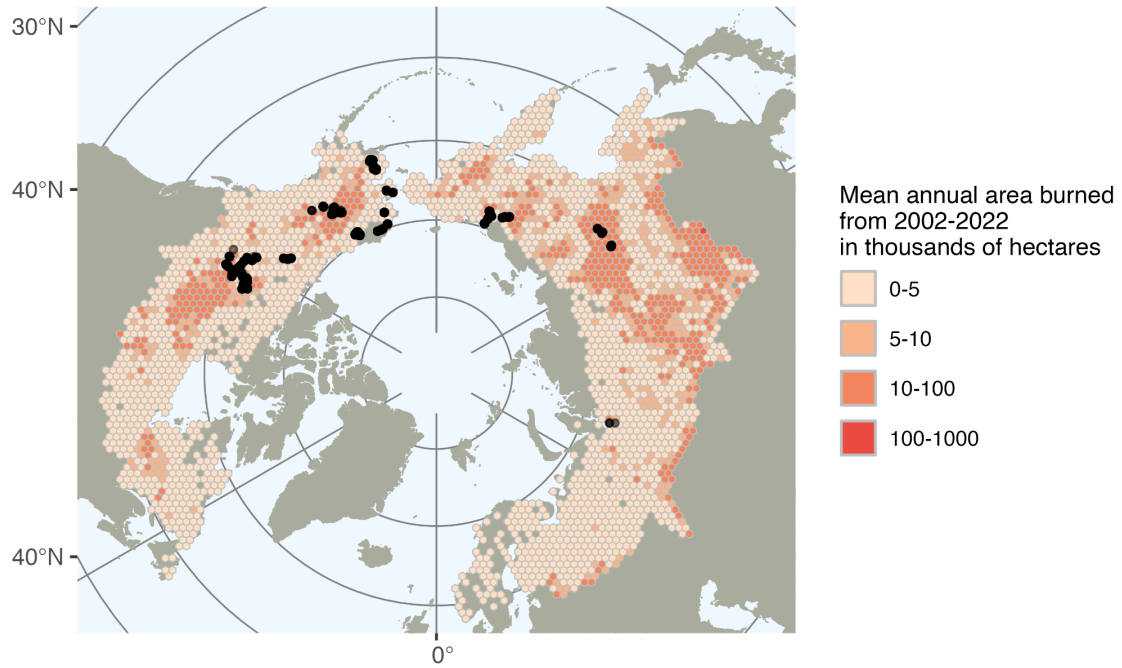
Figure S5. Mean annual area burned between 2002-2022 in hectares with FireALT points overlaid in black to demonstrate potential gaps in data across the boreal and tundra biomes for the high latitude permafrost zone. Burned area data acquired from MODIS burned area product (MCD64A1).

Table S1. Form questions regarding the details of the data contribution completed by the contributor through a Google Form. The form was titled *Data contributions: raw active layer depth measures for paired burned and unburned sites.*

Section	Description or Question
1	Overview: We are seeking data contributions for a fire synthesis paper examining how active layer depths differ across burned and unburned sites in the Arctic and subarctic. The goal is to solicit raw data contributions of active layer depth measures of paired burned and unburned measurements. Although we prefer active layer depth measurements, paired permafrost thaw depth measurements (e.g., thaw depth probing before end of season peak thaw) can also be submitted. This form serves to collect metadata about your data contribution. Data may then be contributed through a formatted google sheet. Failure to format per request may result in data return. Data contributions should consist of raw data (e.g., single measurements) and not aggregated data (e.g., mean value). Data contribution does not guarantee inclusion in analysis. Data contributions that are used in analysis will have the opportunity for co-authorship, provided the contributor meets the authorship guidelines (link below): https://docs.google.com/document/d/10LyrLuP4leAzPXw35MWB_W3qlB2eI30DrKVrth9fOlY/edit?usp=sharing We ask for a citation and DOI for your data so that we can cite your work and give you credit.
1.1	First and Last Name of the person contributing the data.
1.2	Contact email.
1.2	1.2 Contact email
2	Data Descriptions: Here we ask multiple questions about the data your plan to contribute. The purpose is to gauge the viability of the data for this synthesis. We are soliciting data sets that consist of raw measures of active layer depth across burned and unburned sites. We would prefer active layer depth measurements but will consider thaw depth measurements for burned and unburned sites.
2.1	The data I plan to submit is active layer depth (i.e., maximum seasonal thaw at the end of the growing season), or thaw depth (i.e., less than seasonal maximum taken earlier than the end of the growing season), or both.
2.2	2.2 The data I plan to submit is from burned sites, or unburned sites, or both. Note, this study is looking for paired burned and unburned sites.
2.4	Experimental unit of the active layer or thaw depth measure (e.g., 2 x 2 experimental plot, 30 m transect, 1 ha grid)
2.5	Do the active layer depth or thaw depth measurements consist of repeated measurements over multiple years?
2.6	2.6 Four-digit year of the oldest fire event
2.7	2.7 Site description: please provide a qualitative site description 4-5 sentences about topography, vegetation communities, and hydrologic regime.
2.8	2.8 Sample Design: Please describe your sample design. Details should include items such as transect length, plot size, number of plots per transect, number of measurements per plot, number of burned plots, number of unburned plots, number of fires samples, and any other details that you deem to be pertinent.
3	Data Citation: Please provide a data citation for the data set you plan to contribute.
3.1	Data citation
3.2	DOI (Digital Object Identifier) that is associated with the above citation.
4	Acknowledgments: The contribution of data to this synthesis does not guarantee inclusion for analysis. If data is included in the analysis, the data will be made publicly available, and the contributor will be listed on a data citation.
4.1	For data used in this synthesis, I acknowledge that this data will be made publicly available and that I will be listed on the data citation.
4.2	For data used in this synthesis analysis, there will be an opportunity for co-authorship provided that the contributor meets the authorship guidelines: https://docs.google.com/document/d/10LyrLuP4leAzPXw35MWB_W3qlB2eI30DrKVrth9fOlY/edit?usp=sharing

| 4.3 | In contributing data to this synthesis, I acknowledge that contribution does not guarantee data usage. Contributors will be notified either way. |

Table S2. Quality assessment and control summary of known issues in the raw data. These issues were unresolvable with the contributor and were not used in the final dataset.

Last name of data submitter	Measurement missing day of month	Thaw depth greater than probe length	Probe hit rock	Missing thaw depth measure	No unburned pair	Unable to estimate	Total number of measurements contributed	Total number of measurements in final dataset
Baillargeon*	-	40	-	8	-	-	1,695	1,647
Breen	-	-	-	-	-	-	43	42
Buma†	-	77	185	-	134	-	340	52
Delcourt	-	-	-	-	-	-	20	20
Diaz	-	-	-	-	-	-	45	45
Dieleman	903	-	307	-	166	-	2,843	739
Douglas	-	-	-	-	-	-	2,141	2,141
Frost	-	-	-	-	-	-	640	640
Gaglioti	-	-	-	-	-	-	281	281
Holloway	-	538	42	-	-	-	1,970	1,390
Loranty	-	-	9	-	-	-	504	495
Manies	-	1	298	-	-	95	985	592
Natali	-	627	4	24	-	93	7,565	6,819
O'Donnell	-	8	8	5	-	-	493	481
Olefeldt	-	942	-	-	-	-	10,621	9,675
Paulson	-	-	-	-	-	-	858	858
Rocha	-	-	-	390	-	-	22,422	22,032
Sizov	-	-	-	4	-	-	7	3

*Measured depth missing in 2019 because part of the transect was submerged due to ground subsidence.

†No unburned site to accompany siteId STEESE_1, STEESE_2, and STEESE_3