GTN-P

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May 29th, 2020

www.gtnp.org
www. gtnpdatabase.org

Outline

- GTN-P Mission
- GTN-P Governance Structure
- GTN-P Database, Data Standards and Interoperability
- Data Usage and Stakeholders
- Latest developments

GTN-P Mission

GTN-P
Global Terrestrial
Network for
Permafrost

- The Global Terrestrial Network for Permafrost (GTN-P) is the primary international programme concerned with sustained long-term monitoring of permafrost.

- GTN-P was developed in the 1990s by the International Permafrost Association (IPA) under the Global Terrestrial Observing System (GTOS) and the Global Climate Observing System (GCOS).

- Long-term monitoring of permafrost generates essential baseline information for the assessment of climate change impacts in polar and high mountain regions.

Permafrost ECV Products

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The two major components of GTN-P (Essential Climate Variables) are:

- long-term monitoring of the thermal state of permafrost in an extensive borehole network, the Thermal State of Permafrost - TSP;
- monitoring of the Active-layer thickness – ALT (mostly CALM).

- Permafrost ECV products under consideration by GCOS are Rock Glacier Kinematics, Permafrost Extent, also Thaw Subsidence in the future

Challenges

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- Expectations of monitoring, reporting, development and maintaining of standardized geospatial datasets in commonly used formats require a continuing effort for data management.
- The growing need for the permanent secretariat and data management personnel is essential in order to maintain the operational capacity of the network.

Network reformation

GTN-P
Global Terrestrial Network for Permafrost

1st GTN-P Workshop Germany Potsdam 2011

Meeting at WMO Geneva, 2013

2nd GTN-P Workshop Canada Quebec 2015

And GTN-P meetings at EUCOP, ASSW, ICOP, ...

Governance structure and personnel

GTN-P
Global Terrestrial Network for Permafrost

GTN-P governance structure (2018-2020)

STEERING COMMITTEE

Chair:
Dmitry Streletskiy

Co-Chairs:
Jeannette Noetzli
Sharon Smith

Philippe Schoeneich
Gonçalo Vieira
Alexey Maslakov (YNC)

SECRETARIAT

Executive Director:
Anna Irrgang, AWI

Executive Vice Director:
Karina Schollän, AWI/GFZ

Database Manager:
Alexander Smirnov, AP
Mark Jones, AP

IPA Representative:
Sarah M. Strand, UNIS

Technical Assistant:
William Cable, AWI

ADVISORY BOARD

Boris Biskaborn
Jerry Brown
Eduardo Cremonese
Hanne H. Christiansen
Barry Goodison
Wilfried Haeberli
Margareta Johansson
Halldor Johannsson
Hugues Lantuit
Paolo Pogliotti
Vladimir Romanovsky

GTN-P National Correspondents

36 Representatives of 25 countries with permafrost, responsible for coordinating and sustaining national data upload

GTN-P Young National Correspondents

17 Representatives of 17 countries, support to NC responsibilities

Global Terrestrial Network for Permafrost

Supporters

Primary monitoring network for Essential Climate Variable

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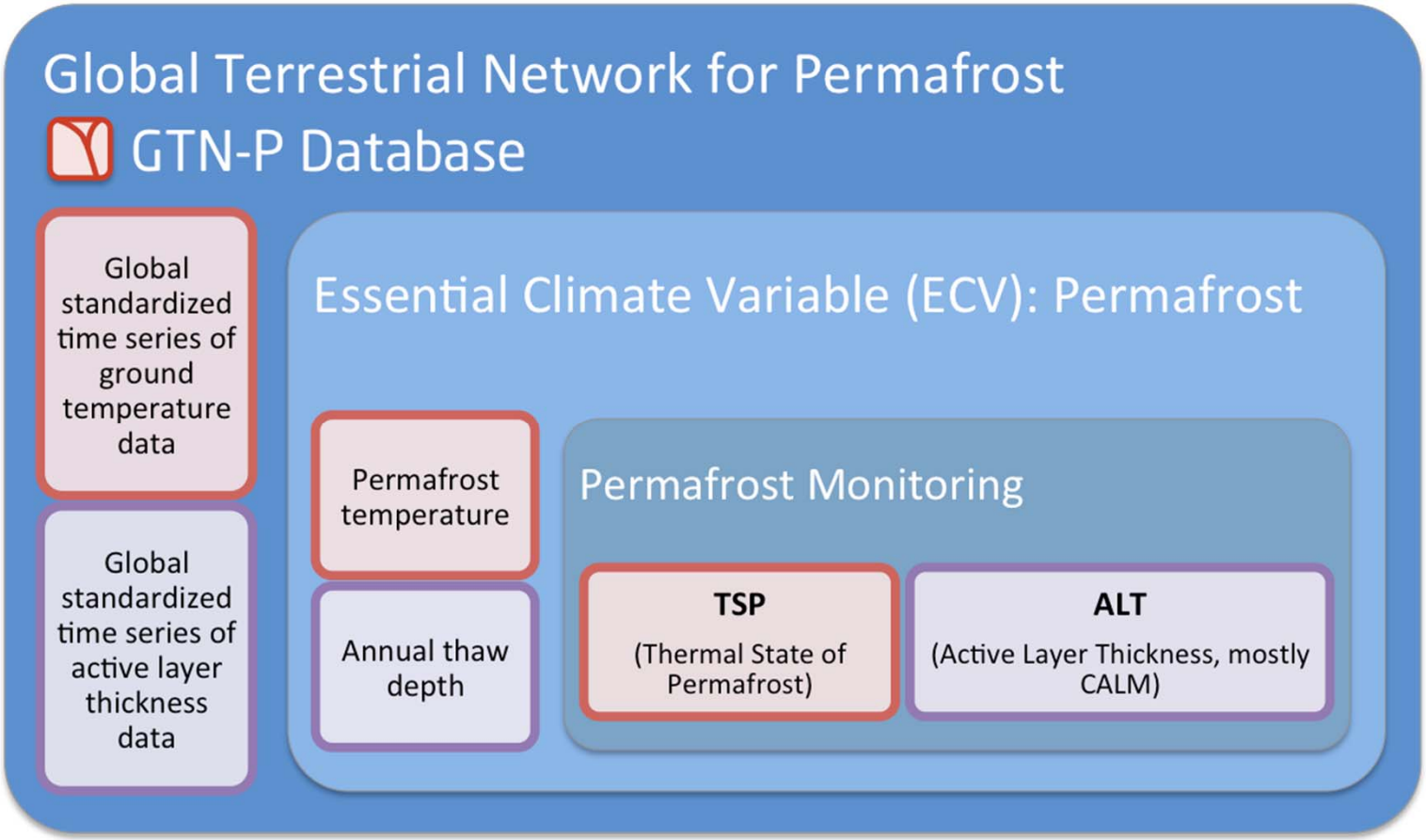

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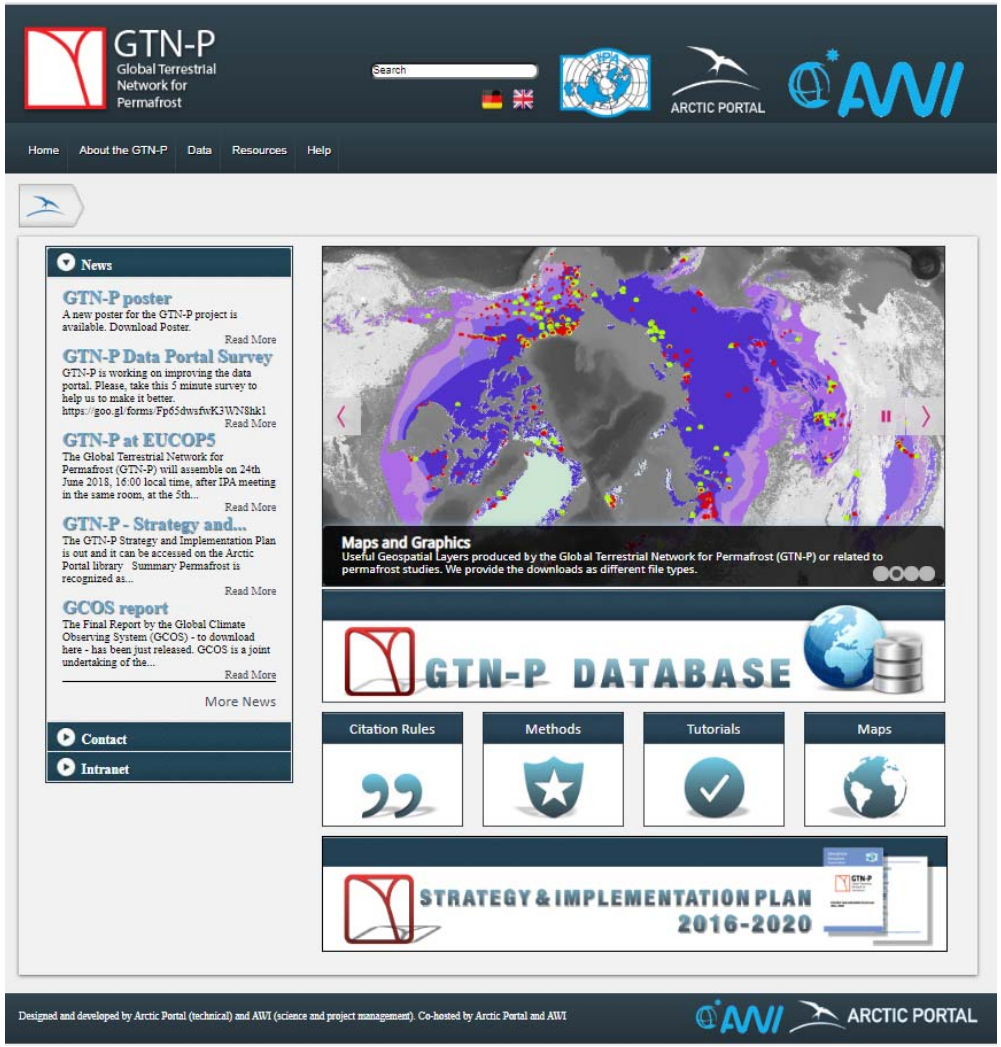
Data Management System for transfering **permafrost temperature** and **active layer thickness** to **global models**

GTN-P portal and database



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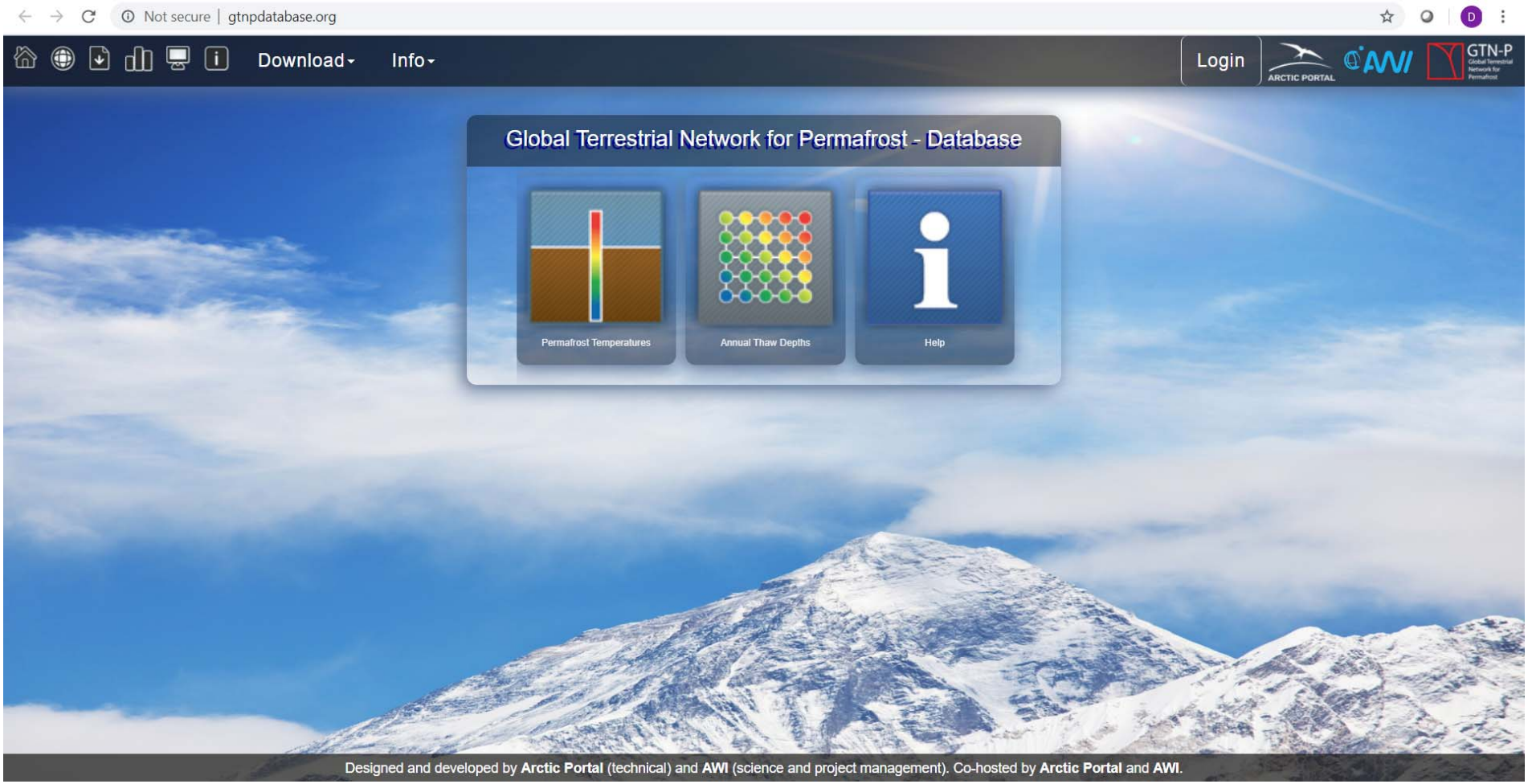


Info

Home > Boreholes

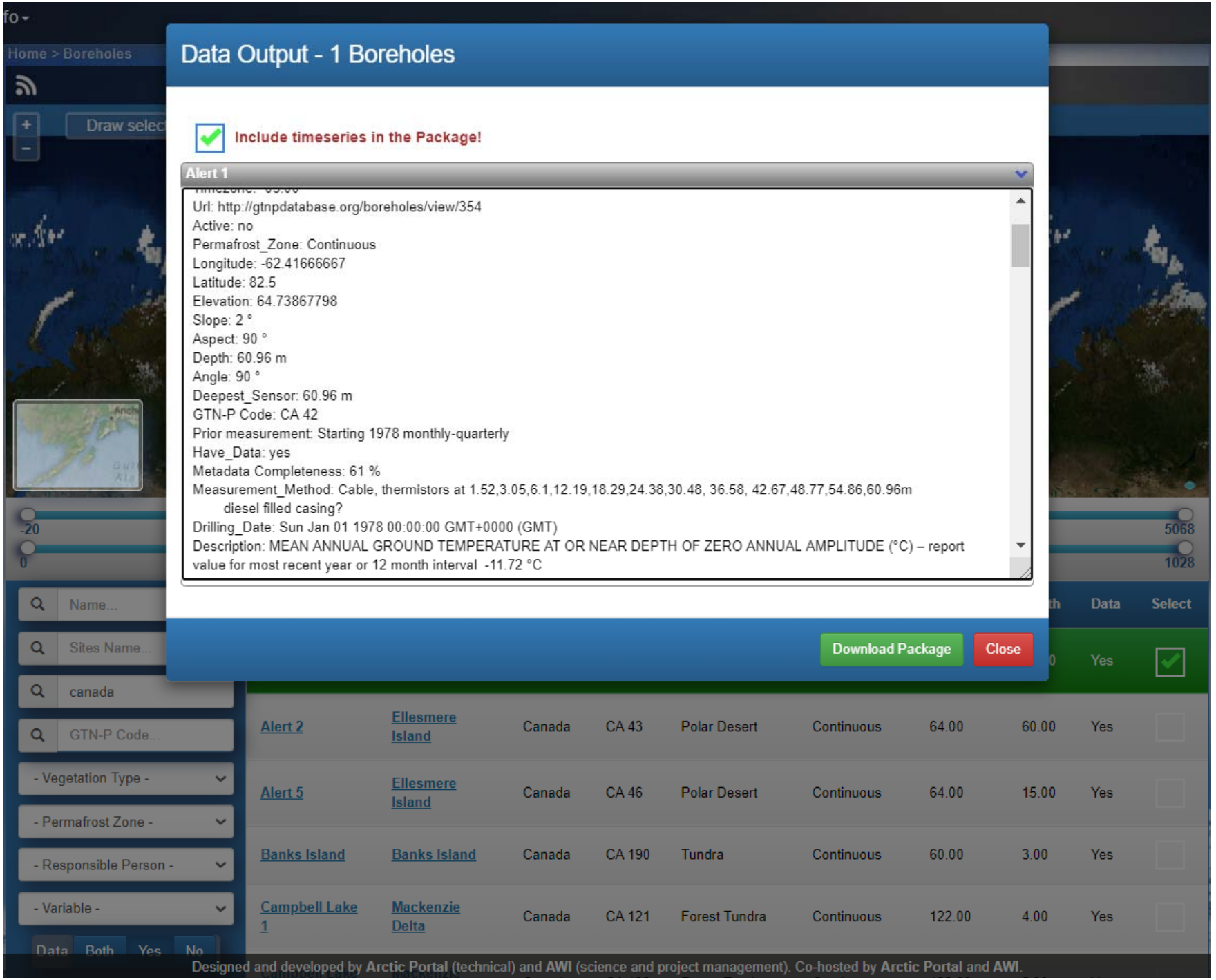
Boreholes - Permafrost Temperatures

-20 Elevation Range (m) 5068

0 Depth Range (m) 1028

Name...
Sites Name...
Country Name...
GTN-P Code...
- Vegetation Type -
- Permafrost Zone -
- Responsible Person -
- Variable -
Data Both Yes No

Name	Site	Country	Gtn-P	Vegetation	Permafrost	Elevation	Depth	Data	Select
0 (Deputatsky)	Deputatskiy	Russia	RU 118	Shrub Tundra	Continuous	462.00	88.00	No	
01TC1	Yukon	Canada	CA 196	Grassland	Continuous	18.00	8.00	No	
01TC2	Yukon	Canada	CA 197	Grassland	Continuous	95.00	10.00	No	
03TC1	Yukon	Canada	CA 195	Grassland	Discontinuous	3.00	6.00	No	
08 (Deputatsky)	Deputatskiy	Russia	RU 119	Forest Tundra	Continuous	473.00	96.00	No	


Home > Boreholes
Data Output - 1 Boreholes
Include timeseries in the Package!
Alert 1
Url: http://gtnpdatabase.org/boreholes/view/354
Active: no
Permafrost_Zone: Continuous
Longitude: -62.41666667
Latitude: 82.5
Elevation: 64.73867798
Slope: 2 °
Aspect: 90 °
Depth: 60.96 m
Angle: 90 °
Deepest_Sensor: 60.96 m
GTN-P Code: CA 42
Prior measurement: Starting 1978 monthly-quarterly
Have_Data: yes
Metadata Completeness: 61 %
Measurement_Method: Cable, thermistors at 1.52,3.05,6.1,12.19,18.29,24.38,30.48, 36.58, 42.67,48.77,54.86,60.96m
diesel filled casing?
Drilling_Date: Sun Jan 01 1978 00:00:00 GMT+0000 (GMT)
Description: MEAN ANNUAL GROUND TEMPERATURE AT OR NEAR DEPTH OF ZERO ANNUAL AMPLITUDE (°C) – report value for most recent year or 12 month interval -11.72 °C
Download Package
Close
Draw select
-20
0
5068
1028
Name...
Sites Name...
canada
GTN-P Code...
- Vegetation Type -
- Permafrost Zone -
- Responsible Person -
- Variable -
Data
Both
Yes
No
Data
Select
Yes
Alert 2
Ellesmere Island
Canada
CA 43
Polar Desert
Continuous
64.00
60.00
Yes
Alert 5
Ellesmere Island
Canada
CA 46
Polar Desert
Continuous
64.00
15.00
Yes
Banks Island
Banks Island
Canada
CA 190
Tundra
Continuous
60.00
3.00
Yes
Campbell Lake 1
Mackenzie Delta
Canada
CA 121
Forest Tundra
Continuous
122.00
4.00
Yes
Designed and developed by Arctic Portal (technical) and AWI (science and project management). Co-hosted by Arctic Portal and AWI.

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Compressed Folder Tools | Boreholes-354_with_timeseries

re | View | Extract

This PC > Downloads > Boreholes-354_with_timeseries

Name	Type	Compressed size	Password p...	Size	Ratio	Date modified
Borehole_354-Alert_1.metadata	Text Document	2 KB	No	5 KB	62%	5/11/2017 11:18 AM
Borehole_354-Alert_1-Dataset_2076-Average-Annually-Ground_Temp...	Microsoft Excel Comma S...	1 KB	No	1 KB	81%	5/11/2017 11:18 AM
GTNP_Citation_TSP	Text Document	1 KB	No	2 KB	46%	5/11/2017 11:17 AM
GTNP_ISO_19115_2	XML Document	3 KB	No	14 KB	80%	5/11/2017 11:17 AM

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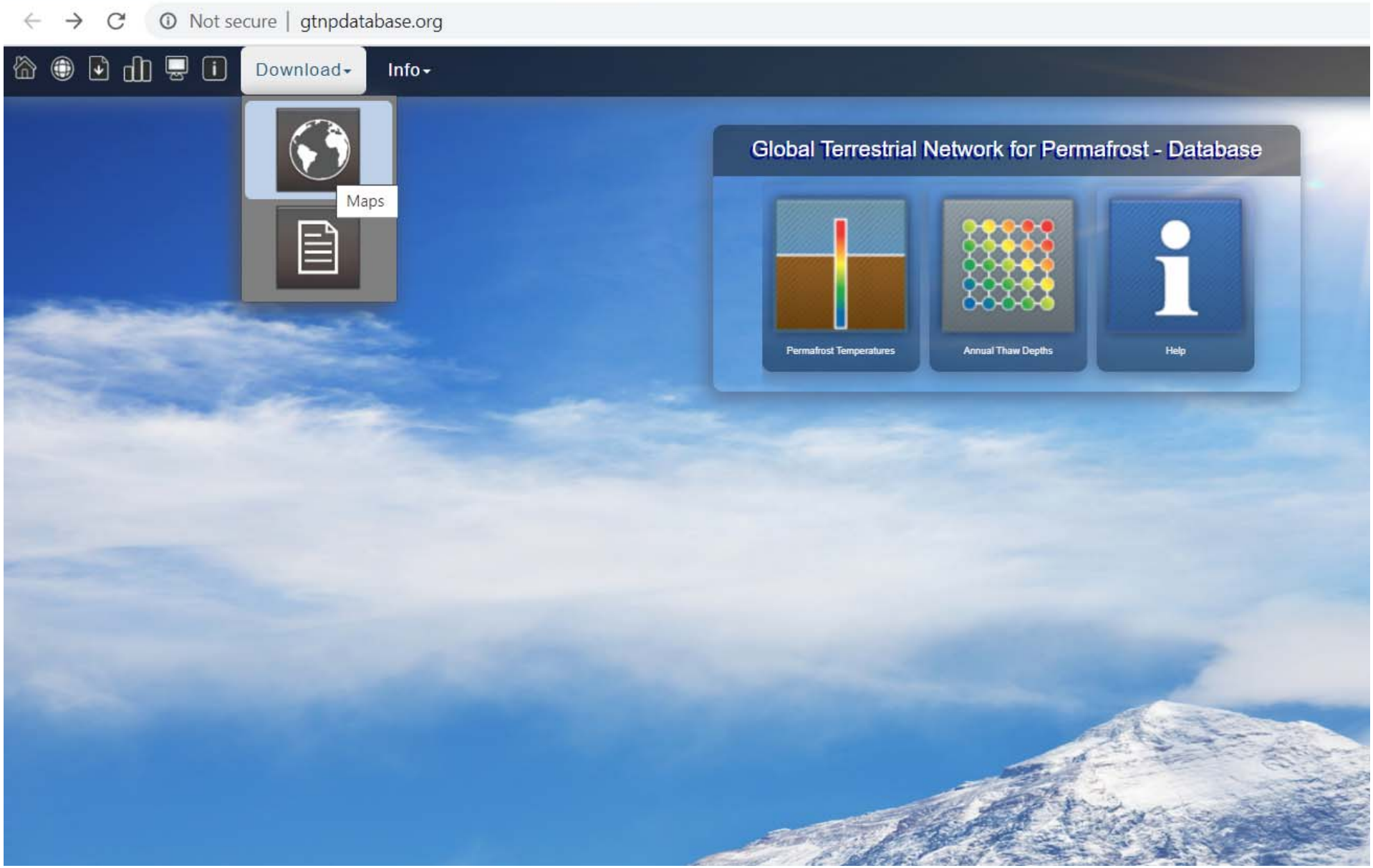
Global Terrestrial Network for Permafrost



Download Options

GTN-P Global Terrestrial Network for Permafrost

Download KML (Google Earth layer)

By clicking on the single points, an information window opens displaying active layer measuring site name, code, site name, permafrost zone, and spatial location. The link "Responsible person" opens a window in Google Earth displaying the citation of the specific site including responsible person(s), institution, and contact information. The link "More information" opens a window in Google Earth which is directly linked to the GTN-P database displaying the whole information of the site and appendent data.

Download shapefiles (GIS layer)

The shapefiles can be opened in (Q)GIS and show the distribution of all active layer measuring sites contained in the database in the WGS 84 projection. The attribute table contains information on country, latitude and longitude.

Download CSV (Comma Separated Values)

Contains information on all active layer measuring sites (name, ID, country, permafrost zone, spatial location, and responsible person).

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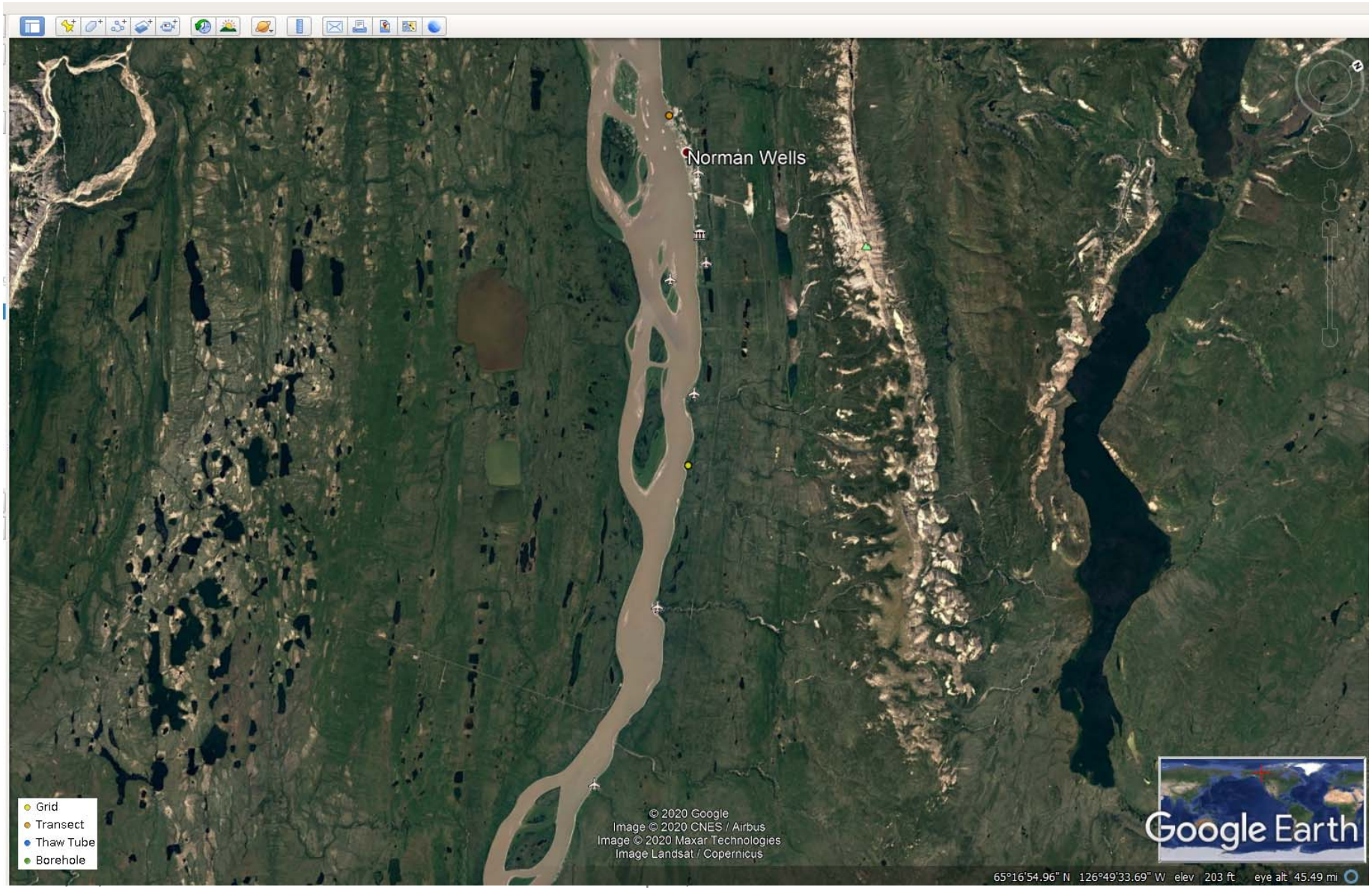
Global Terrestrial Network for Permafrost



Pump Station

General Information

Created: 2014-01-30 09:01:24
Modified: 2014-01-30 09:02:18

Active:	No
Country:	Canada
Site:	Mackenzie River
CALM-Code:	C10
Responsible Countries:	Canada,
Timezone:	UTC/GMT -07:00 hours
Vegetation Type:	Coniferous Forest
Responsible Person:	Charles Tarnocai
Type:	Transect
Nodes:	7
Transect Length:	7
Offset:	1 m

Active-Layer Thickness is inferred from ground temperature profile measurements at 2.5, 5.0, 10.0, 20.0, 50.0, 100.0 and 120.0 cm depth. The ALT values are presented in summary table. The dataset also include soil temperature data for 01/01/1989 - 10/09/1996 period. For details on site description and instrumentation contact site investigator directly.

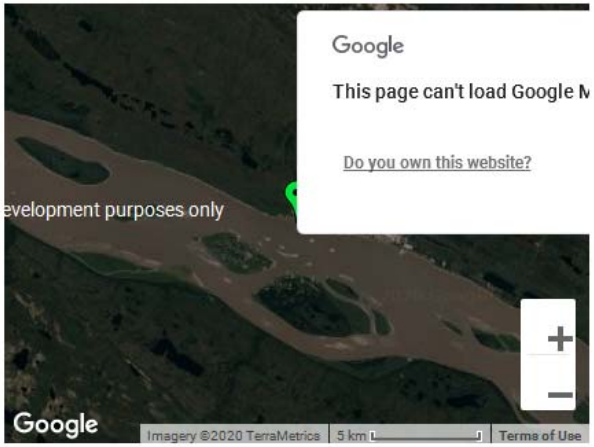
Accessibility | **Disturbance**

Data | **Citation** | **Links**

Slope:	1 °
Aspect:	317
Permafrost Zone:	Discontinuous
Vegetation:	Open black spruce forest
Lithology:	Histic Regosolic Turbic Cryosol Lacustrine material, silt loam texture, imperfectly drained clay loam (38 cm)
Morphology:	Blanket, ground pattern: earth hummocks
Description:	General description of soil moisture Moist

Gallery

Map



Longitude:	-126.8833 °
Latitude:	65.2833 °
Elevation:	60 m
EPSG:	4326

Meta Data Completeness

Percentage of information fields provided for this monitoring site!

71%

Download

Data Management System

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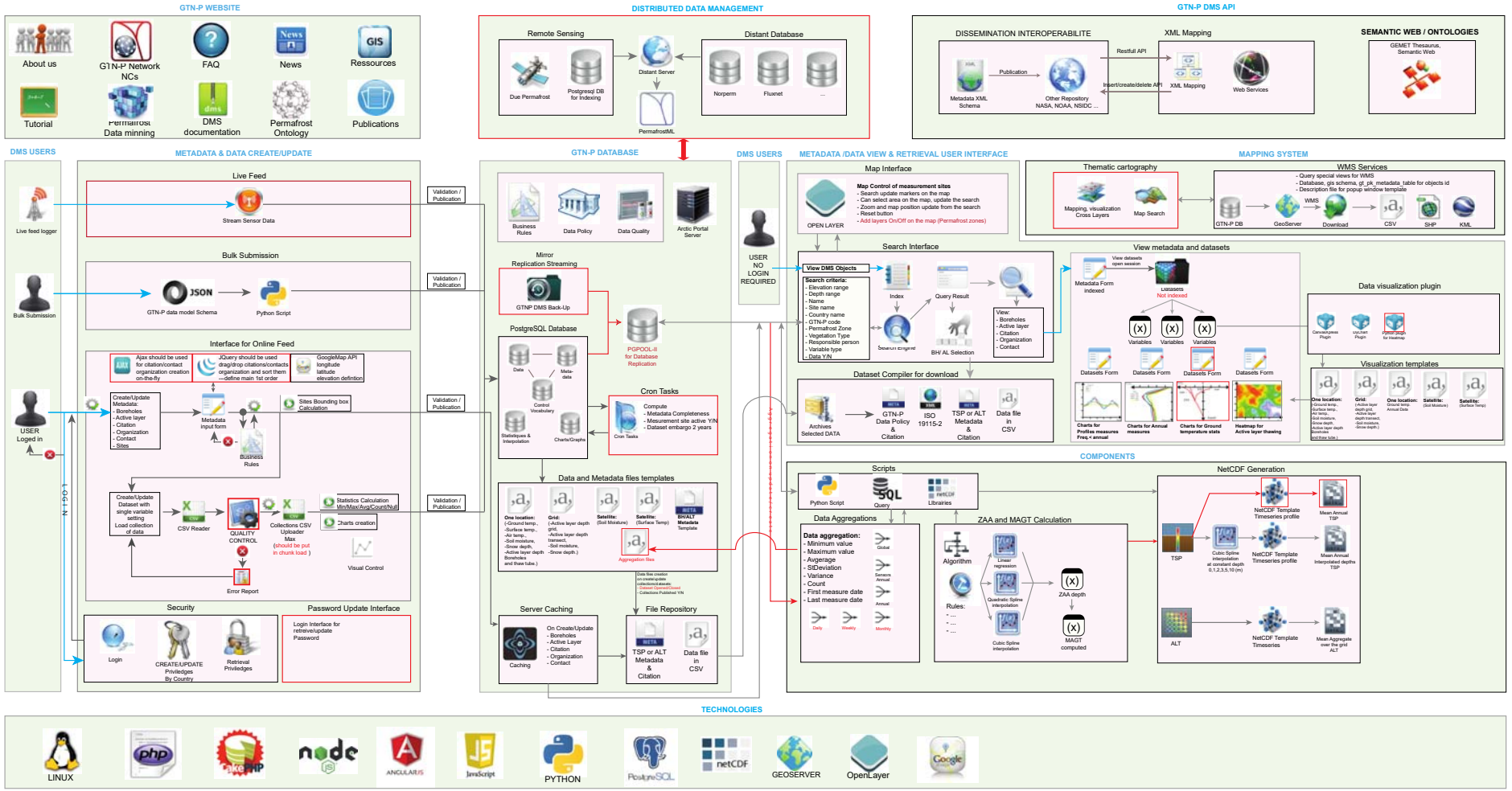
ARCTIC PORTAL



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Metadata and data quality

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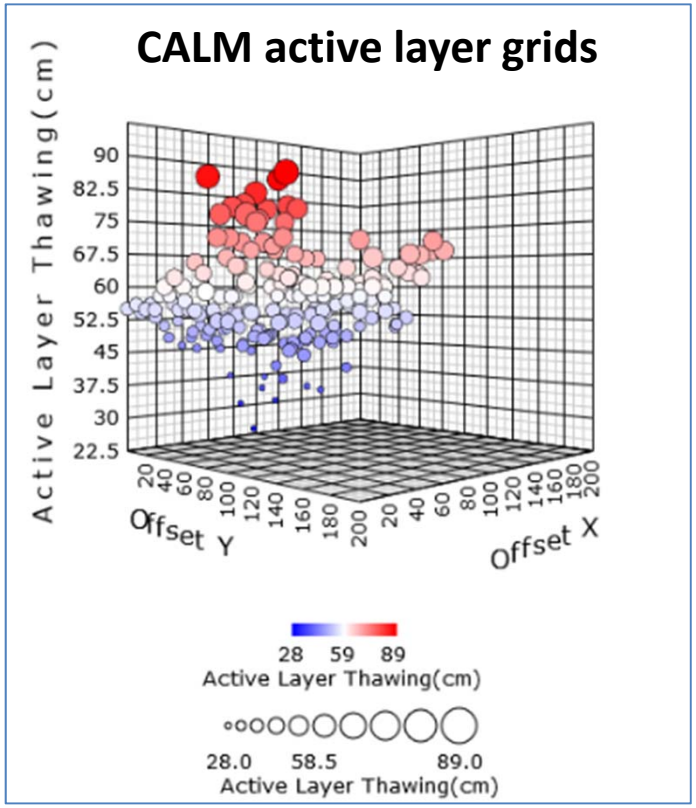
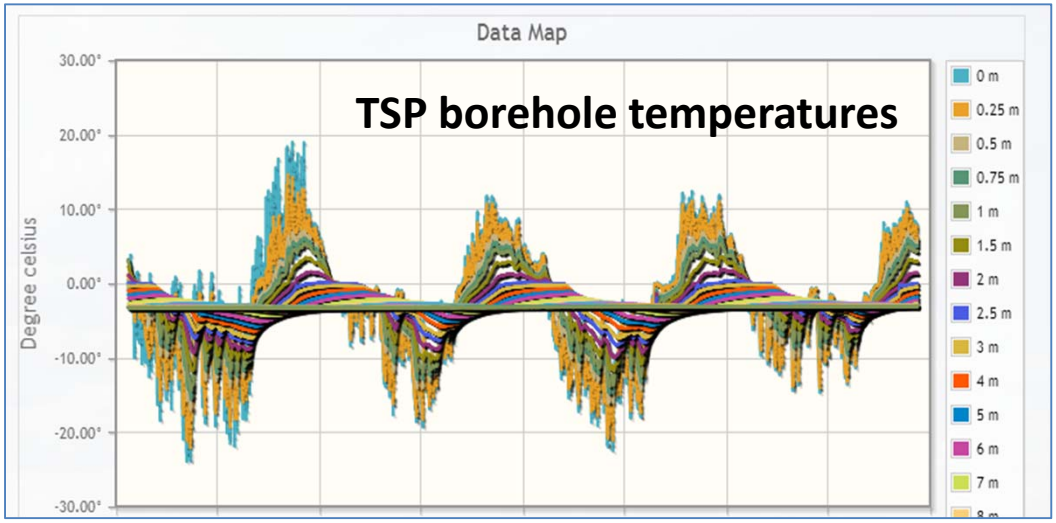
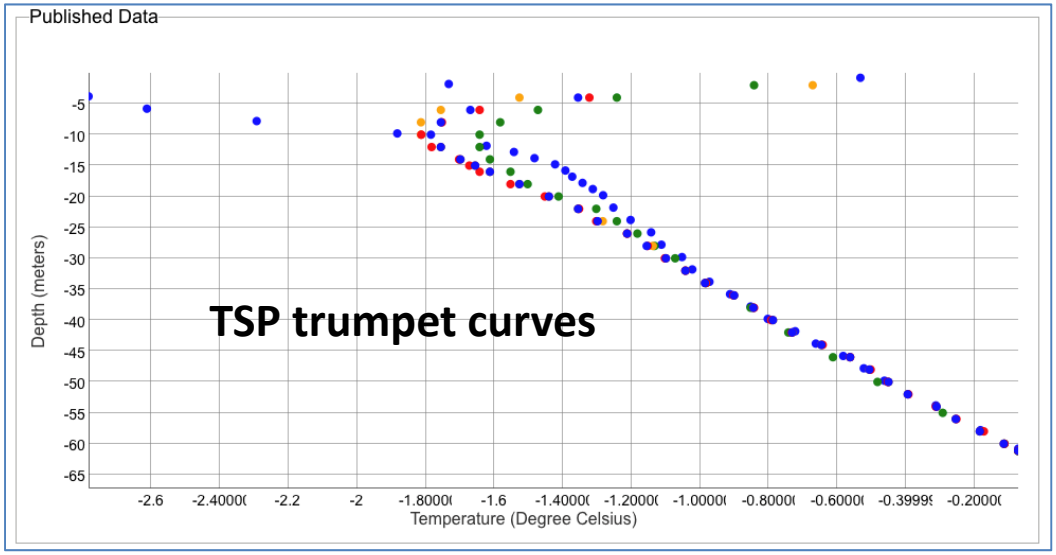
Automated visualisation





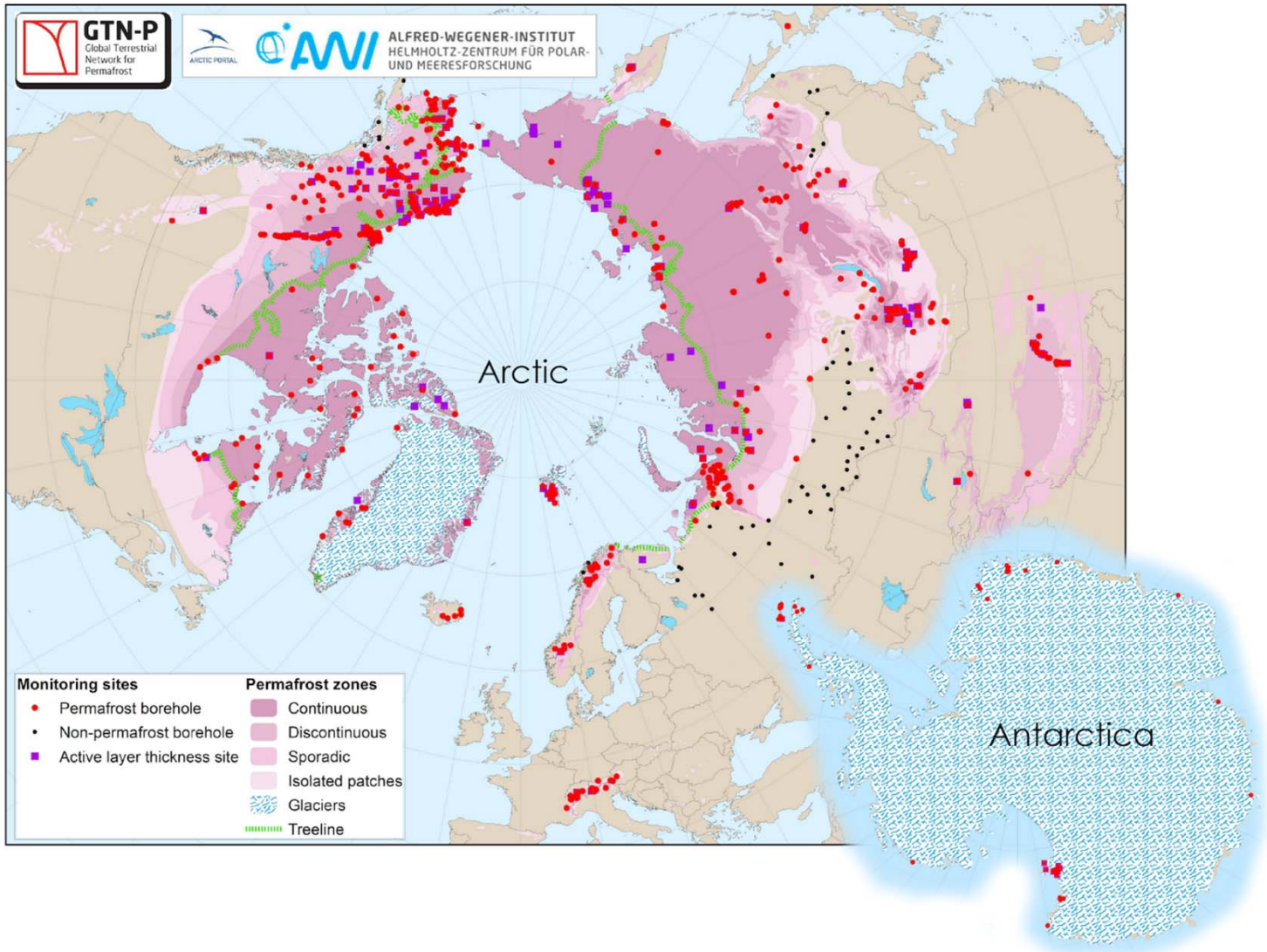


Global Terrestrial Network for Permafrost

1350 boreholes
249 active layer sites
5 Million data points

Supporters

PAGE21
AWI
ARCTIC PORTAL
IPA
WMO
GCOS
IASC
NSIDC
National Snow and Ice Data Center



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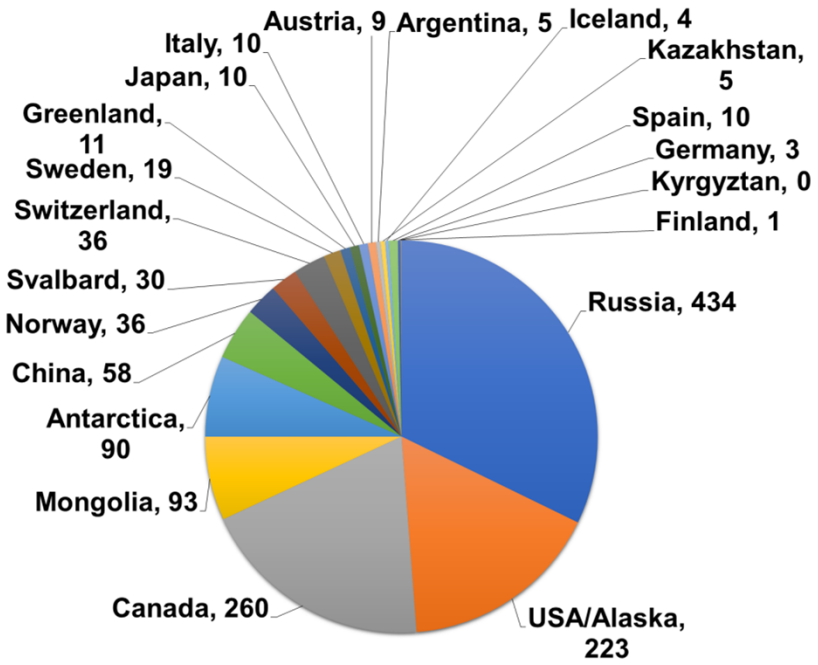
Data Management System for transfering **permafrost temperature** and **active layer thickness** to **global models**

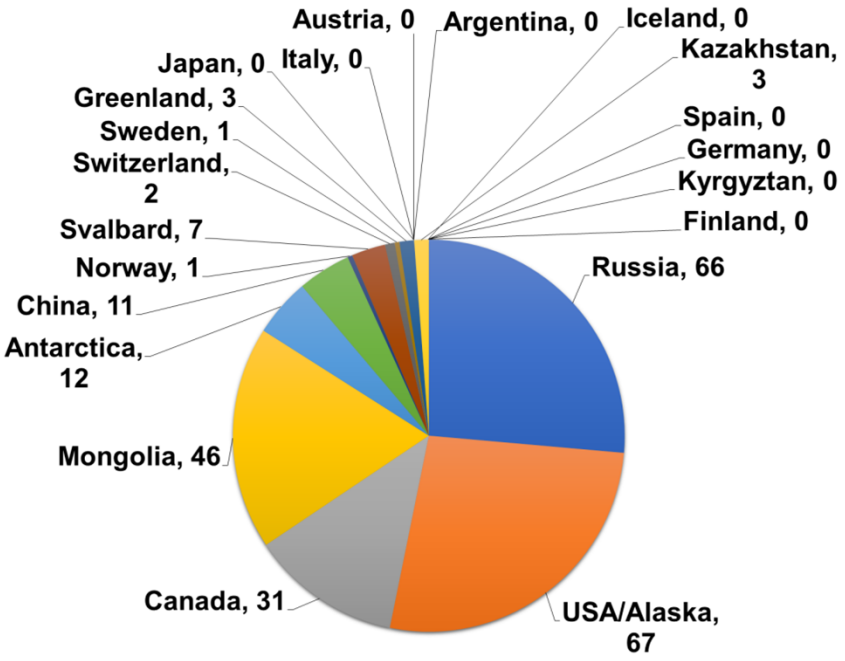
Distribution of GTN-P sites by country

GTN-P Global Terrestrial Network for Permafrost

TSP Sites



ALT Sites

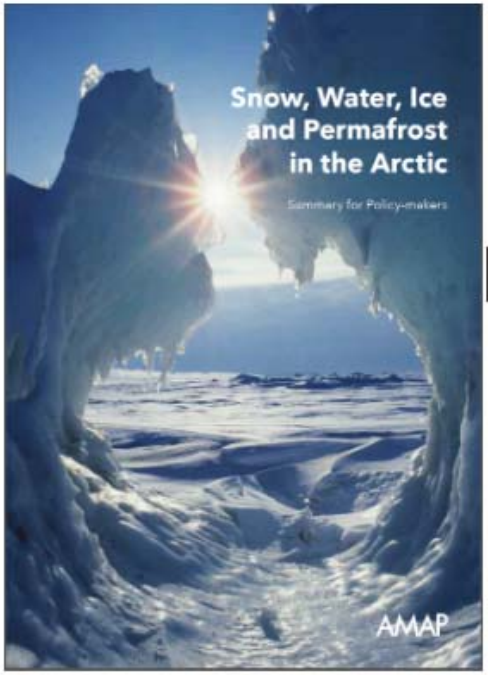


GTN-P: Summary 01/01/15 - 01/01/20

	gtnp.arcticportal.org	gtnpdatabase.org
Users	23038	11630
Sessions	34765	18156
New users, %	84.5	88.2
Returning users, %	15.5	11.8
Page views	85323	137078
Avg. Session dur., min	02:02	06:34
Countries	USA [26.53%]	USA [20.31%]
	Germany [11.58%]	France [9.29%]
	China [8.25%]	Germany [8.42%]
	Canada [6.66%]	Canada [7.88%]
	France [5.37%]	Russia [5.53%]

GTN-P Products

GTN-P
Global Terrestrial Network for Permafrost



ARCTIC PROGRAM

The Cryosphere Discussions — Open Access — EGU

AGU ADVANCING EARTH AND SPACE SCIENCE

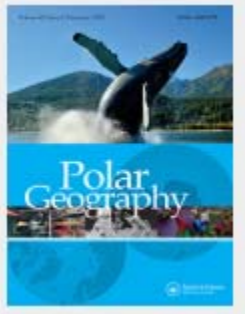
Environmental Research Letters

remote sensing

Permafrost and Periglacial Processes

IPA

Cold Regions Science and Technology



Permafrost Temperature Publication

GTN-P Global Terrestrial Network for Permafrost

nature communications

Article | Open Access | Published: 16 January 2019

Permafrost is warming at a global scale

Boris K. Biskaborn, Sharon L. Smith, Jeannette Noetzli, Heidrun Matthes, Gonçalo Vieira, Dmitry A. Streletskiy, Philippe Schoeneich, Vladimir E. Romanovsky, Antoni G. Lewkowicz, Andrey Abramov, Michel Allard, Julia Boike, William L. Cable, Hanne H. Christiansen, Reynald Delaloye, Bernhard Diekmann, Dmitry Drozdov, Bernd Etzelmüller, Guido Grosse, Mauro Guglielmin, Thomas Ingeman-Nielsen, Ketil Isaksen, Mamoru Ishikawa, Margareta Johansson, Halldor Johannsson, Anseok Joo, Dmitry Kaverin, Alexander Kholodov, Pavel Konstantinov, Tim Kröger, Christophe Lambiel, Jean-Pierre Lanckman, Dongliang Luo, Galina Malkova, Ian Meiklejohn, Natalia Moskalenko, Marc Oliva, Marcia Phillips, Miguel Ramos, A. Britta K. Sannel, Dmitrii Sergeev, Cathy Seybold, Pavel Skryabin, Alexander Vasiliev, Qingbai Wu, Kenji Yoshikawa, Mikhail Zheleznyak & Hugues Lantuit - Show fewer authors

Nature Communications **10**, Article number: 264 (2019) | Cite this article

25k Accesses | **84** Citations | **642** Altmetric | Metrics

CALM V (2019-2024)

GTN-P
Global Terrestrial Network for Permafrost

Welcome to the web site for the Circumpolar Active Layer Monitoring Network-CALM: *Long-Term Observations of the Climate-Active Layer-Permafrost System*.

The primary goal of the Circumpolar Active Layer Monitoring (CALM) program is to observe the response of the active layer and near-surface permafrost to climate change over long (multi-decadal) time scales. The CALM observational network, established in the 1990s, observes the long-term response of the active layer and near-surface permafrost to changes and variations in climate at more than 200 sites in both hemispheres. CALM currently has participants from 15 countries. Majority of sites measure active-layer thickness on grids ranging from 1 ha to 1 km^2, and observe soil temperatures. Most sites in the CALM network are located in Arctic and Subarctic lowlands. Southern Hemisphere component (CALM-South) is being organized and currently includes sites in Antarctic and South America. The broader impacts of this project are derived from the hypothesis that widespread, systematic changes in the thickness of the active layer could have profound effects on the flux of greenhouse gases, on the human infrastructure in cold regions, and on landscape processes. It is therefore critical that observational and analytical procedures continue over decadal periods to assess trends and detect cumulative, long-term changes.

5

Please consider joining CALM network!

www2.gwu.edu/~calm/data/north.htm

Site Code	Site Name	LAT	LONG	Method	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
U51	Eagle	64.7777 N	141.10954 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	65	63	52	41	51	-	63	-	-	-
U52	Allakaket	66.54491 N	152.64539 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45	60	49	34	55	-	-	-	-	inactive
U53	Ruby	64.73486 N	155.48461 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53	63	66	64	66	-	-	-	-	inactive
U54	Nome Creek	65.36988 N	147.0609 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46	50	-	43	43	47	53	-	-	-
U55	Arctic Village	68.13013 N	145.540066 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	69	69	62	65	-	55	-	-	-
U56	Venetie	67.03829 N	146.40263 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	72	45	66	-	-	-	-	-	inactive
U57	Nenana	64.55446 N	149.08339 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	59	60	60	65	59	67	-	-	-
U58	Dot Lake	63.67475 N	144.14597 W		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64	49	68	57	-	-	-	-	-	inactive
Alaska Seward Peninsula																																		
Site Code	Site Name	Location LAT	Location LONG	Method	SITE AVERAGES OF THE ANNUAL END-OF-SEASON THAW DEPTH (cm) 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
U27	Council Grid	64° 50' N	163° 42' W	1000	-	-	-	-	-	-	-	-	-	73	53	71	53	59	-	76	-	-	75	63	65	71	57	55	60	68	75	64	69	85
U28	Kougarok	65° 27' N	164° 37' W	1000	-	-	-	-	-	-	-	-	-	65	47	56	52	54	-	75	-	-	62	61	64	68	56	58	58	57	58	63	61	70
CANADA																																		
Site Code	Site Name	Location LAT	Location LONG	Method	SITE AVERAGES OF THE ANNUAL END-OF-SEASON THAW DEPTH (cm) 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
C1	Alexandria Fiord	78° 53' N	75° 55' W	100	-	-	-	-	-	43	49	-	-	57	62	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C3 A	North Head (thaw tube)	69°43'11" N	134°27'43" W	TT	-	61	62	63	64	62	60	<66	70	66	59	62	60	59	-	-	-	64	63	-	-	-	-	-	-	56	57	-	61	-
C3 B	North Head (grid)	69°43'11" N	134°27'43" W	100	-	-	-	-	-	-	-	-	52	52	43	43	44	45	50	40	52	48	50	44	-	50	-	42	-	-	-	-	-	inactive
C4 A	Taglu (Thaw tube)	69°22' 9" N	134°56'55" W	TT/T/B30	-	-	111	<119	118	>124	112	118	>148	>132	-	117	110	124	119	101	129	132	114	138	-	171	-	-	-	-	-	-	-	inactive
C4 B	Taglu (grid)	69°22' 9" N	134°56'55" W	100	-	-	-	-	-	-	-	-	104	110	109	100	100	96	99	80	96	94	91	86	94	94	91	85	-	-	-	-	-	inactive
C5 A	Lousy Point (Thaw tube)	69°13' 8" N	134°17'28" W	TT/T/B30	-	81	78	80	86	85	75	<89	91	84	64	70	64	73	68	68	77	73	68	67	74	72	83	78	81	82	77	83	73	-
C5 B	Lousy Point (grid)	69°13' 8" N	134°17'28" W	100	-	-	-	-	-	-	-	-	64	62	52	53	54	53	55	49	61	55	59	55	-	-	63	51	-	-	-	-	-	inactive
C6	Parsons Lake	68° 58' N	133° 33' W	T	79	80	85	84	91	89	84	90	80	75	78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C7 A	Reindeer Depot (Thaw tube)	68°41' 5" N	134° 8'45" W	TT	-	-	127	129	132	136	134	135	140	137	134	136	123	129	122	115	134	128	131	129	137	138	154	150	144	146	151	145	146	-
C7 B	Reindeer Depot (grid)	68°41' 5" N	134° 8'45" W	100	-	-	-	-	-	-	-	-	-	-	113	117	108	101	-	104	121	109	111	-	-	-	-	-	-	-	-	-	-	inactive
C8 A	Rengleng River (Thaw tube)	67°47'42" N	134° 7'34" W	TT	-	-	102	106	111	111	108	110	116	111	110	108	108	105	107	103	115	113	110	-	-	-	-	-	-	111	112	112	102	-
C8 B	Rengleng River (grid)	67°47'42" N	134° 7'34" W	100	-	-	-	-	-	-	-	-	82	78	80	77	75	72	-	71	83	80	81	78	-	84	85	-	79	76	-	-	-	inactive
C9 A	Mountain River (Thaw tube)	65°40'25" N	128°49'45" W	TT	-	-	58	59	62	62	58	59	62	57	59	53	53	54	48	48	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C10	Pump Station	65° 17' N	126° 53' W	T/P	62	66	64	58	60	63	61	77	78	77	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C11 A	Norman Wells (Thaw tube)	65°11'35" N	126°28' 8" W	TT	-	-	64	63	61	61	59	59	66	64	64	66	64	60	60	61	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C11 B	Norman Wells (grid)	65°11'35" N	126°28' 8" W	100	-	-	-	-	-	-	-	-	50	49	45	45	47	41	39	46	48	47	50	-	-	-	-	-	-	-	-	-	-	inactive
C12	Great Bear River	64° 55' N	125° 35' W	T/P	71	72	72	72	69	69	63	69	87	86	86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C13	Ochre River	63°27'59" N	123°41'34" W	TT	-	-	-	<58	60	58	63	<65	66	65	65	64	64	64	58	62	66	67	-	-	-	-	69	-	72	-	-	70	-	-
C14 A	Willowlake River	62°41'48" N	123° 3'54" W	TT	-	-	-	79	83	84	90	87	89	91	82	86	88	86	80	82	89	88	-	-	90	-	91	-	89	-	91	-	102	-
C14 B	Willowlake River	62°41'48" N	123° 3'54" W	100	-	-	-	-	-	-	-	-	-	-	-	74	78	72	73	78	88	87	88	84	-	87	-	83	-	-	-	-	-	inactive
C15 A	Fort Simpson	61°53'16" N	121°36' 6" W	TT/T	-	-	-	95	106	123	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C15 B	Fort Simpson	61°53'16" N	121°36' 6" W	100	-	-	-	-	-	-	-	-	-	76	85	84	82	76	77	91	93	99	98	88	-	104	-	96	-	101	-	-	-	inactive
C16	Lake Hazen; Ellesmere Island	81° 49' N	71° 23' W	T	-	-	-	-	47	51	47	46	52	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C17	Sheldrake River	56° 38' N	76° 06' W	T	121	134	107	131	134	-	154	157	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C18	Tanquary Fiord; Ellesmere Island	81° 24.043' N	76° 42.562' W	100/T	-	-	-	-	-	-	-	-	-	57	54	57	56	59	58	59	60	59	56	61	58	66	66	58	56	63	67	62	50	-
C19	Eureka; Ellesmere Island	80° 01' N	85° 45' W	1000	-	-	-	-	-	-	-	52	53	-	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C20	Baker Lake	64° 10' N	95° 30' W	T/B3	-	-	-	-	-	-	-	120	170	174	189	193	-	-	178	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C21	Marmot Mountain	52° 48' N	118° 07' W	T	336	352	362	220	354	272	240	192	-	342	96	152	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	inactive
C22	Dawson	63.94054 N	138.59157 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	32	39	45	37	52	-	-	-	-	inactive
C23	Teslin	60.44943 N	133.52016 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	46	53	52	58	65	-	-	-	-	inactive
C24	Beaver Creek	62.3377 N	140.83835 W	50/P/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42	48	42	52	54	-	-	-	-	inactive
C25	Ukkusiksalik National Park	65° 52.685' N	89° 22.030' W	100/TT/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	-	52	43	-	-
C26	Borden Peninsula, Sirmilik NP	73° 00.324' N	80° 41.235' W	100/TT/T														-	-	-	-	-	-	-	-	62	65	43	51	50	54	40	46[2]	-[3]
C27	Owl River, Auyuittuq NP	66° 52.759' N	64° 41.837' W	100/TT/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	29	36	35	26	28	26	33	25	-	-
C28	Baylot Island, Sirmilik NP	72° 48.643' N	79° 19.757' W	100/TT/T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53	-	50	50	49	46	45	51	35	49[4]	-[5]
Russia																																		
Russian European north																																		
Site Code	Site Name	Location LAT	Location LONG	Method	SITE AVERAGES OF THE ANNUAL END-OF-SEASON THAW DEPTH (cm) 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
R2	Ayach-Yakha, Vorkuta	67° 35' N	64° 11' E	100/T	-	-	-	-	-	-	70	63	65	64	69	73	76	77	78	81	84	89	87	86	89	88	91	93	91	90	92	80	85	86
R23	Talnik	67° 20' N	63° 44' E	100	-	-	-	-	-	-	-	-	76	91	111	111	110	113	125	131	137	138	152	144	138	144	161	156	-	150	169	155	158	167
R24	Bolvansky	68° 18' N	54° 30' E	100	-	-	-	-	-	-	-	-	-	89	106	106	104	113	120	115	114	125	124	112	104	107	>135[6]	117	102	110	111	88	110	104
R24 A	Kashin Island	[illegible]	[illegible]	[illegible]																					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

https://www2.gwu.edu/~calm/data/webforms/c18_f.html

Latest Updates

- Call for new members of SC
- Major ALT data update in DMS
- Planning NC Workshop and Session at RCOP
- Development of Monitoring Standards with GCW, GCOS and GTOS
- More at information at the Strategy and Implementation Plan 2016-2020: http://library.arcticportal.org/1938/

- AOS Poster with GTN-P highlights is here
- https://gtnp.arcticportal.org/images/GTNP_Introduction/gtn-p_AOS_streletskiy_2020.pdf