



Pre-ABOVE: Vegetation, NDVI, Snow and Thaw Depths, in North Slope, Alaska and NWT, CA

Get Data

Documentation Revision Date: 2017-09-14

Data Set Version: 1

Summary

This dataset includes vegetation cover maps, Normalized Difference Vegetation Index (NDVI) maps, snow depth and thaw depth data that were obtained as part of a biocomplexity project on the North Slope of Alaska, USA, and the Northwest Territories (NWT), Canada. In Alaska, seven sites are located along the Dalton Highway and in the Prudhoe Bay Oilfield area, forming a transect across the climate gradient of the North Slope. From South to North, the sites are Happy Valley, Sagwon (an acidic and nonacidic site), Franklin Bluffs, Deadhorse, West Dock and Howe Island. Four sites are in the NWT, forming a latitudinal gradient from South to North; the sites include Inuvik, Green Cabin, Mould Bay, and Isachsen.

At each site, permanent 10 x 10 m grids were established for repeated long-term measurements. Snow depth and thaw depth measurements started at selected Alaska sites in 2000, NWT sites in 2003, and continued at selected sites at varying intervals through 2006. In 2006, vegetation cover was mapped at the Alaska sites. In 2012, spectral measurements were acquired at the Alaska sites and NDVI was calculated. A table of study sites, that displays when the different measurements were collected, is included.

There are 50 data files with this dataset. This includes 21 shapefiles (compressed in .zip format) with vegetation and NDVI data, and 29 files with snow and thaw depth data in comma-separated (.csv) format.

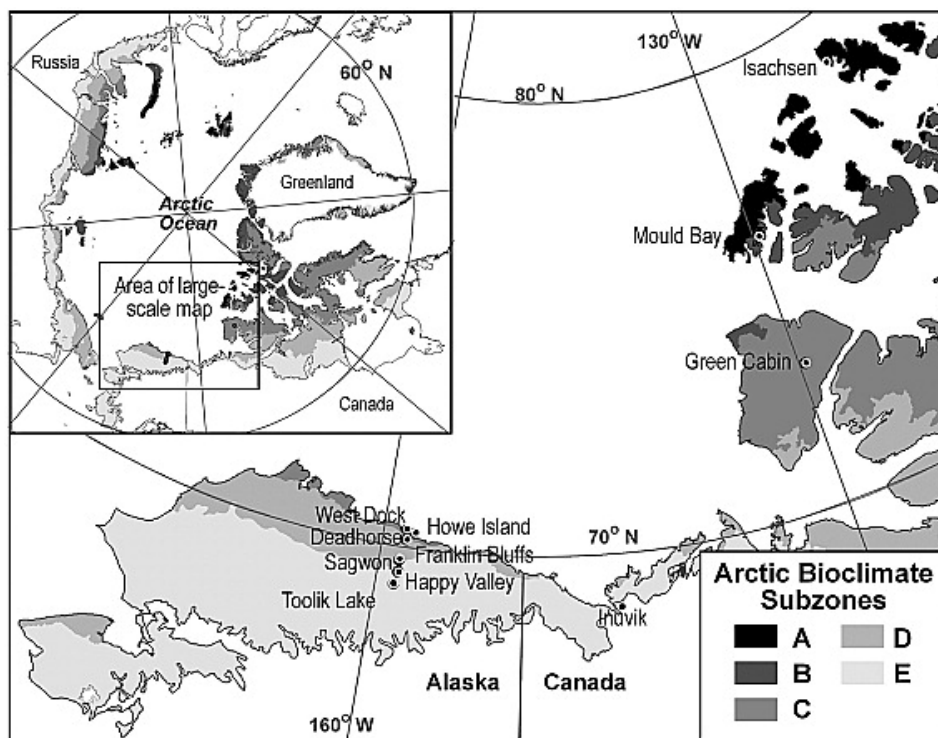


Figure 1. Locations of the study sites. Note that seven locations are indicated along Dalton Highway as there were two for Sagwon for acidic and nonacidic tundra areas (Walker et al., 2008).

Citation

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1. Data Set Overview

This dataset provides measurements obtained as part of a biocomplexity project on the North Slope of Alaska and the NWT, Canada. In Alaska, seven sites are located along the Dalton Highway and in the Prudhoe Bay Oilfield area, forming a transect across the climate gradient of the North Slope. From South to North, the sites are Happy Valley, Sagwon (an acidic and nonacidic site), Franklin Bluffs, Deadhorse, West Dock and Howe Island. Four sites are in the NWT, forming a latitudinal gradient from South to North; the sites include Inuvik, Green Cabin, Mould Bay, and Isachsen.

At each site, one to three permanent 10 x 10 m grids were established for repeated long-term measurements. Snow depth and thaw depth measurements started at selected Alaska sites in 2000, NWT sites in 2003, and continued at selected sites at varying intervals through 2006. In 2006, vegetation cover was mapped at the Alaska sites. In 2012, spectral measurements were acquired at the Alaska sites and NDVI was calculated. A table of study sites, that displays when the different measurements were collected, is included.

Project: Arctic-Boreal Vulnerability Experiment (ABOVE)

The [Arctic-Boreal Vulnerability Experiment](#) (ABOVE) is a NASA Terrestrial Ecology Program field campaign based in Alaska and western Canada between 2016 and 2021. Climate change in the Arctic and Boreal region is unfolding faster than anywhere else on Earth. ABOVE seeks a better understanding of the vulnerability and resilience of ecosystems and society to this changing environment.

Acknowledgements:

These data were obtained from the Alaska Arctic Geoecological Atlas (<http://agc.portal.gina.alaska.edu>), which provides access to existing Arctic vegetation plot and map data in support of the ABOVE campaign.

Related publications:

Barreda, J.E., J. Knudson, D.A. Walker, M. K. Reynolds, A. Kade, and C. Munger. 2006. Biocomplexity of Patterned Ground Data Report Dalton Highway, 2001-2005.

Buchhorn, M., D. A. Walker, B. Heim, M. K. Reynolds, H. E. Epstein, and M. Schwieder. 2013. Ground-based hyperspectral characterization of Alaska tundra vegetation along environmental gradients. *Remote Sensing* 5:3971-4005.

Kade, A. N., D. A. Walker, and M. K. Reynolds. 2005. Plant communities and soils in cryoturbated tundra along a climate gradient in the Low Arctic, Alaska. *Phytocoenologia* 35:761–820.

Reynolds, M. K., D. A. Walker, C. A. Munger, C. M. Vonlanthen, and A. N. Kade. 2008. A map analysis of patterned-ground along a North American Arctic transect. *Journal of Geophysical Research* 113:G03S03, doi:10.1029/2007JG000512.

Vonlanthen, C. M., D. A. Walker, M. K. Reynolds, A. N. Kade, H. P. Kuss, F. J. A. Daniels, and N. V. Matveyeva. 2008. Patterned-ground plant communities along a bioclimate gradient in the High Arctic, Canada. *Phytocoenologia* 38:23-63.

Walker, D. A., H. E. Epstein, V. E. Romanovsky, C.-L. Ping, G. J. Michaelsen, R. P. Daanen, Y. Shur, R. A. Peterson, W. B. Krantz, M. K. Reynolds, W. A. Gould, G. Gonzalez, D. J. Nicolsky, C. M. Vonlanthen, A. N. Kade, H. P. Kuss, A. M. Kelley, C. A. Munger, C. T. Tarnocai, N. V. Matveeva, and F. J. A. Daniels. 2008. Arctic patterned-ground ecosystems: A synthesis of studies along a North American Arctic Transect. *Journal of Geophysical Research - Biogeosciences* 113:G03S01. doi:10.1029/2007JG000504

2. Data Characteristics

Spatial Coverage: Seven sites on the North Slope of Alaska along the Dalton Highway and in the Prudhoe Bay Oilfield area and four sites in the NWT, Canada. See Figure 2.

ABOVE Grid Locations:

Domain: Core ABOVE

State/territory: Alaska and NWT, Canada

Grid cells: Ah1Av0Bh2Bv2; Ah1Av0Bh4Bv5; Ah2Av0Bh3Bv2; Ah2Av0Bh3Bv4; Ah2Av0Bh5Bv1

Region: Northern Alaska and the NWT

Spatial Resolution: 10 x 10 m plots and point measurements

Temporal Coverage: Snow depth and thaw depth measurements started at selected Alaska sites in 2000, NWT sites in 2003, and continued at selected sites at varying intervals through 2006. In 2006, vegetation cover was mapped at the Alaska sites. In 2012, spectral measurements were acquired at the Alaska sites and NDVI was calculated

Temporal Resolution: Varied

Study Area (These coordinates are the approximate locations of the study sites and may not match the extents of data files. All latitude and longitude given in decimal degrees.)

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Seven sites along the Dalton Highway, North Slope, Alaska	-148.85222	-147.99336	70.37475	69.14678
Four sites in the NWT, Canada	-133.73056	-103.55078	78.78565	68.36167

Data file information

This dataset provides 21 compressed shapefiles (.zip) with vegetation and NDVI data for seven sites in Alaska, and 29 comma-separated files (.csv) with snow and thaw depth data for those seven sites as well as four sites in the NWT. Measurements were made on one to three grids established at each site.

All vegetation and NDVI shapefile data are also provided as a companion files in .kmz format for viewing in Google Earth.

Table 1. List of study sites and year range when each measurement type was collected or 'Not collected'.

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	Snow Depth	Thaw Depth	Vegetation Mapping	NDVI
Alaska				
Happy Valley	2002-2006	2001-2002, 2006	2006	2012
Sagwon - acidic	2001-2005	2000-2002	2006	2012
Sagwon - nonacidic	2001-2005	2001-2002, 2006	2006	2012
Franklin Bluffs	2001-2006	2001-2002, 2006	2006	2012
Deadhorse	2001-2005	2000-2006	2006	2012
West Dock	2000-2005	2000-2006	2006	2012
Howe Island	2003-2005	2001-2006	2006	2012
Northwest Territories				
Inuvik	Not collected	2004, 2006	Not collected	Not collected
Green Cabin	Not collected	2003, 2006	Not collected	Not collected
Mould Bay	2006	2004, 2006	Not collected	Not collected
Isachsen	2006	2005-2006	Not collected	Not collected

Table 2: Data file names and descriptions.

From South to North, the sites are Happy Valley, Sagwon (two sites), Franklin Bluffs, Deadhorse, West Dock, Howe Island, Inuvik (NWT), Green Cabin (NWT), Mould Bay (NWT), and Isachsen (NWT).

Vegetation and NDVI Data Files	Descriptions
happy_valley_X_vegetation.shp	There are three vegetation maps for Happy Valley in shapefile (.shp) format provided in compressed (*.zip) files. There were three 10 x 10 m grids along a hill-slope where X denotes the location of the grid on the slope: hillcrest -on the crest of the hill (grid G3-dry), midslope -on the mid-slope (grid G2-mesic), and toeslope -on the toe slope (grid G1-wet) (three individual files)
happy_valley_X_ndvi.shp	There are three NDVI maps for Happy Valley in shapefile (.shp) format provided in compressed (*.zip) files. There were three 10 x 10 m grids along a hill-slope where X in the file names denotes the location of the grid on the slope: hillcrest -on the crest of the hill (grid G3-dry), midslope -on the mid-slope (grid G2-mesic), and toeslope -on the toe slope (grid G1-wet) (three individual files)
sagwon_X_vegetation.shp	There are two vegetation maps for Sagwon in shapefile (.shp) format provided in compressed (*.zip) files; one file for an acidic tundra site and one file for a nonacidic site tundra site (two individual files). There was one grid at the acidic site and two grids at the nonacidic site
sagwon_X_ndvi.shp	There are two NDVI maps for Sagwon in shapefile (.shp) format provided in compressed (*.zip) files; one file for an acidic tundra site and one file for a nonacidic site tundra site (two individual files). There was one grid established at the acidic site and two grids at the nonacidic site
franklin_bluffs_X_vegetation.shp	There are three vegetation maps for Franklin Bluffs in shapefile (.shp) format provided in compressed (*.zip) files. There were three 10 x 10 m grids established where X in the file names denotes dry , moist , and wet (three individual files)
franklin_bluffs_X_ndvi.shp	There are three NDVI maps for Franklin Bluffs in shapefile (.shp) format provided in compressed (*.zip) files. There were three 10 x 10 m grids established where X in the file names denotes dry (grid 3), moist (grid 2), and wet (grid 1); three individual files for each area
deadhorse_vegetation.shp	A vegetation map in shapefile (.shp) format provided in a compressed (*.zip) file. There was only one grid established at Deadhorse
deadhorse_ndvi.shp	NDVI data in shapefile (.shp) format provided in a compressed (*.zip) file. There was only one grid established at Deadhorse
west_dock_vegetation.shp	A vegetation map in shapefile (.shp) format provided in a compressed (*.zip) file

howe_island_vegetation.shp	A vegetation map in shapefile (.shp) format provided in a compressed (*.zip) file.
Snow and Thaw Depth Files	Descriptions
Site_snowdepth_gridG#_Xm_YYYYDDMM	Snow depth measured at each site for each established grid. There were 1-3 grids per site (gridG#). Measurements were made every meter. YYYYDDMM is the sampling date or sampling date range YYYYMMDD-YYYYMMDD
Site_thawdepth_gridG#_Xm_YYYYDDMM	Thaw depth measured at each site for each established grid. There were 1-3 grids per site (gridG#). Measurements were made every meter or half meter (Xm=1m or half meter). YYYYDDMM is the sampling date or sampling date range YYYYMMDD-YYYYMMDD

Properties of the shapefiles

Table 3: Attributes of the shapefiles.

File Name	Attribute
All shapefiles with "ndvi" in the file name	<p>NDVI: NOTE: The NDVI remote data using band widths of 2-7 were not data from the remote sources listed, but were calculated based on the PSII data as though they were the band widths of the remote sources for comparative purposes only</p> <p>Tabelle1_1: NDVI from PSII field spectrometer Tabelle1_2: NDVI from GeoEye Tabelle1_3: NDVI from AVHRR Tabelle1_4: NDVI from Landsat 5 Tabelle1_5: NDVI from Landsat 7 Tabelle1_6: NDVI from MERIS Tabelle1_7: NDVI from MODIS</p>
happy_valley_hillcrest_vegetation.shp	<p>VEGTYPE:</p> <p>1 B1b - Barren 2 P1a – Prostrate dwarf-shrub, herb tundra with thin organic layer 3 P1b – Prostrate dwarf-shrub, herb tundra with thick moss and organic layer 7 G4 – Tussock-sedge, dwarf-shrub, moss tundra (acidic) 8 S1 – Erect dwarf-shrub tundra</p>
happy_valley_midslope_vegetation.shp	<p>VEGTYPE:</p> <p>1 B1b - Barren 2 P1a – Prostrate dwarf-shrub, herb tundra with thin organic layer 3 P1b – Prostrate dwarf-shrub, herb tundra with thick moss and organic layer 7 G4 – Tussock-sedge, dwarf-shrub, moss tundra (acidic) 8 S1 – Erect dwarf-shrub tundra</p>
happy_valley_midslope_vegetation.shp	<p>VEGTYPE:</p> <p>1 B1b - Barren 2 P1a – Prostrate dwarf-shrub, herb tundra with thin organic layer 3 P1b – Prostrate dwarf-shrub, herb tundra with thick moss and organic layer 7 G4 – Tussock-sedge, dwarf-shrub, moss tundra (acidic) 8 S1 – Erect dwarf-shrub tundra</p>
sagwon_nonacidic2_vegetation.shp (* .lyr file included)	<p>VEGTYPE:</p> <p>1 B1b - Barren 3 P1b – Prostrate dwarf-shrub, herb tundra with thick moss and organic layer 5 W2 – Sedge, moss, dwarf-shrub wetland 7 G3 – Nontussock sedge, dwarf-shrub, moss tundra (nonacidic)</p>

sagwon_nonacidic1_vegetation.shp (* .lyr file included)	VEGTYPE: 1 B1b - Barren 2 P1 –Prostrate dwarf-shrub, herb tundra with thin organic layer 7 G3 – Nontussock sedge, dwarf-shrub, moss tundra (nonacidic) 9 P1b –Prostrate dwarf-shrub, herb tundra with thick moss and organic layer
sagwon_acidic_vegetation.shp (* .lyr file included)	VEGTYPE: 1 B1b - Barren 2 P1 – Prostrate dwarf-shrub, herb tundra 4 S1 – Erect dwarf-shrub tundra 7 G4 – Tussock-sedge, dwarf-shrub, moss tundra (acidic)
franklin_bluffs_wet_vegetation.shp (* .lyr file included)	VEGTYPE: 1 B1b - Barren 3 P1a – Prostrate dwarf-shrub, herb tundra with thin organic layer 7 W2 – Sedge, moss, dwarf-shrub wetland within non-sorted circle 10 W2 – Sedge, moss, dwarf-shrub wetland between non-sorted circles 11 G3 – Nontussock sedge, dwarf-shrub, moss tundra (nonacidic)
franklin_bluffs_moist_vegetation.shp (* .lyr file included)	VEGTYPE: 1 B1b - Barren 3 P1a – Prostrate dwarf-shrub, herb tundra with thin organic layer 7 W2 – Sedge, moss, dwarf-shrub wetland within non-sorted circle 10 W2 – Sedge, moss, dwarf-shrub wetland between non-sorted circles 11 G3 – Nontussock sedge, dwarf-shrub, moss tundra (nonacidic)
franklin_bluffs_dry_vegetation.shp (* .lyr file included)	VEGTYPE: 1 B1b - Barren 2 P1a – Prostrate dwarf-shrub, herb tundra with thin organic layer 7 G3 – Nontussock sedge, dwarf-shrub, moss tundra (nonacidic)
deadhorse_vegetation.shp (* .lyr file included)	VEGTYPE: 1 B1b - Barren 2 P1a – Prostrate dwarf-shrub, herb tundra with thin organic layer 3 P1b – Prostrate dwarf-shrub, herb tundra with thick moss and organic layer 4 G3 – Nontussock sedge, dwarf-shrub, moss tundra (nonacidic) on circle rim 5 W2 – Sedge, moss, dwarf-shrub wetland 7 G3 – Nontussock sedge, dwarf-shrub, moss tundra (nonacidic) between non-sorted circles
west_dock_vegetation.shp (* .lyr file included))	VEGTYPE: 7 G3 –Nontussock sedge, dwarf-shrub, moss tundra (nonacidic)
howe_island_vegetation.shp (* .lyr file included)	VEGTYPE: 1 B1a - Barren 5 B1b – Barren with cryptogamic crust 6 P1 – Prostrate dwarf shrub, herb tundra

Table 4: Coordinates for the individual 10 x 10 m sampling grids at each Alaskan site. These are the extents of the vegetation and NDVI shapefile data..

File Name	Grid	North	South	East	West
happy_valley_hillcrest_ndvi.shp	G3	69.146846	69.146752	-148.851952	-148.852217
happy_valley_hillcrest_vegetation.shp	G3	69.146851	69.146747	-148.851939	-148.852229

happy_valley_midslope_ndvi.shp	G2	69.14684	69.146757	-148.848126	-148.84836
happy_valley_midslope_vegetation.shp	G2	69.146844	69.146753	-148.848116	-148.84837
happy_valley_toeslope_ndvi.shp	G1	69.147069	69.146978	-148.84682	-148.847076
happy_valley_toeslope_vegetation.shp	G1	69.147074	69.146974	-148.846809	-148.847088
sagwon_acidic_ndvi.shp	G1	69.425502	69.425409	-148.695726	-148.695991
sagwon_acidic_vegetation.shp	G1	69.425506	69.425404	-148.695714	-148.696003
sagwon_nonacidic1_vegetation.shp	G1	69.433423	69.433295	-148.669909	-148.670272
sagwon_nonacidic2_ndvi.shp	G2	69.433554	69.433458	-148.671571	-148.671846
sagwon_nonacidic2_vegetation.shp	G2	69.43356	69.433453	-148.671556	-148.671857
franklin_bluff_dry_ndvi.shp	G3	69.67479	69.674684	-148.720751	-148.721057
franklin_bluff_moist_ndvi.shp	G2	69.674581	69.674474	-148.720995	-148.721304
franklin_bluff_wet_ndvi.shp	G1	69.674194	69.674087	-148.716946	-148.717254
franklin_bluffs_dry_vegetation.shp	G3	69.674795	69.674679	-148.720737	-148.721071
franklin_bluffs_moist_vegetation.shp	G2	69.674586	69.674468	-148.720981	-148.721319
franklin_bluffs_wet_vegetation.shp	G1	69.674198	69.674082	-148.716933	-148.717269
deadhorse_vegetation.shp	G1	70.161485	70.161384	-148.466644	-148.46694
deadhorse_ndvi.shp	G1	70.161481	70.161389	-148.466656	-148.466928
west_dock_vegetation.shp	G1	70.374752	70.374636	-148.552269	-148.552615
howe_island_vegetation.shp	G1	70.315169	70.315052	-147.99336	-147.993707

Snow and thaw depth data files

There are 29 files in comma-separated (.csv) format which provide snow depth (9 sites) and thaw depth (active layer, 11 sites) measurements in cm made at the established grids. Snow depth measurements were only made every meter. Thaw depth measurements were made every half meter or meter. There were 1-3 grids per site.

The files are named by Site, variable, grid# (s), meter or half meter (1m or halfmeter) and YYYYDDMM for the sampling date or sampling date range YYYYMMDD-YYYYMMDD: **Site_snowdepth_gridG#_1m_YYYYDDMM**

Example file names and descriptions:

Inuvik_thawdepth_gridG1_halfmeter_20040714.csv: Provides thaw depth measurements in cm taken every half meter at the one established grid at the Inuvik NWT site on 2004-07-14.

HappyValley_snowdepth_gridsG1-G3_1m_20020425-20060418.csv: Provides snow depth measurements in cm taken every one meter at the Happy Valley Site at all three established grids during the date range of 2002-04-25 to 2006-04-18.

Variables

All files have the same column header names.

The 1-m files for snow depth and thaw depth have measurements recorded at 11 grid points x 11 grid points as shown in Figure 5. The top row/column names are column_point_1 to column_point_11. The half meter thaw depth files have measurements recorded at 22 gridpoints x 22 gridpoints, every half meter. The number of measurements made at each site varied. The data can be sorted by by grid, date, and row_point.

Table 5. Variable descriptions in the snow and thaw depth data files (.csv).

Variable	Description
site	Study site: seven sites in Alaska and four sites in the NWT, Canada
date	Date of measurement
grid	Grid number where measurement was taken. Sites had 1-3 grids

row_point_a through row_point_k	Grid point where measurement was taken on the grid when associated with the column_point below. The one meter grids had 11 x 11 points established; 11 rows (points) x 11 points (column_points). The half meter grids had 22 x 22 points established; 22 rows (points) x 22 points (column_points). In the half meter files, the column_points are named to reflect half meter increments-1, 1_5, 2, 2_5, etc. The row_points are named a, ab, b, bc through k to provide 22 rows
column_points_1 through 11	Grid point where measurement was taken on the grid when associated with the row_point above. The one meter grids had 11 x 11 points established; 11 rows (points) x 11 points (column_points). The half meter grids had 22 x 22 points established; 22 rows (points) x 22 points (column_points). In the half meter files, the column_points are named to reflect half meter increments-1, 1_5, 2, 2_5, etc. The row_points are named a, ab, b, bc through k to provide 22 rows

Table 6. Example snow depth 1m data file (showing only 7/15 columns and 3 rows of data):

site	date	grid	row_point	column_point_1	column_point_2	column_point_3
Franklin Bluffs	2001-04-20	G1	row_point_a	18	25	20
Franklin Bluffs	2001-04-20	G1	row_point_b	22	21	15
Franklin Bluffs	2001-04-20	G1	row_point_c	10	11	9

Table 7. Example thaw depth half meter data file (showing only 8/26 columns and 5 rows of data).

In the half meter files, the column_points are named to reflect half meter increments-1, 1_5, 2, 2_5, etc. The row_points are named a, ab, b, bc through k to provide 22 rows.

site	date	grid	row_point	column_point_1	column_point_1_5	column_point_2	column_point_2_5
Franklin Bluffs	2001-08-23	G2	row_point_a	51	52	55	52
Franklin Bluffs	2001-08-23	G2	row_point_ab	50	49	53	53
Franklin Bluffs	2001-08-23	G2	row_point_b	53	48	51	53
Franklin Bluffs	2001-08-23	G2	row_point_bc	60	54	62	54
Franklin Bluffs	2001-08-23	G2	row_point_c	50	55	60	52

Extents of the .csv data files

Table 8. Extents for the snow and thaw depth comma-separated data files for all sites and grid locations.

File Name	North	South	East	West
Deadhorse_thawdepth_gridG1_halfmeter_20000801-20060903.csv	70.161481	70.161389	-148.467	-148.47
Deadhorse_snowdepth_gridG1_1m_20010420-20050413.csv	70.161481	70.161389	-148.467	-148.47
FanklinBluffs_thawdepth_gridsG1-G3_halfmeter_20000801-20020809.csv	69.67479	69.67453	-148.721306	-148.721306
FanklinBluffs_thawdepth_gridsG1-G3_1m_20060903.csv	69.67479	69.67453	-148.721306	-148.721306
FanklinBluffs_snowdepth_gridsG1-G3_1m_20010420-20060416.csv	69.67479	69.67453	-148.721306	-148.721306
GreenCabin_thawdepth_gridsG1-G3_halfmeter_20030709	73.224472	73.218833	-119.555694	-119.555694
GreenCabin_thawdepth_gridsG1-G3_1m_20060824	73.224472	73.218833	-119.555694	-119.55925
HappyValley_thawdepth_gridsG1-G3_halfmeter_20010709-20020810.csv	69.147	69.146778	-148.847028	-148.85222
HappyValley_thawdepth_gridsG1-G3_1m_20060905.csv	69.147	69.146778	-148.847028	-148.85222
HappyValley_snowdepth_gridsG1-G3_1m_20020425-20060418.csv	69.147	69.146778	-148.847028	-148.85222
Howelsland_snowdepth_gridG1_1m_20030412-20050415.csv	70.315169	70.315052	-147.99336	-147.993707
Howelsland_thawdepth_gridG1_1m_20010824-20060904.csv	70.315169	70.315052	-147.99336	-147.993707
Howelsland_thawdepth_gridG1_halfmeter_20020816.csv	70.315169	70.315052	-147.99336	-147.993707

Inuvik_thawdepth_gridG1_1m_20060824.csv	68.36166667	68.36166667	-133.73055556	-133.73055556
Inuvik_thawdepth_gridG1_halfmeter_20040714.csv	68.36166667	68.36166667	-133.73055556	-133.73055556
Isachsen_snowdepth_gridsG1-G3_1m_20060512.csv	78.78565	78.7851	-103.55078	-103.551517
Isachsen_thawdepth_gridsG1-G3_1m_20050725-20060823.csv	78.78565	78.7851	-103.55078	-103.551517
Isachsen_thawdepth_gridsG1-G3_halfmeter_20050725-20050728.csv	78.785317	78.7851	-103.55078	-103.551517
MouldBay_snowdepth_gridsG1-G2_1m_20060512.csv	76.228139	76.225889	-119.292222	-119.296806
MouldBay_thawdepth_gridsG1-G2_1m_20060823.csv	76.228139	76.225889	-119.292222	-119.296806
MouldBay_thawdepth_gridsG1-G2_halfmeter_20040718-20040719.csv	76.228139	76.225889	-119.292222	-119.296806
SagwonAcidic_snowdepth_gridG1_1m_20010420-20050414.csv	69.4255	69.4255	-148.695972	-148.695972
SagwonAcidic_thawdepth_gridG1_halfmeter_20000801-20020806.csv	69.4255	69.4255	-148.695972	-148.695972
SagwonNonacidic_snowdepth_gridsG1-G2_1m_20010420-20050415.csv	69.433583	69.433361	-148.671833	-148.673306
SagwonNonacidic_thawdepth_gridsG1-G2_1m_20060905.csv	69.433583	69.433361	-148.671833	-148.673306
SagwonNonacidic_thawdepth_gridsG1-G2_halfmeter_20000801-20020806.csv	69.433583	69.433361	-148.671833	-148.673306
WestDock_thawdepth_gridG1_halfmeter_20010628-20020809.csv	70.374752	70.374636	-148.552269	-148.552615
WestDock_thawdepth_gridG1_1m_20000801-20060903.csv	70.374752	70.374636	-148.552269	-148.552615
WestDock_snowdepth_gridG1_1m_20010420-20050414.csv	70.374752	70.374636	-148.552269	-148.552615

Table 9. Coordinates for the individual 10 x 10 m sampling grids at each NWT site.

Site	North	South	East	West
Green Cabin				
Grid 1	73.2195	73.2195	-119.55925	-119.55925
Grid 2	73.218833	73.218833	-119.555694	-119.555694
Grid 3	73.224472	73.224472	-119.558806	-119.558806
Mould Bay				
Grid 1	76.228139	76.228139	-119.296806	-119.296806
Grid 2	76.225889	76.225889	-119.292222	-119.292222
Isachsen				
Grid 1	78.785317	78.785317	-103.550783	-103.550783
Grid 2	78.78565	78.78565	-103.55135	-103.55135
Grid 3	78.7851	78.7851	-103.551517	-103.551517
Inuvik				
Grid 1	68.110917	68.110917	-133.477278	-133.477278

3. Application and Derivation

These data could be useful to climatic change and climate impact studies.

4. Quality Assessment

Refer to the related publications.

5. Data Acquisition, Materials, and Methods

This dataset provides measurements obtained as part of a biocomplexity project on the North Slope of Alaska and the NWT, Canada. Seven sites were on the North Slope of Alaska located along the Dalton Highway and in the Prudhoe Bay Oilfield area, forming a north-south transect across the climate gradient of the North Slope. Vegetation and NDVI were mapped for the seven sites which included, from South to North, Happy Valley, Sagwon (two sites), Franklin Bluffs, Deadhorse, West Dock and Howe Island. Snow depth and thaw depth measurements were also made at the seven sites as well as four additional sites in the Northwest Territories (NWT), Canada. From South to North, these sites include Inuvik, Green Cabin, Mould Bay, and Isachsen.

At each site, permanent 10 x 10 m grids were established for repeated long-term measurements. Thaw depth, snow depth, and NDVI were sampled on the grids, usually every meter. The 10 x 10 m grids were mapped to characterize the heterogeneity of vegetation in the patterned ground ecosystems created by soils, climate and vegetation interactions. The vegetation maps were hand-drawn in the field, and later digitized as shapefiles.

Descriptions of Alaskan Sites

The Happy Valley biocomplexity sites are located in the warmest part of the Arctic, in the foothills of the Brooks Range, located just west of the Dalton Highway in the foothills of the Arctic Slope approximately 82 km (52 mi) north of Toolik Lake, Alaska at an elevation of about 320 m. Three 10 x 10 m grids were established along a hill-slope, one on the crest of the hill (dry), one on the mid-slope (mesic), and one on the toe slope (wet). Vegetation at all three included tussock-sedge, erect dwarf-shrub, moss vegetation.

The Sagwon biocomplexity sites are located at the northern edge of the rolling foothills, at the boundary with the flatter coastal plain, northwest of the Dalton Highway at an elevation of 300 m. This is also the boundary between Subzones E and D, and between the acidic tundra to the south and the nonacidic tundra to the north. Three 10 x 10 m grids were established, one with acidic tussock-sedge, erect dwarf-shrub, moss vegetation, and two grids in the nonacidic nontussock-sedge, prostrate dwarf-shrub, moss tundra.

The Franklin Bluffs biocomplexity sites are located in Subzone D, on the coastal plain of the Alaska North Slope, just west of the Sagavanirktok River. Three 10 x 10 m grids were established: one near the rim of an abandoned river terrace (dry), one on the same terrace, but further back from the edge and a little lower in elevation (mesic), and one on the lower abandoned river terrace below the first two (wet). A complex of vegetation types were at all three created by non-sorted circles, with sparser vegetation in the circles and more continuous vegetation between the circles.

The Deadhorse biocomplexity site is located near the industrial center of Deadhorse, AK, within 15-km of the Beaufort Sea coast, at an elevation of 15 m. One 10 x 10 m grid was established, with a complex of vegetation types created by non-sorted circles, with sparser vegetation in the circles and more continuous vegetation between the circles.

The West Dock biocomplexity site is located near the water pumping facility at West Dock in the Prudhoe Bay oilfield, AK, within 1-km of the Beaufort Sea coast, at an elevation of 1.5 m. One 10 x 10 m grid was established with non-tussock sedge, prostrate dwarf-shrub, moss tundra on sandy soils.

The Howe Island biocomplexity site is located on a 1.5 x 0.5-km island off the delta of the Sagavanirktok River, west of the Endicott Causeway in the Prudhoe Bay oilfield, AK, at sea level. One 10 x 10 m grid was established with a complex of vegetation types created by 10 to 30-m polygonal cracking due to permafrost ice-wedges, smaller 1 to 3-m non-sorted circles, and small 10-20 cm surficial desiccation cracking. There is sparse vegetation on the sorted circles and more continuous vegetation between the sorted circles and in the troughs between the polygons (Barreda et al., 2006).

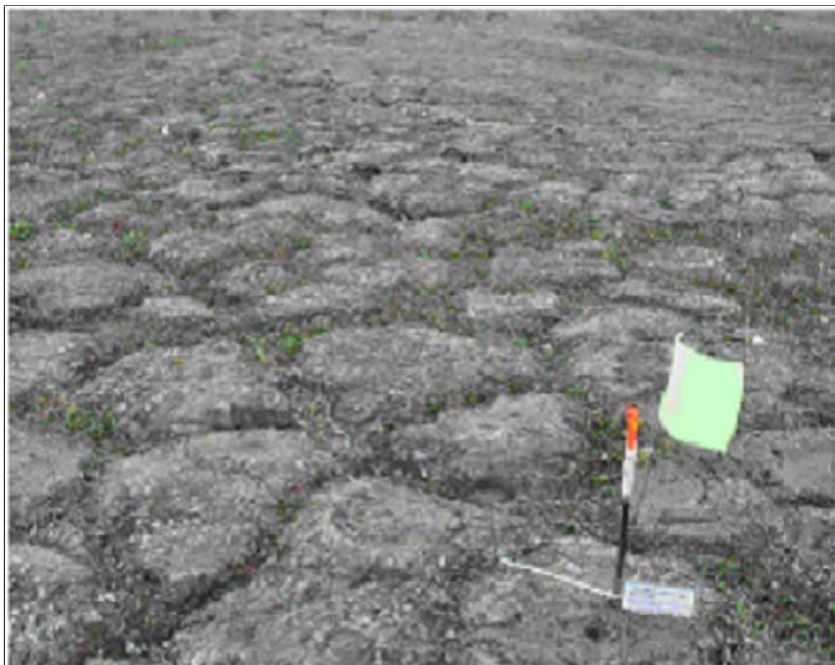


Figure 2. Small non-sorted polygons at Howe Island, AK.

Vegetation Mapping

For the seven sites in Alaska; there are no vegetation maps for the four sites in the NWT.

In 2006, maps of the vegetation types within each grid were created. Following identification of the vegetation communities, their location within the marked 10 x 10 m grid was mapped by hand on a 15-cm paper grid (1:66.7 scale). Maps of grid vegetation were hand digitized. Example maps for Howe Island are provided in Figure 4 (Barreda et al., 2006).

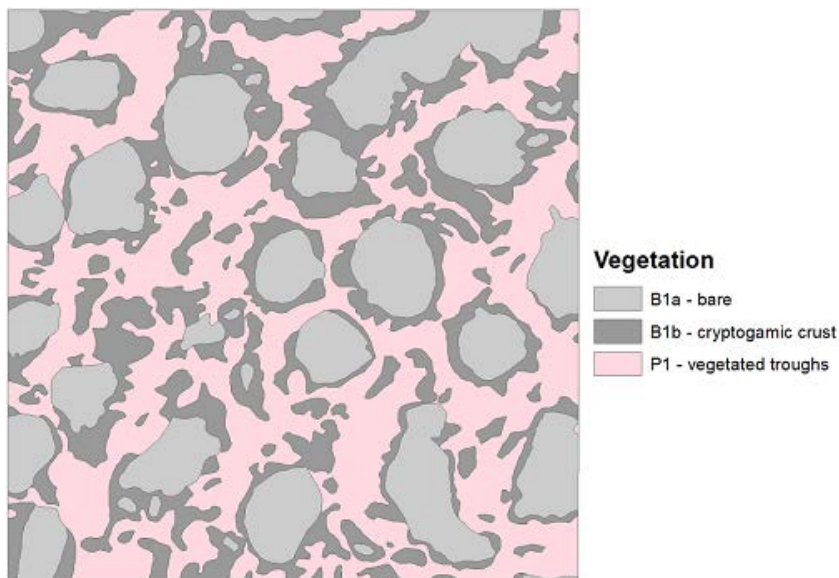


Figure 3. Vegetation map for the Howe Island site.

Snow and Thaw Depth Measurements

Beginning in August of 2000 and continuing at various sites and intervals through September 2006, thaw depth and snow depth measurements were taken by hand using a probe at each grid point located every meter (snow depth only) and sometimes at half meter on the 10 x 10 m grids.

Data were collected at flags spaced every meter along the edges and within the 10 x 10 m grid, for a total of 121 points (11 for each row and column).

See Figure 5, where: sampling point A1 is the SW corner; A11 is the SE corner; K1 is the NW corner; and K11 is the NE corner. Compass directions are approximate.

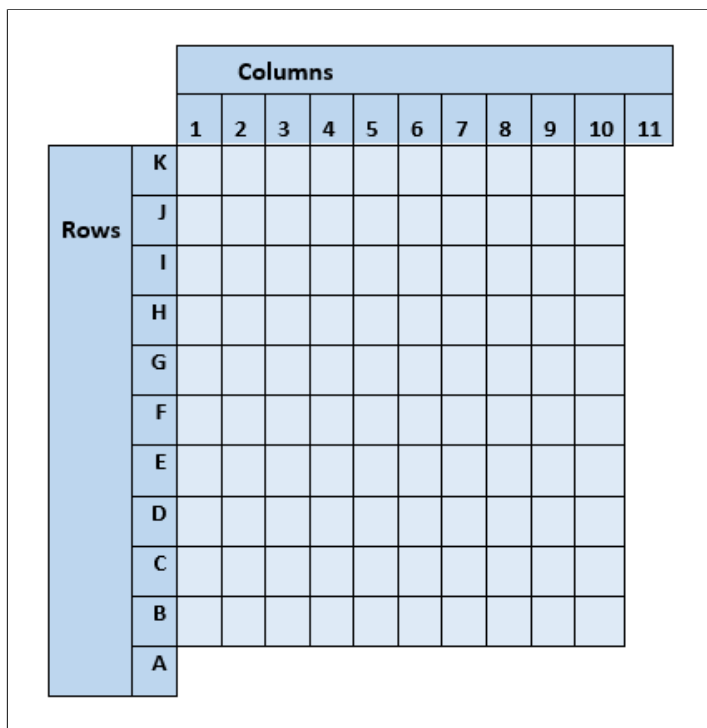


Figure 4: Sampling layout for 10 x 10 m grid plot, where sampling point A1 is the SW corner; A11 is the SE corner; K1 is the NW corner; and K11 is the NE corner. Compass directions are approximate.



Figure 5. Snow depth measurements being taken at a site (Barreda et al., 2006).

NDVI Measurements

In 2012, measurements of NDVI were made with an Analytical Spectral Devices field spectrometer (PSII) on the same grids at all 121 points at the seven Alaskan sites. The NDVI remote data provided in the shapefiles were not data from the remote sources listed (from Geoeye, MODIS, Landsat, AVHRR, and MERIS), but were calculated based on the PSII data as though they were from those sources for comparative purposes only.



Figure 6. Franklin Bluffs dry vegetation NDVI overlay. NDVI measurements are shown as circles at each gridpoint.

6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

[Pre-ABOVE: Vegetation, NDVI, Snow and Thaw Depths, in North Slope, Alaska and NWT, CA](#)

Contact for Data Center Access Information:

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- Telephone: +1 (865) 241-3952

7. References

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