Active Layer Monitoring, Arctic and Subarctic Canada, Version 6

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Nixon, F. Mark 2003, updated January 2009. Active Layer Monitoring, Arctic and Subarctic Canada, Version 6. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. doi: https://doi.org/10.7265/7m84-k262

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/GGD353

National Snow and Ice Data Center

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2 DETAILED DATA DESCRIPTION

2.1 Format

Data are in Rich Text Format (RTF). Data are presented by study site, with the following information for each site:

Site: site name and CALM number (if appropriate)
Responsibility: person responsible for data at this site
Location: latitude and longitude
Elevation: in meters
Slope: e.g., flat
Landform: e.g., glaciolacustrine plain, alluvial plain
Soil: description of soil (e.g., well drained silty sand)
Vegetation: description of vegetation
Installations: description of instruments and methods

The maximum annual active layer is reported for each year in integer centimeters, with a precision of ±1 cm. Data are reported as maximum values when the value of maximum subsidence was not available. The ground surface height measured during mid-summer in the year following the record was used as a minimum subsidence at the time of maximum thaw. Minimum values usually result from thaw progressing below the measuring range of the instrument. Missing values at the beginning of records result from a variable start of record for different sites.

3 DESCRIPTION OF DATA FILES

The data set consists of one RTF file (ggd353data_v5.rtf) that contains all the data.

4 VERSION HISTORY

The latest release of these data is Version 6, current as of 1 January 2009. Previously released copies of files with names that do not include "_v6" are obsolete and should be replaced with the Version 6 copy. Changes since Version 5 are highlighted in red in the Version 6 RTF document. Version 6 contains additional data from 2006 and 2007, more Mean Annual Air Temperatures and Mean Annual Ground Temperatuures for the sites and updated station data plus a few minor edits.

Version 5 contained one year of additional data and data corrections since Version 4. Version 5 was only available as a single RTF file.

Version 4 contained two years of additional data and data corrections since Version 3. Version 4 was only available as a single RTF file, while Version 3 also included ASCII versions of the data.

Version 3 data contained two years of additional data and data corrections since Version 2, released on the Circumpolar Active-Layer Permafrost System Version 2.0. Version 1 only included data from the CALM sites and used a different file naming convention.

5 SPATIAL COVERAGE

The active-layer monitoring system extends from Fort Simpson, Canada, in the upper Mackenzie River valley to the Beaufort Sea coast at North Head, Richards Island, Canada. The study area includes 10 Canadian CALM sites. Geographic extent is as follows:

Northernmost latitude: 69° 43' N
Westernmost longitude: 135° 20' W
Southernmost latitude: 61° 53' N
Easternmost longitude: 121° 36' W

A site location table lists individual site locations and corresponding CALM numbers.

6 TEMPORAL COVERAGE

Data begin in 1991 and continue to 2008. Data collection is ongoing and is added as it becomes available.

7 DATA ACQUISITION METHODS

Maximum annual thaw penetration and maximum heave and subsidence of the ground surface are measured using a modified version of a frost tube developed by Mackay (1973) and Nixon et al. (1995). The device is a removable water-filled, clear plastic observation tube, 2 cm in diameter, approximately 2.5 m long inside a 2.5-cm diameter, heave-resistant access tube (Tarnocai et al 2004), which is long enough (approximately 4 m) to be anchored in permafrost upon installation. See Figure 3 in Nixon and Taylor (1994).

The ice-water interface in the observation tube corresponds to the frost table in the surrounding ground. A 3-mm diameter colored marker, which is dropped into the tube each year prior to time of maximum thaw, rests on the ice surface. It descends during the thaw season to be trapped at the maximum depth on freeze in late summer or fall. Maximum heave and subsidence are recorded between observations by a scriber attached to a weighted sleeve around the outside of the access tube that scratches a painted surface on either side of a reference mark (renewed at each visit). Tubes were installed using a lightweight pump that is approximately 10 kg with a maximum discharge of 100 liters/min. The active layer is defined as the thaw recorded in the thaw tube minus the height of the tube above ground at maximum surface subsidence, which is assumed to occur about the time of maximum thaw.

Many of the thaw tube sites are also instrumented with automatic air and ground temperature loggers (Tarnocai et al, 2004). At 40 sites, a 6-plate, 12-cm diameter radiation shield (R.M. Young, model 41301-5) was mounted 1.5 m above the ground surface. Air temperatures are measured by a thermistor in the shield that is connected to a single-channel, miniature data logger in the lower part of the mast (see Figure 5 in Nixon et al. (1995). A similar miniature data logger with an internal sensor is buried near the base of the air temperature mast at a nominal depth of 3 to 7 cm to measure near-surface ground temperatures. Two types of miniature data loggers are used: HOBO loggers (Onset Computer Corp, USA.), range -37 to 46° C, resolution 0.25° C; and Minilog loggers (Vemco Ltd., Canada), -50 to 40° C, resolution 0.3° C. Temperatures are recorded every two to six hours for a year or more before servicing.

The snow pack observations was observed during March or April and reported as a range of values from all the observations at the site.

8 REFERENCES AND RELATED PUBLICATIONS

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9 DOCUMENT INFORMATION

9.1 Document Creation Date

January 2003

9.2 Document Revision Dates

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