

Shallow Borehole Temperatures, Ilulissat, Greenland, Version 1

USER GUIDE

How to Cite These Data

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

Olesen, O.B 2003. *Shallow Borehole Temperatures, Ilulissat, Greenland, Version 1*. [Indicate subset used]. Copenhagen, Denmark. Greenlandic Geological Survey, GEUS.

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

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/GGD631>



National Snow and Ice Data Center

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1 DATA DESCRIPTION

This data set contains borehole temperatures from Ilulissat, west Greenland (69°N, 51°N, 44 m asl), recorded from 21 thermistors at depths of 0.25 m, 0.5 m, 0.75 m, 1 m, 1.25 m, 1.5 m, 1.75 m, 2 m, 2.5 m, 3 m, 3.5 m, 4 m, 4.5 m, 5 m, 6 m, 7 m, 8 m, 9 m, 11 m, 13 m, and 15 m below the surface. Snow depth, snow extent, and surface air temperature were also recorded. Thermometers recorded temperatures once a day from 06 November 1968 to 15 June 1982; however, this data set only contains bi-weekly averages. Data are in tab-delimited ASCII text format and are available via FTP.

In 1967, the Greenlandic Geological Survey (GEUS) started a program to monitor soil temperatures in permafrost and seasonal frost areas in West Greenland as part of the UNESCO International Hydrological Decade program (Olesen 1967a, van Tatenhove and Olesen 1994). That same year, Ole Olesen established a permafrost station in Ilulissat (formerly Jakobshavn, 69°N, 51°N, 44 m asl). After 1982, the GGU ceased monitoring the thermal properties of permafrost, in part, because several thermistors stopped working.

Olesen installed 21 platinum resistance thermometers in boreholes every 0.25 m down to 2 m below the surface, every 50 cm down to 5 m, every 1 m between 5 m and 9 m, and every 2 m from 9 m to 15 m. The thermistors consisted of platinum wire with a resistance of $100.00 \pm 0.1 \ \Omega$ at 0.25°C. They were mounted in pertinax tubes, each holding three thermistors at different levels.

1.1 File Information

1.1.1 Format

Data are in tab-delimited ASCII text format. The file "ggd631_soiltmp_iluliss.txt" contains columns for date, raw borehole temperatures at depths ranging from 0.25 m to 15 m, maximum and minimum daily air temperatures, snow index (1-4), and snow depth (cm). The snow index indicates snow extent in quartiles (1 = 25%, 2 = 50%, 3 = 75%, 0 = no data).

The date format is "ddmmyyyy." The date is left-justified when days are single digits. For example, "61111968" is 6 November 1968.

Missing values are indicated by "-999." Corrected temperatures take into account calibration factors found in "ggd631_sensors_iluliss.txt." This file lists the sensors with corresponding depths (m) and calibration factors (°C). Some thermistors stopped working during the period of data collection.

1.1.2 File Size

ggd631_sensors_iluliss.txt: 1 KB

ggd631_soiltmp_iluliss.txt: 41 KB

1.1.3 Naming Convention

ggd631_sensors_iluliss.txt

ggd631_soiltmp_iluliss.txt

1.2 Spatial Information

1.2.1 Coverage

Data were collected from a station in Ilulissat, west Greenland, at approximately 69°N, 51°W. The station was located 32 m east of the heliport control house, at approximately 44 m asl, in an area with about 8 m of sediment above the bedrock. The ground around the station was horizontal and completely saturated with water. About 10 cm of grass and moss grew in the station area. A peat layer 20 m to 30 cm thick underlied the vegetation. A blue-gray silt sediment with some stones and sandy layers underlied the peat layer down to the bedrock surface, at approximately 7.8 m to 9.4 m below the surface. The bedrock was gneiss. It was heavily weathered in the top 3 m to 4 m. Permafrost was present at 2 m depth.

1.3 Temporal Information

1.3.1 Coverage

Thermometers recorded temperatures once a day from November 1968 to June 1982; however, this data set only contains bi-weekly averages.

2 CONTACTS AND ACKNOWLEDGMENTS

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Acknowledgments:

When using these data, please acknowledge that they are the property of the Danish and Greenlandic Geological Survey (GEUS). A cooperative agreement with GEUS was signed before any access was granted to the hardcopy data digitized by Niels Foged and his students at Artek.

3 REFERENCES

Smith, S., M. Burgess, and H.H. Christiansen. 2002. Compilation and documentation of variations in permafrost conditions in Greenland and the adjacent Canadian Arctic. *Unpublished report for Global Terrestrial Network for Permafrost*. 9 pp.

Van Tatenhove, F.G.M., and O.B. Olesen. 1994. Ground temperature and related permafrost characteristics in West Greenland. *Permafrost and Periglacial Processes* 5:199-215.

4 DOCUMENT INFORMATION

4.1 Publication Date

March 2003

4.2 Date Last Updated

20 January 2021