

Ground temperatures in ice-cemented ground at Linnaeus Terrace, Dry Valleys, Antarctica, Version 1

USER GUIDE

How to Cite These Data

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

McKay, C. P. 1998. *Ground temperatures in ice-cemented ground at Linnaeus Terrace, Dry Valleys, Antarctica, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. <https://doi.org/10.7265/tjgd-wp08>. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/GGD6>



National Snow and Ice Data Center

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Notice: This data set was first published on the [1998 CAPS CD](#).
The text for this document was taken unchanged from that CD.

1 DETAILED DATA DESCRIPTION

1.1 File description

Soil temperatures were measured with Campbell 107 soil thermistors. Thermistors were placed at 0, 17, 23 (just above the ice-cemented permafrost) and 40 cm depth. To emplace the sensors, first a soil pit was dug to the level of ice-cemented permafrost. Then a hammer drill was used to make a narrow, 15 cm deep, hole into the ice-cemented ground. The thermistor was placed into the drill hole. This procedure caused minimal disturbance to the ice-cemented ground. Air temperature and humidity were measured with a Campbell 207 air probe. The temperature on the surface of an outcrop of Beacon sandstone was measured with a T-type thermocouple. Sunlight was measured with a LiCor 200 pyranometer. The sensors were deployed during Jan 1993 but (due to equipment failure) data storage only began 6 Jan 1994 and was continued until 16 Jan 1995.

All temperature sensors were removed after the data collection interval and calibrated in the laboratory. Calibrations were applied using the Steinhart and Hart (1968) representations for the temperature dependence of the thermistor resistance. This was necessary since the instrumental calibration for the 107 thermistor provided by Campbell did not extend below -40C. After correction, the error in the temperature measurement is estimated to be less than 0.2 C and error in the humidity measurement was <10%. However, an important caveat is that the Campbell 207 RH sensor has high errors for relative humidity values below 15% --- tending to systematically overestimate values by more than 10% humidity. The error in the averaged light measurement is less than 10 W/m² All sensors were sampled once every 10 minutes and averages of three measurements were written to final memory every 30 minutes corresponding to 48 recordings each day.

1.2 Data format

Data are stored in columns of ASCII data:
entries are:

1. Digital day of year in 1994
2. Air temperature
3. Air relative humidity
4. Sunlight, W/m²
5. Soil surface temperature
6. Temperature at 17 cm depth

7. Temperature at 23 cm depth
8. Temperature at 40 cm depth
9. Temperature on surface of rock

First record

6.469 -5.29 24.99 757.03 11.37 -5.93 -9.10 -11.34 0.30

1.3 SITE DATA FILE

```
*Site no.: LT

*Source of data: (enter names)
  Name of investigator: Christopher P. McKay
  Name of institute: NASA Ames Research Center

*Data type: (check or specify)
  Temperature log XXXXX

*Location: (enter Long. Lat. or UTM )
Linnaeus Terrace 77 36'S, 161 05'E, 1600 m elevation.

*Geodetic datum: none

*Elevation a.s.l.: (enter elevation in meters or feet)
  (m): 1600 m
  (feet):

*Aspect (slope orientation): (check one)
  North
  Northeast
  East
  Southeast
  South
  Southwest
  West
  Northwest
  Complex (undulating)
  x Level

*Slope angle (degree): (enter the numerical value)
flat

*Landform: (check one)
  Blanket
  Fan
  Hummock
  Inclined
  Level
  Rolling
  x Ridged
  Steep
  Terraced
  Undulating
  Veneer
```

Other (specify)

*Material: (check one)

- Anthropogenic
- Colluvial
- Eolian
- Fluvial
- Lacustrine
- Alluvial
- Residual
- Morainal (till)
- Volcanic
- Marine
- Organic
- x Bedrock
- Ice
- Other (specify)

*Texture of material: (check one)

- Clay
- Silt
- Loam
- Coarse, gravelly
- Diamicton
- x sandy soil

*Drainage: (check one)

- Very rapidly drained
- Rapidly drained
- Well drained
- x Moderately well drained
- Imperfectly drained
- Poorly drained
- Very poorly drained

*Vegetation type: (check one)

- Closed coniferous forest
- Open coniferous forest
- Deciduous forest
- Mixed deciduous and coniferous forest
- Grassland
- Wetland (including peatland)
- Tundra, alpine
- Tundra, high shrub
- Tundra, medium shrub
- Tundra, low shrub
- Tundra, broken herb
- x Unvegetated surface

Vegetation cover (%): (enter % cover)

0

Anthropogenically disturbed site: (check one)

- Yes
- x No

Fire history: (enter number of years since fire)

none

Remarks: (free format text - any additional information about the site that may be important to users of the data) none

1.4 INTERNATIONAL PERMAFROST ASSOCIATION GLOBAL GEOCRYOLOGICAL DATABASE

1.4.1 Metadata to accompany shallow ground temperature measurements

The following standard was discussed in a small working group at the IPA/WDC-A meeting in Boulder, December 1996. The standard concerns the minimum metadata to accompany measurements of permafrost temperatures, particularly non-borehole data. Standards and formats for borehole data is proposed in a separate standard.

```
////////////////////////////////////  
Shallow ground temperature measurements are:  
Manual...      XXX      Automatic (logger)...  
  
Temperature sensor is:  
  XX thermistor...  
  thermocouple...  
  mercury thermometer...  
  other...  
  
Sampling rate (period of measurement) 10 min  
  and averaging period of individual measurements 30 min  
  
Time standard used is local time zone XXXX  
  
Accuracy is:  
  plus/minus 0.2 degrees Celsius in temperature  
  plus/minus 0.03 meters in depth  
  
Comments: none
```

2 REFERENCES AND RELATED PUBLICATIONS

McKay, C.P., M.T. Mellon, E.I. Friedmann, Soil temperatures and stability of ice-cemented ground in the McMurdo Dry Valleys, Antarctica, Antarctic Science, 10, 31-38, 1998.

3 DOCUMENT INFORMATION

3.1 Publication Date

1998

3.2 Date Last Updated

2021