CLPX-Ground: Micrometeorological Data at the Local Scale Observation Site (LSOS), Version 1

USER GUIDE

How to Cite These Data

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

England, A. 2003. *CLPX-Ground: Micrometeorological Data at the Local Scale Observation Site (LSOS), Version 1.* [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/BSLOAIYXCLHU. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/NSIDC-0168

National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

The University of Michigan micrometeorological station made observations between 6 November 2002 and 29 May 2003 at the Local Scale Observation Site (LSOS) at Fraser, Colorado. These data were primarily collected to support University of Michigan microwave radiometric observations acquired at the same site. Subterranean and atmospheric sensors are located in dense and open pine areas close to the radiometer truck that is located at 39.90661N, 105.88294W. See the spatial coverage map.

1.1 Format

Data are available in a single tab-delimited ASCII file. Data have undergone quality control and invalid data have been replaced by the default value of -6999. Missing data are identified by "-999".

The data file has the following columns:

```
Column 1: Year, 4 digit Year
Column 2: DOY, Day of Year
Column 3: TIME, hhmm
Column 4: Mean Battery Voltage averaged over previous time step
Column 5: STP01 – Mean soil temperature at 10cm beneath ground surface in open pine area averaged over previous time step (degrees Celsius)
Column 6: STP02 – Mean soil temperature at 4.5cm beneath ground surface in open pine area averaged over previous time step (degrees Celsius)
Column 7: STP03 – Mean soil temperature at 10cm beneath ground surface in open pine area averaged over previous time step (degrees Celsius)
Column 8: STP04 – Mean soil temperature at 20cm beneath ground surface in open pine area averaged over previous time step (degrees Celsius)
Column 9: STP05 – Mean soil temperature at 27cm beneath ground surface in open pine area averaged over previous time step (degrees Celsius)
Column 10: STP06 – Mean soil temperature at 45cm beneath ground surface in open pine area averaged over previous time step (degrees Celsius)
Column 11: STP07 – Mean soil temperature at 10cm beneath ground surface in dense pine area averaged over previous time step (degrees Celsius)
Column 12: STP08 – Mean soil temperature at 4.5cm beneath ground surface in dense pine area averaged over previous time step (degrees Celsius)
Column 13: STP09 – Mean soil temperature at 10cm beneath ground surface in dense pine area averaged over previous time step (degrees Celsius)
Column 14: STP10 – Mean soil temperature at 20cm beneath ground surface in dense pine area averaged over previous time step (degrees Celsius)
Column 15: STP11 – Mean soil temperature at 27cm beneath ground surface in dense pine area averaged over previous time step (degrees Celsius)
Column 16: STP12 – Mean soil temperature at 48cm beneath ground surface in dense pine area averaged over previous time step (degrees Celsius)
Column 17: TCAV01 – Mean soil temperature at 1.5cm beneath ground surface in open pine area averaged over previous time step (degrees Celsius)
Column 18: TCAV02 – Mean soil temperature at 1.5cm beneath ground surface in dense pine area averaged over previous time step (degrees Celsius)
Column 19: RH – Mean relative humidity at 3.5m averaged over previous time step (percentages)
Column 20: ATP – Mean air temperature at 3.5m averaged over previous time step (degrees Celsius)
Column 21: SHF01 – Mean soil heat flux at 3cm beneath ground surface in dense pine area averaged over previous time step (Watts per meter square)
Column 22: SHF02 – Mean soil heat flux at 3cm beneath ground surface in dense pine area averaged over previous time step (Watts per meter square)
Column 23: SHF03 – Mean soil heat flux at 3cm beneath ground surface in open pine area averaged over previous time step (Watts per meter square)
Column 24: SHF04 – Mean soil heat flux at 3cm beneath ground surface in open pine area averaged over previous time step (Watts per meter square)
Column 25: SM01 – Mean volumetric soil moisture at 1.5cm beneath ground surface in open pine area averaged over previous time step (m3/m3)
Column 26: SM02 – Mean volumetric soil moisture at 4.5cm beneath ground surface in open pine area averaged over previous time step (m3/m3)
Column 27: SM03 – Mean volumetric soil moisture at 10cm beneath ground surface in open pine area averaged over previous time step (m3/m3)
Column 28: SM04 – Mean volumetric soil moisture at 20cm beneath ground surface in open pine area averaged over previous time step (m3/m3)
Column 29: SM05 – Mean volumetric soil moisture at 27cm beneath ground surface in open pine area averaged over previous time step (m3/m3)
Column 30: SM06 – Mean volumetric soil moisture at 45cm beneath ground surface in open pine area averaged over previous time step (m3/m3)
Column 32: SM07 – Mean volumetric soil moisture at 1.5cm beneath ground surface in dense pine area averaged over previous time step (m3/m3)
Column 32: SM08 – Mean volumetric soil moisture at 4.5cm beneath ground surface in dense pine area averaged over previous time step (m3/m3)
Column 33: SM09 – Mean volumetric soil moisture at 10cm beneath ground surface in dense pine area averaged over previous time step (m3/m3)
Column 34: SM10 – Mean volumetric soil moisture at 20cm beneath ground surface in dense pine area averaged over previous time step (m3/m3)
Column 35: SM11 – Mean volumetric soil moisture at 27cm beneath ground surface in dense pine area averaged over previous time step (m3/m3)
Column 36: SM12 – Mean volumetric soil moisture at 48cm beneath ground surface in dense pine area averaged over previous time step (m3/m3)
Column 37: SNOW01 – Mean snow/air temperature at 152.4cm averaged over previous time step (degrees Celsius)
Column 38: SNOW02 – Mean snow/air temperature at 143.0cm averaged over previous time step (degrees Celsius)
Column 39: SNOW03 – Mean snow/air temperature at 131.3cm averaged over previous time step (degrees Celsius)
Column 40: SNOW04 – Mean snow/air temperature at 119.6cm averaged over previous time step (degrees Celsius)
Column 41: SNOW05 – Mean snow/air temperature at 107.9cm averaged over previous time step (degrees Celsius)
Column 42: SNOW06 – Mean snow/air temperature at 96.2cm averaged over previous time step (degrees Celsius)
Column 43: SNOW07 – Mean snow/air temperature at 84.5cm averaged over previous time step (degrees Celsius)
Column 44: SNOW08 – Mean snow/air temperature at 72.8cm averaged over previous time step (degrees Celsius)
Column 45: SNOW09 – Mean snow/air temperature at 61.1cm averaged over previous time step (degrees Celsius)
Column 46: SNOW10 – Mean snow/air temperature at 49.4cm averaged over previous time step (degrees Celsius)
Column 47: SNOW11 – Mean snow/air temperature at 37.7cm averaged over previous time step (degrees Celsius)
Column 48: SNOW12 – Mean snow/air temperature at 26.0cm averaged over previous time step (degrees Celsius)
Column 49: SNOW13 – Mean snow/air temperature at 14.2cm averaged over previous time step (degrees Celsius)
Column 50: SNOW14 – Mean snow/air temperature at 2.5cm averaged over previous time step (degrees Celsius)
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Two sets of measurements were made at 10 cm in both dense and open pine (STP01 and STP07). This is because the soil temperature (STP) sites were too big for a shallow layer, so the investigators used TCAV at 1.5cm.

1.2 File Naming Convention

The data file is named nsidc0168_final.txt.

1.3 File Size

File size is 16.189 MB.

1.4 Spatial Coverage

This data set covers the CLPX Local Scale Observation Area (LSOS) in northern Colorado. This site is 100 m x 100 m.study site located within the Fraser ISA, near the Fraser Experimental Forest Headquarters Facility. At this 100-m x 100-m site, intensive ground observations of snow, soil, and vegetation were made in conjunction with stationary, ground-based microwave remote sensing (active and passive) and micrometeorological observations. The site consists of two open meadows separated by a stand of short trees.

1.4.1 Spatial Coverage Map:

The following map shows the CLPX LSOS, with the dense pine area to the south and east of open area (outlined in blue), and the open pine site to the north of the open area. Red cross-hairs show the meteorology sites.
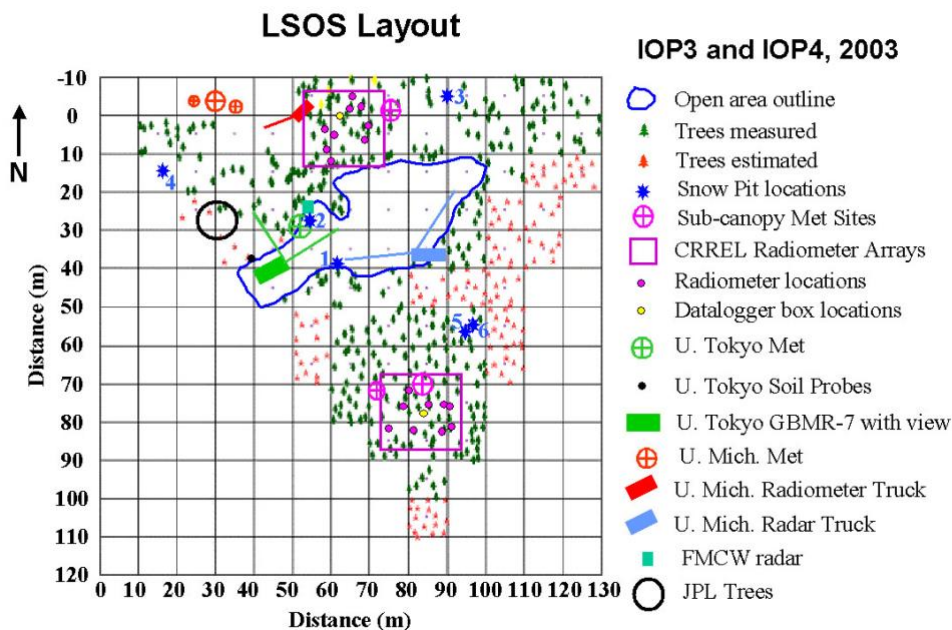
1.5 Temporal Coverage

Data were collected between 6 November 2002 and 29 May 2003. Measurements were made every 10 seconds and averaged over time steps of 6 minutes.

1.6 Parameter or Variable

Parameters presented in this data set are soil temperature, soil moisture, soil heat flux, snow temperature, air temperature, and relative humidity.

2 DATA ACQUISITION AND PROCESSING

Soil temperatures (°C) and soil moisture (m3m-3) were measured at the following depths below ground: 1.5 cm, 4.5 cm, 10 cm (twice), 20 cm, 27 cm, and either 45 cm (for open pine area) or 48 cm (for dense pine area).

Mean snow/air temperatures (°C) were measured at the following heights above the ground surface 152.4 cm, 143.0 cm, 131.3 cm, 119.6 cm, 107.9 cm, 96.2 cm, 84.5 cm, 72.8 cm, 61.1 cm, 49.4 cm, 37.7 cm, 26.0 cm 14.2 cm and 2.5 cm.

Soil heat flux profiles (Wm-2) were measured at 3 cm beneath the ground surface.

Air temperature (°C) and relative humidity (%) were measured at 3.5 m above the ground surface.

Sensor information is shown in the following table.

Instrument	Manufacturer	Variable	Accuracy	Precision
CS615 Water Content Reflectometers	Campbell Scientific	volumetric soil moisture		<<1%
107 Temperature Probes	Campbell Scientific	soil temperature at layers deeper than 1.5 cm	<±0.4K	<0.1K
TCAV Soil Thermocouple Probes	CampbellScientific	soil temperature at 1.5 cm	<±0.4K	<0.1K
HMP35C Air Temp./ RH Probes	Vaisala	air temperature at 3.5 cm	<±0.4K	<0.1K
HMP35C Air Temp./ RH Probes	Vaisala	relative humidity at 3.5cm	±2-3%RH	<0.1%RH
610 Soil Heat Flux Disks	Thornthwaite	soil heat flux at 3cm		

Instrument	Manufacturer	Variable	Accuracy	Precision
44032 Precision Thermistor	YSI	snow temperature		

Soil moisture and snow temperature data are converted from the sensor outputs using standard calibration coefficients provided by the manufacturers. Bias between sensors collecting soil temperature data was removed using in situ calibration data. Soil heat flux, air temperature, and relative humidity are taken directly from sensor outputs without in situ calibration.

The site was set up as shown in the following figures:

3   REFERENCES AND RELATED PUBLICATIONS

Hardy, J., D. Cline, K. Elder, R. Davis, R. Armstrong, G. Castres Saint-Martin, R. DeRoo, T. Graf, Y. Koh, T. Koike, H-P. Marshall, K. McDonald, T. Painter, and K. Sarabandi (submitted). An Overview of Data from the Local Scale Observation Site of the Cold Land Processes Field Experiment (CLPX). Journal of Hydrometeorology.

3.1 RELATED DATA COLLECTIONS

AMSR-E Validation Data Sets
CLPX-Ground: Snow Measurements at the Local Scale Observation Site (LSOS)
CLPX-Ground: Ground-based L and Ku Band Polarimetric Scatterometry at the LSOS
CLPX-Ground: Ground Based Passive Microwave Radiometer (GBMR-7) Data at the LSOS

4   CONTACTS AND ACKNOWLEDGMENTS

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4.1.1   Acknowledgments

Haoyu Gu, a graduate student and research assistant at the University of Michigan, acquired and compiled the meteorological data.

5   DOCUMENT INFORMATION

5.1 Publication Date

29 December 2003

5.2 Date Last Updated

8 April 2021