CLPX-Ground: ISA Corner Site Meteorological Data, Version 1

USER GUIDE

How to Cite These Data

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

Houser, P. and D. Kunera. 2005. *CLPX-Ground: ISA Corner Site Meteorological Data, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/UF6SCSMT9F1M. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/NSIDC-0173

National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

Thirty-six identical meteorological towers were located close to each corner of nine CLPX Intensive Study Areas (ISAs). At each site, measurements of air temperature, relative humidity, wind speed, and wind direction were made at either 2 m or 4 m above ground level. Snow depth, soil moisture, and soil temperatures were also measured. Meteorological observations were recorded at an hourly resolution between September 2002 and October 2003.

In addition to direct observations, parameters were generated within the logger program and as a result of post processing (year, month, day, hour and minute [HH:MM], and decimal day of year [Deci-DOY]). All time measurements were recorded in Greenwich Mean Time (GMT).

Each tower collected the following 22 specific parameters:

Year
Month
Day
HHMM [hour and minute]
Deci-DOY (decimal day of year)
Air Temperature [1-hr average] (°C)
Air Temperature [1-hr maximum] (°C)
Air Temperature [1-hr minimum] (°C)
Relative humidity [1-hr average] (%)
Relative humidity [1-hr maximum] (%)
Relative humidity [1-hr minimum] (%)
Wind speed [1-hr average] (ms-1)
Wind speed [1-hr maximum] (ms-1)
Wind speed [1-hr minimum] (ms-1)
Wind direction [1-hr average] (degrees)
Acoustic depth sounder (m)
Average hydraprobe temperature: 5 cm (°C)
Average hydraprobe soil water content: 5 cm (water fraction by volume, wfv)
Average hydraprobe temperature: 20 cm (°C)
Average hydraprobe soil water content: 20 cm (wfv)
Average hydraprobe temperature: 50 cm (°C)
Average hydraprobe soil water content: 50 cm (wfv)

For Deci-DOY:

12:00 midnight on day 100 is 100.0
6:00 a.m. on day 100 is 100.25
12:00 noon on day 100 is 100.5
6:00 p.m. on day 100 is 100.75

In addition, the data include photographs of the meteorological towers and surroundings. For each tower, there are six associated photographs: one of the tower, one looking down, and one looking from the tower in each compass direction.

1.1 Format

Meteorological data are presented in comma-delimited ASCII format. Each data file contains 22 parameters (columns), which are listed above, in consecutive 1-hour time intervals. Column header information for each data file is provided in a separate comma-delimited ASCII file (Headers.csv).

1.2 File Naming Convention

Data for each of the corner sites is contained in one file; the files are named as follows:

##$$_L1master_v1.0.csv

"##" refers to the two- or three-letter MSA, ISA code:

NM = North Park, Michigan River
NI = North Park, Illinois River
NP = North Park, Potter Creek
RB = Rabbit Ears, Buffalo Pass
RS = Rabbit Ears, Spring Creek
RW = Rabbit Ears, Walton Creek
FS = Fraser, St. Louis Creek
FF = Fraser, Fool Creek
FA = Fraser, Alpine

"$$" refers to the ISA corner:

NE = Northeast Corner
SE = Southeast Corner
NW = Northwest Corner
SW = Southwest Corner

Headers are not included in the first row of each data file. A separate file containing header information is provided, named Headers.csv.

A separate directory ("photos") contains photographs of the meteorlogical towers and the surrounding areas. There are six photographs associated with each tower: one of the tower, one looking down, and one looking from the tower in each compass direction. Photographs are named accordingly; for example, "FANE.JPG" is the photograph of the FANE site tower; "FANE-Down.JPG" is the downward-looking photograph; and "FANE-East.JPG" is the photograph looking eastward from the FANE site tower.

1.3 File Size

The uncompressed meteorological files range from 0.08 MB to 1.3 MB.

1.4 Spatial Coverage

Spatial coverage consists of the three MSAs within the SRSA (105° to 107.5° W, 39.5° to 41° N). One measurement tower was placed at, or close to, the corner of each ISA. Exact locations of each 2-m or 4-m high instrument tower are as follows:

Table 1. Instrument Tower Locations

Site ID	UTM (Easting)	UTM (Northing)	Latitude	Longitude	Elevation (m)
FANE	426903	4411844	39.853	-105.855	3446
FANW	425903	4411844	39.853	-105.866	3429
FASE	426903	4410844	39.844	-105.854	3448
FASW	425903	4410844	39.844	-105.866	3449
FFNE	426488	4415259	39.884	-105.860	3118
FFNW	425482	4415254	39.884	-105.871	3074
FFSE	426488	4414259	39.875	-105.860	3305
FFSW	425480	4414277	39.875	-105.871	3255
FSNE	426262	4420309	39.930	-105.863	2724
FSNW	425331	4420250	39.929	-105.874	2742
FSSE	426210	4419285	39.920	-105.863	2712
FSSW	425258	4419312	39.921	-105.875	2776
NINE	394505	4506210	40.700	-106.249	2477
NINW	393504	4506210	40.700	-106.261	2474
NISE	394504	4505210	40.691	-106.249	2477
NISW	393504	4505210	40.691	-106.260	2495
NMNE	400494	4500540	40.650	-106.177	2559
NMNW	399494	4500540	40.650	-106.189	2544
NMSE	400494	4499540	40.639	-106.323	3564
NMSW	399537	4499555	40.641	-106.188	2561
NPNE	388657	4503210	40.672	-106.317	2478
NPNW	387653	4503210	40.672	-106.329	2485
NPSE	388695	4502181	40.663	-106.317	2482
NPSW	387566	4502188	40.663	-106.330	2485

Site ID	UTM (Easting)	UTM (Northing)	Latitude	Longitude	Elevation (m)
RBNE	358076	4488891	40.537	-106.758	3256
RBNW	357076	4488891	40.538	-106.688	3170
RBSE	358076	4487891	40.530	-106.675	elevation data missing
RBSW	357076	4487891	40.529	-106.687	3097
RSNE	351588	4488451	40.534	-106.752	2747
RSNW	350588	4488451	40.533	-106.764	2720
RSSE	351588	4487451	40.525	-106.752	2845
RSSW	350588	4487451	40.524	-106.764	2752
RWNE	360645	4474079	40.406	-106.642	2981
RWNW	359645	4474079	40.405	-106.654	3006
RWSE	360645	4473079	40.397	-106.642	2929
RWSW	359645	4473079	40.396	-106.654	3007

1.4.1 Spatial Resolution

The following map shows the CLPX study area:

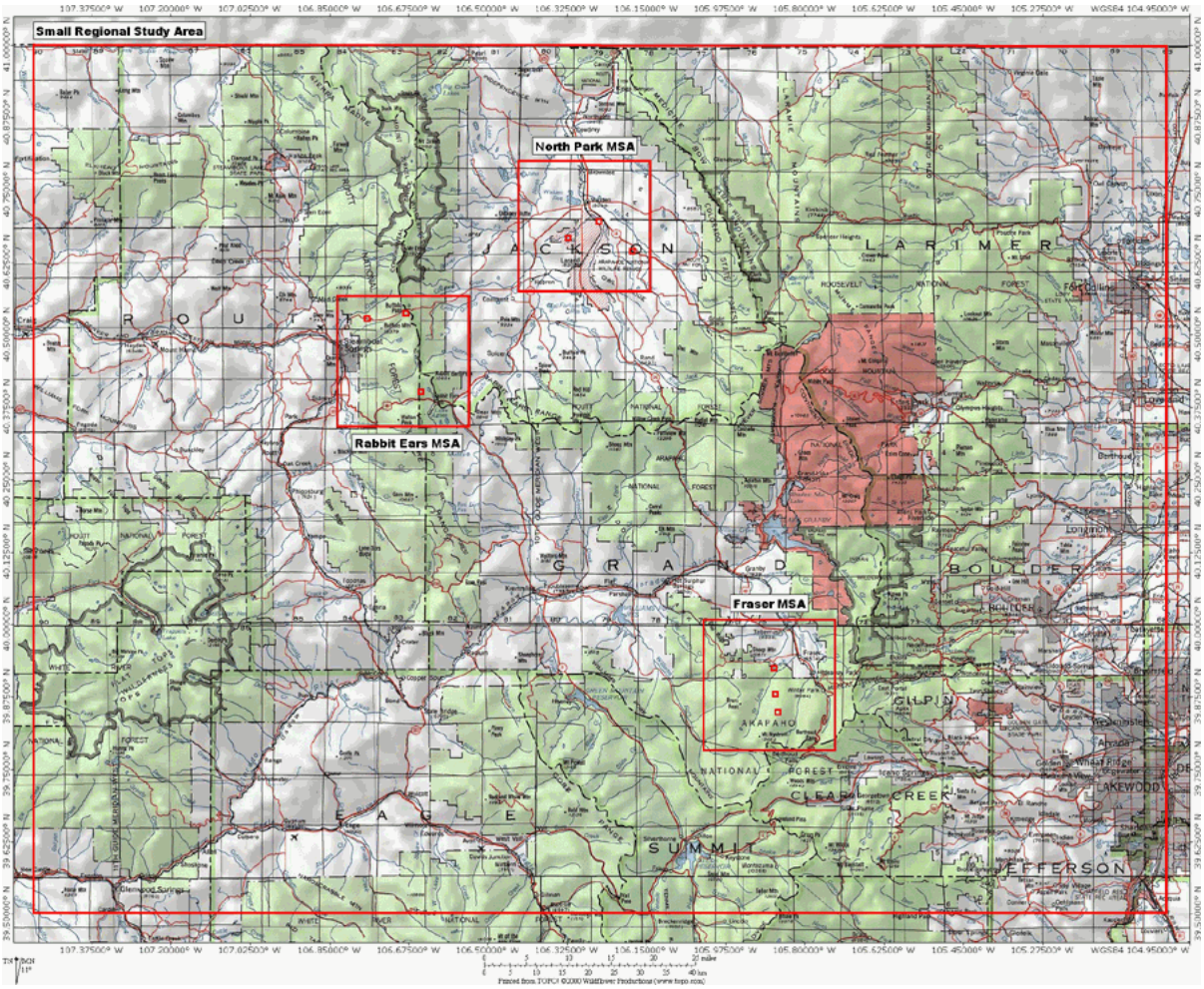

Figure 1. CLPX Study Area

1.4.2 Projection

Data are Universal Transverse Mercator (UTM) projection: Zone 13 North, based on the WGS84 datum.

1.5 Temporal Coverage

Meteorological data were collected between September 2002 and October 2003; data are not continuous at all sites throughout this period.

1.5.1 Temporal Resolution

Measurements of all parameters were made every 10 seconds. For all parameters except snow depth, soil moisture content and soil temperature, measurements were averaged over every 1-hour period. For snow depth, soil moisture content, and soil temperature, no average was taken and instead a single sample measurement was recorded at the mid-point of each 1-hour period.

1.6 Parameter or Variable

Parameters presented in this data set are wind speed, wind direction, air temperature, relative humidity, snow depth, soil moisture, and soil temperature.

Table 2. Parameters Presented in Data Set

Parameter	Minimum Value	Maximum Value
Air temperature (°C)	-50	50
Relative humidity (%)	0	105
Wind speed (ms-1)	0	50
Average hydraprobe temperature: 5 cm (°C)	-50	50
Average hydraprobe soil water content: 5 cm (wfv)	0	0.7
Average hydraprobe temperature: 20 cm (°C)	-50	50
Average hydraprobe soil water content: 20 cm (wfv)	0	0.7
Average hydraprobe temperature: 50 cm (°C)	-50	50
Average hydraprobe soil water content: 50 cm (wfv)	0	0.7

Data that were considered suspect during manual filtering were left in Level 1 files even after they were identified as suspect. This was done when technicians recognized potential inconsistencies but were either unsure of the cause or were unable to verify their assumptions. Rather than alter the data set without definitive proof of faulty data, data were left for further interpretation and quality control by future investigators. Although the investigator has a high level of confidence in the products that are delivered in this data set, future investigators should implement their own quality control procedures.

1.7 Quality Assessment

The available data product has been processed to a Level 1 standard. This means that raw data (Level 0 data), which were downloaded on approximately a 6-month basis, have been concatenated into one continuous file per meteorological tower. Data have then been filtered twice for faulty values. The first filtering process was done manually to recognize instrument, wiring, or programming problems. The second filtering process was done computationally to remove blank values or any faulty values that fall outside of acceptable boundaries for each instrument (see table below for instrument list). Faulty data and missing data were replaced with a default value of 8999.

2 DATA ACQUISITION AND PROCESSING

2.1 Sensor or Instrument Description

Table 3. Variable Instrumentation

Variable	Instrumentation
Air temperature	Vaisala HMP45C Temperature and Relative Humidity Probe
Relative humidity	Vaisala HMP45C Temperature and Relative Humidity Probe
Wind speed	MetOne 034A Wind Monitor
Wind direction	MetOne 034A Wind Monitor
Snow depth	Judd Ultrasonic Depth Sensor
Average hydraprobe soil temperature	Stevens Vitel Hydra Soil Moisture Probe
Average hydraprobe soil water content	Stevens Vitel Hydra Soil Moisture Probe

Below are photographs of the wind monitor (Figure 2) and snow depth sensor (Figure 3):

Figure 2. Wind Monitor

Figure 3. Snow Depth Sensor

Future investigators should use manufacturers' guidelines to calculate instrument error. No independent instrument calibration has been applied to these data.

Figure 4 illustrates the assembly of each meteorological tower. Observations were made along a cross-arm of the meteorological tower, at 2 m above the ground surface at the North Park MSA and 4 m above ground surface at all other sites. However, because of sloping ground beneath the cross-arms, these heights should only be considered as approximate values.

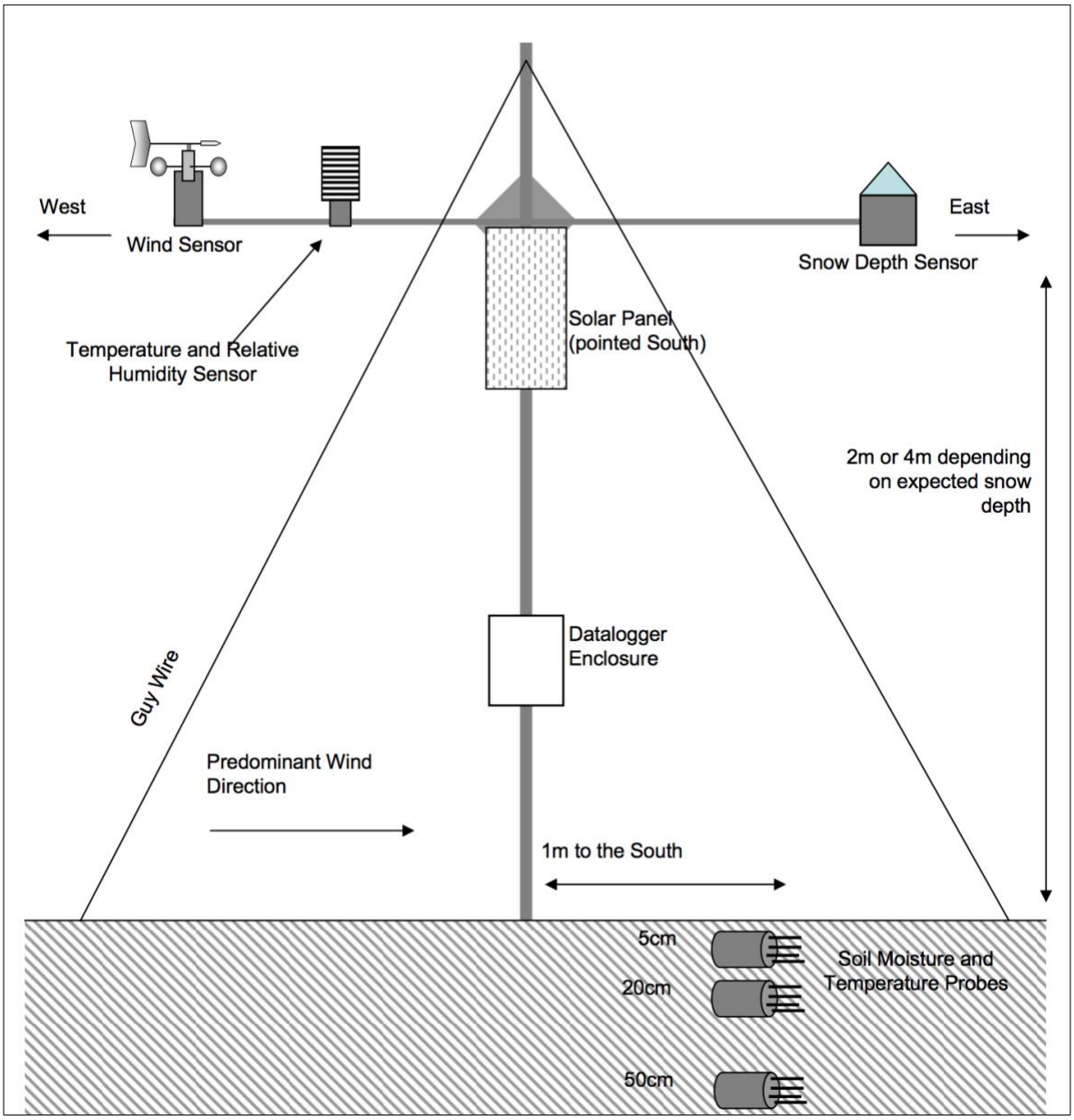

Figure 4. A schematic of meteorological tower assembly

The data include six photographs associated with each tower: one of the tower, one looking down, and one looking from the tower in each compass direction. Photographs are named accordingly; for example, "FANE.JPG" is the photograph of the FANE site tower; "FANE-Down.JPG" is the downward-looking photograph; and "FANE-East.JPG" is the photograph looking eastward from the FANE site tower.

Table 4. Parameters and Measurement Locations

Measurement Location on Tower	Parameters
Cross-arm (2 m to 4 m above ground surface)	Wind speed, wind direction, snow depth, air temperature, relative humidity
At 5 cm, 20 cm, and 50 cm beneath ground surface	Soil moisture content, soil temperature

In addition to direct observations, some parameters were generated within the logger program and as a result of post processing (year, month, day, HH:MM, and Deci-DOY). All time measurements were recorded in GMT.

3 CONTACTS AND ACKNOWLEDGMENTS

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4 DOCUMENT INFORMATION

4.1 Publication Date

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4.2 Date Last Updated

10 March 2021