



Lake Untersee, Antarctica Climate Data, Version 1

USER GUIDE

How to Cite These Data

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

Andersen, D. T., C. P. McKay, and V. Lagun. 2016. *Lake Untersee, Antarctica Climate Data, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. <https://doi.org/10.5067/01U4L6KSRLFU>. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/NSIDC-0665>



National Snow and Ice Data Center

TABLE OF CONTENTS

1	DETAILED DATA DESCRIPTION.....	2
1.1	Format	2
1.2	File and Directory Structure.....	2
1.3	File Size.....	7
1.4	Spatial Coverage.....	7
1.5	Temporal Coverage.....	7
1.5.1	Temporal Resolution.....	7
1.6	Parameter or Variable	7
1.6.1	Sample Data Record.....	7
2	SOFTWARE AND TOOLS	9
2.1	Software and Tools.....	9
3	DATA ACQUISITION AND PROCESSING.....	9
3.1	Data Acquisition Methods.....	9
4	REFERENCES AND RELATED PUBLICATIONS	10
5	CONTACTS AND ACKNOWLEDGMENTS	11
6	DOCUMENT INFORMATION.....	11
6.1	Publication Date	11
6.2	Date Last Updated.....	11

1 DETAILED DATA DESCRIPTION

In November 2008, an automated meteorological station was established at Lake Untersee, a perennially ice-covered lake in East Antarctica. This data set is a five-year data record of meteorological conditions at Lake Untersee. The data cover five austral summer seasons comprised of December, January, and February (D, J, F). The data in the Lake_Untersee_Hourly_2008-12-01_2014-12-06.xlsx file are the hourly averages from the field measurements, and the data in the Lake_Untersee_Daily_2008-12-01_2014-12-06.xlsx file were determined from the hourly values. The data in the Lake_Untersee_MetHobo_2010-12-07_2014-11-23.xlsx file provide the data in two columns in the daily file and form the basis for two different figures (1 and 14) in Andersen, et al. 2015.

1.1 Format

The data are available in Microsoft Excel (.xlsx) format.

1.2 File and Directory Structure

Data are available via [FTP](#) and [HTTPS](#). There are three files in this data set: Lake_Untersee_Daily_2008-12-01_2014-12-06.xlsx, Lake_Untersee_MetHobo_2010-12-07_2014-11-23.xlsx, and Lake_Untersee_Hourly_2008-12-01_2014-12-06.xlsx. See Tables 1, 2, and 3 for data field descriptions.

The Lake_Untersee_Daily_2008-12-01_2014-12-06.xlsx file has 3 header rows and 28 columns. The header rows are defined as follows:

- First header row provides a "long name" for each data field.
- Second header line provides a "short name" for each data field.
- Third header line provides the units for each data field.

Table 1. Lake_Untersee_Daily_2008-12-01_2014-12-06.xlsx Data Field Descriptions

Column Header	Short Name	Description
Date		Date format = mm/dd/yy
Ave Sunlight Figure 2b	SirkW_Avg	Average daily sunlight in kw/m ² from Figure 2b in Andersen, et al. 2015
Net Solar Radiation (Downwelling - Reflected)	NetSW_Tot	Measured with a CNR2-L Kipp and Zonen longwave and shortwave net radiometer. Measurements in W/m ²

Column Header	Short Name	Description
Total Downwelling Longwave Radiation	NetLW_Tot	Measured with a CNR2-L Kipp and Zonen longwave and shortwave net radiometer. Measurements in W/m^2
Minimum Air Temp	RTD_C_Min	Daily minimum temperature in °C measured with a Campbell Scientific 43347-VX RTD temperature probe 2.2 m above the ground
Average Air Temp	RTD_C_Avg	Daily average temperature in °C measured with a Campbell Scientific 43347-VX RTD temperature probe 2.2 m above the ground
Maximum Air Temperature	RTD_C_Max	Daily maximum temperature in °C measured with a Campbell Scientific 43347-VX RTD temperature probe 2.2 m above the ground
Minimum Ground Temp at 1 cm Depth	Temp107C_Min (1 cm)	Daily minimum temperature in °C at 1 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Minimum Ground Temperature at 10 cm Depth	Temp107C_Min(4)	Daily minimum temperature in °C at 10 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Minimum Ground Temperature at 22 cm Depth	Temp107C_Min(5)	Daily minimum temperature in °C at 22 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Minimum Ground Temperature at 27 cm Depth	Temp107C_Min(2)	Daily minimum temperature in °C at 27 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Average Ground Temperature at 1 cm Depth	Temp107C_Avg(1)	Daily average temperature in °C at 1 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Average Ground Temperature at 10 cm Depth	Temp107C_Avg(4)	Daily average temperature in °C at 10 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Average Ground Temperature at 22 cm Depth	Temp107C_Avg(5)	Daily average temperature in °C at 22 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Average Ground Temperature at 27 cm Depth	Temp107C_Avg(2)	Daily average temperature in °C at 27 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Maximum Ground Temperature at 1 cm Depth	Temp107C_Max(1)	Daily maximum temperature in °C at 1 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Maximum Ground Temperature at 10 cm Depth	Temp107C_Max(4)	Daily maximum temperature in °C at 10 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface

Column Header	Short Name	Description
Maximum Ground Temperature at 22 cm Depth	Temp107C_Max(5)	Daily maximum temperature in °C at 22 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Maximum Ground Temperature at 27 cm Depth	Temp107C_Max(2)	Daily maximum temperature in °C at 27 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Mean wind speed over 30 min interval	WS_ms_WVc(1)	Measurements in m/s and were measured with an R.M. Young 05103 wind monitor (Alpine model) affixed to the mast 3.0m above the ground, using WindVector Output option zero. See CR1000 Measurement and Control System Operator's Manual , p. 188-189 for more information.
Maximum wind speed over 30 min interval	WS_ms_Max	Measurements in km/h and were measured with an R.M. Young 05103 wind monitor (Alpine model) affixed to the mast 3.0m above the ground, using WindVector Output option zero. See CR1000 Measurement and Control System Operator's Manual , p. 188-189 for more information.
Minimum Battery Voltage	Batt_Volt_Min	Daily minimum voltage output
Maximum Battery Voltage	Batt_Volt_Max	Daily maximum voltage output
Average Panel Temperature	PTemp_Avg	Daily average temperature in °C of the wiring panel of the Campbell Scientific CR1000 datalogger
blank		no data
blank		no data
Date		Date (mm/dd/yy) of measurements made by the Onset HOBO Pro
Daily Average Air Temp, Deg_C		Daily average air temperature in °C as measured by the Onset HOBO pro instrument

The Lake_Untersee_MetHobo_2010-12-07_2014-11-23.xlsx has 2 header rows and 4 columns. The first header row contains the name and attributes of the sensor used for the HOBO's hourly readings, with the second row providing the field names.

Table 2. Lake_Untersee_MetHobo_2010-12-07_2014-11-23.xlsx Data Field Descriptions

Column Header	Description
LU Local Time	Lake Untersee local time

Column Header	Description
Temperature, C	Temperature read by the Methobo sensor in °C
RH, %	Relative humidity, %
RH Ice	Relative humidity of ice, %

The Lake_Untersee_Hourly_2008-12-01_2014-12-06.xlsx has 4 header rows and 19 columns. The header rows are defined as follows:

- First header row describes the location and instrument for the measurements.
- Second header row provides a "short name" for each data field.
- Third header row provides the units of measure for the data field.
- Fourth header row indicates whether the values of the data field are averages, minimums, maximums, wind vector outputs or sampled values.

Table 3. Lake_Untersee_Hourly_2008-12-01_2014-12-06.xlsx Data Field Descriptions

Column Header	Long Name	Description
Timestamp (TS)		Lake Untersee local timestamp for each measurement. Format = mm/dd/yy hh:mm
Record (RN)		Sequential number applied to each measurement, beginning with 0 and ending with 93735
SlrkW_Avg	Ave Sunlight Figure 2b	Average daily sunlight in kw/m ² from Figure 2b in Andersen, et al. 2015
NetSW_Avg	Net Solar Radiation (Downwelling - Reflected)	Hourly average of the solar shortwave radiation measurement in W/m ² . Measured with a CNR2-L Kipp and Zonen longwave and shortwave net radiometer
NetLW_Avg	Downwelling Longwave Radiation Average	Hourly average of the longwave radiation measurement in W/m ² . Measured with a CNR2-L Kipp and Zonen longwave and shortwave net radiometer.
AirTC_Avg	Minimum Air Temp	Hourly average of the minimum temperature in °C measured with a Campbell Scientific 43347-VX RTD temperature probe 2.2 m above the ground
RTD_C_Avg	Average Air Temp	Hourly average temperature in °C measured with a Campbell Scientific 43347-VX RTD temperature probe 2.2 m above the ground
RTD_C_Max	Maximum Air Temperature	Hourly maximum temperature in °C measured with a Campbell Scientific 43347-VX RTD temperature probe 2.2 m above the ground

Column Header	Long Name	Description
RTD_C_Min	Minimum Air Temp	Hourly average of the minimum temperature in °C measured with a Campbell Scientific 43347-VX RTD temperature probe 2.2 m above the ground
RH_Avg	Relative Humidity Average	Hourly average of relative humidity, %
WS_kmh_Max	Maximum wind speed over 30 min interval	Hourly average of wind speed in km/h. Measured with an R.M. Young 05103 wind monitor (Alpine model) affixed to the mast 3.0m above the ground
WS_kmh_WVc(1)	Mean horizontal wind speed over 30 min interval (S)	Hourly readings measured in km/h with an R.M. Young 05103 wind monitor (Alpine model) affixed to the mast 3.0m above the ground. using WindVector Output option zero. See CR1000 Measurement and Control System Operator's Manual , p. 188-189 for more information.
WS_degrees_WVc(2)	Unit vector mean wind direction (Θ 1)	Hourly readings measured in degrees with an R.M. Young 05103 wind monitor (Alpine model) affixed to the mast 3.0m above the ground, using WindVector Output option zero. See CR1000 Measurement and Control System Operator's Manual , p. 188-189 for more information.
WS_degrees_WVc(3)	Standard deviation of wind direction $\delta(\Theta$ 1)	Hourly readings measured in degrees with an R.M. Young 05103 wind monitor (Alpine model) affixed to the mast 3.0m above the ground, using WindVector Output option zero. See CR1000 Measurement and Control System Operator's Manual , p. 188-189 for more information.
Temp107C_Avg(1) 1cm depth	Average Ground Temperature at 1 cm Depth	Hourly average ground temperature in °C at 1 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Temp107C_Avg(4) 10 cm depth	Average Ground Temperature at 10 cm Depth	Daily average temperature in °C at 10 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Temp107C_Avg(5) 22 cm depth	Average Ground Temperature at 22 cm Depth	Daily average temperature in °C at 22 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
Temp107C_Avg(2) 27 cm depth	Average Ground Temperature at 27 cm Depth	Hourly average temperature in °C at 27 cm ground depth measured with a Campbell 107 thermistor probe buried 1 cm below the surface
BP_kPa	Barometric Pressure	Hourly barometric pressure readings in kPa measured with a Campbell Scientific CS106 barometric pressure sensor

1.3 File Size

The file size ranges from 362 KB to 12.6 MB.

1.4 Spatial Coverage

Data collected at coordinates 74.34° S and 13.45° E at Lake Untersee.

1.5 Temporal Coverage

The data cover from 11 December 2008 to 07 December 2014 for the months of December, January, and February.

1.5.1 Temporal Resolution

The interval averages and minimum and maximum values were recorded every 30 minutes.

1.6 Parameter or Variable

Parameters for this data set are air temperature, ground temperature, wind speed, and solar radiation.

1.6.1 Sample Data Record

See Figures 1, 2, and 3 below for sample data. These figures are representative only and do not contain all columns nor all rows.

Date	Ave Sunlight Figure 2b SrkW_Avg KW/m²	Net Solar Radiation NetSW_Tot W/m²	Total Downwelling Long NetLW_Tot W/m²	Minimum Air Temp RTD_C_Min Deg_C	Average Air Temp RTD_C_Avg Deg_C	Maximum Air Temp RTD_C_Max Deg_C	Minimum Ground Temp at 1 cm Temp107C_Min(1 cm) Deg_C	Minimum Ground Temperature at 10 cm Temp107C_Min(4) Deg_C
1-Dec-08				-6.82	-4.74	-2.92		
2-Dec-08				-6.82	-3.92	-1.53		
3-Dec-08				-4.65	-2.86	-1.2		
4-Dec-08				-5.86	-4.64	-3.33		
5-Dec-08				-5.92	-3.89	-2.35		
6-Dec-08				-5.88	-3.97	-2.63		
7-Dec-08				-7.76	-4.68	-3		
8-Dec-08	0.148	104894.4	-56393.77	-5.617	-4.107	-2.496	-6.441	-6.813
9-Dec-08	0.171	181057.9	-75259.3	-6.188	-3.752	-2.008	-6.17	-6.271
10-Dec-08	0.195	202102.9	-62095.14	-6.273	-3.6	-1.987	-6.09	-5.931
11-Dec-08	0.294	196972.7	-83460.22	-4.577	-2.243	0.503	-3.364	-2.496
12-Dec-08	0.228	246848	-99634.45	-5.849	-3.425	-0.923	-3.575	-1.003
13-Dec-08	0.175	179350.5	-61922.34	-4.832	-2.711	-0.732	-3.803	-0.622
14-Dec-08	0.182	192097.3	-66939.77	-4.556	-2.884	-1.604	-3.551	-0.803
15-Dec-08	0.132	135508.2	-48308.45	-5.361	-4.167	-2.943	-4.095	-2.231
16-Dec-08	0.15	155877	-61222.71	-5.255	-4.383	-3.389	-4.181	-2.725
17-Dec-08	0.21	220076.5	-75947.05	-6.548	-3.64	-1.859	-4.533	-2.992
18-Dec-08	0.291	315482.3	-113626.6	-4.492	-2.686	-0.306	-3.853	-1.605
19-Dec-08	0.357	399721.7	-164352.9	-6.4	-3.198	0.269	-6.518	-1.104
20-Dec-08	0.363	399979	-159041.4	-5.998	-3.412	-0.476	-6.186	-0.281
21-Dec-08	0.146	150433.3	-76346.32	-5.616	-3.06	-1.604	-5.025	-0.152
22-Dec-08	0.278	301266.8	-131411.8	-5.637	-1.841	1.334	-5.598	-0.401
23-Dec-08	0.171	175693.5	-65534.73	-3.665	-0.824	0.929	-2.803	-0.029
24-Dec-08	0.121	123851.9	-46060.95	-2.964	-1.401	-0.434	-1.993	-0.087
25-Dec-08	0.27	311581.9	-117846.2	-3.112	-0.469	3.189	-2.378	-0.183
26-Dec-08	0.234	258035.4	-102480.3	-3.006	-1.284	0.95	-2.581	-0.02
27-Dec-08	0.358	398080.9	-145857.5	-3.261	0.092	3.018	-3.055	-0.039
28-Dec-08	0.202	206147.5	-68178.72	-2.709	-0.252	1.739	-1.388	-0.179
29-Dec-08	0.082	10391.73	-10297.13	-3.346	-1.49	-0.051	-1.638	-0.002
30-Dec-08	0.218	65482.64	-34173.59	-2.73	0.316	2.357	-1.412	-0.057
31-Dec-08	0.281	153288.7	-70510.42	-3.073	1.075	5.304	-2.769	-0.373
1-Jan-09	0.145	51701.84	-32283.4	-5.064	-2.885	-0.902	-3.609	-1.369
2-Jan-09	0.205	95458.45	-53686.56	-7.097	-0.753	1.568	-4.038	-2.263
3-Jan-09	0.35	254956.8	-126989.9	-8.73	-2.127	2.975	-4.592	-3.035
4-Jan-09	0.358	310963.7	-138041.3	-9.7	-1.183	2.079	-1.954	-3.745

Figure 1. Daily Measurements

Local Time	Temperature	RH, %	RH Ice
12/7/10 0:00	-4.9	25.16	26.39
12/7/10 1:00	-4.96	22.58	23.7
12/7/10 2:00	-4.17	20.49	21.34
12/7/10 3:00	-3.54	20.85	21.58
12/7/10 4:00	-3.78	18.93	19.64
12/7/10 5:00	-4.23	25.3	26.36
12/7/10 6:00	-3.84	24.48	25.41
12/7/10 7:00	-3.09	23.86	24.59
12/7/10 8:00	-2.51	23.94	24.53
12/7/10 9:00	-1.79	21.74	22.12
12/7/10 10:00	-1.93	25.45	25.93
12/7/10 11:00	-1.81	24.05	24.48
12/7/10 12:00	-1.58	27.19	27.61
12/7/10 13:00	-1.3	24.92	25.24
12/7/10 14:00	-0.96	28.58	28.85
12/7/10 15:00	-0.76	29.45	29.67
12/7/10 16:00	-1.16	29.51	29.84
12/7/10 17:00	-1.1	28.94	29.25
12/7/10 18:00	-1.07	25.68	25.95
12/7/10 19:00	-1.58	24.58	24.96
12/7/10 20:00	-2.54	23.17	23.75
12/7/10 21:00	-3.04	19.17	19.74
12/7/10 22:00	-3.81	20.12	20.88
12/7/10 23:00	-3.96	18.5	19.23
12/8/10 0:00	-4.65	20.9	21.87
12/8/10 1:00	-5.26	24.02	25.28
12/8/10 2:00	-5.26	20.74	21.83

Figure 2. MetHobo Measurements

Row	NetLW_Avg	AirT_C_Avg	RTD_C_Max	RTD_C_Min	RH_Avg	WS_kmh_Max	WS_kmh_WVc(1)	WS_Degrees_WVc(2)	WS_Degrees_WVc(3)	Temp107C_Avg(1) 1cm depth	Temp107C_Avg(4) 10 cm depth
5	-135.9	-1.065	-1.303	-0.796	-1.731	40.34	21.5	10.47	60.25	48.31	8.59
6	-131.2	-1.208	-1.286	-0.434	-1.646	40.28	28.69	13	60.27	61.78	11.52
7	-147	-0.636	-0.858	0.098	-1.391	40.38	18.77	7.053	111	71.55	13.08
8	-155.1	-0.512	-0.673	0.205	-1.051	40.42	19.11	8.61	76.08	67.47	9.35
9	-146.6	-0.956	-1.158	-0.859	-1.37	40.49	32.99	20.72	70.33	26.34	6.926
10	-147.7	-0.695	-0.742	0.354	-1.178	40.45	29.94	10.94	112.2	69.71	6.99
11	-155.8	-0.46	-0.535	0.332	-1.072	40.24	16.75	7.431	180	82.2	7.863
12	-150	-0.485	-0.578	0.056	-1.369	40.31	22.4	6.888	130.1	87.4	6.912
13	-136.5	-0.878	-0.855	0.503	-1.476	40.57	21.16	10.83	223.5	30.6	4.295
14	-125	-1.127	-1.16	-0.668	-1.561	40.65	17.09	8.44	204.7	46.89	3.056
15	-124.4	-1.001	-1.142	-0.774	-1.497	40.53	14.66	8.09	166.8	66.3	4.158
16	-103.9	-1.323	-1.482	-0.838	-1.731	40.65	20.86	11.69	71.18	39.69	5.544
17	-99.4	-1.513	-1.659	-1.263	-1.944	40.7	13.09	5.366	154.8	64.56	8.31
18	-89.1	-1.535	-1.556	-1.264	-1.774	40.79	16.26	7.206	318.5	60.9	7.325
19	-80.6	-2.088	-2.146	-1.668	-2.369	40.82	22.1	14.43	219.6	18.57	5.961
20	-86.7	-2.246	-2.294	-1.965	-2.518	40.82	20.88	13.11	201	27.54	4.628
21	-82.8	-1.979	-2.111	-1.327	-2.432	40.73	12.92	7.173	200.5	46.45	3.612
22	-81.4	-2.113	-2.337	-1.497	-2.857	40.51	21.81	8.43	223.8	62.11	3.655
23	-79.32	-2.878	-2.951	-2.603	-3.409	40.8	19.74	12.67	191	25.57	2.545
24	-80.7	-3.299	-3.375	-2.942	-3.876	40.78	27.85	19.36	205.2	18.86	1.071
25	-79.46	-3.622	-3.655	-3.028	-3.897	40.81	29.07	23.33	201.9	11.94	-0.104
26	-77.2	-3.69	-3.724	-3.282	-4.067	40.81	33.69	17.3	207.3	36.35	-1.06
27	-74.92	-3.86	-3.917	-3.474	-4.322	40.78	34.15	18.95	202.4	34.32	-1.873
28	-68.43	-3.974	-4.003	-3.644	-4.322	40.76	23.9	13.27	203.2	31.75	-2.498
29	-51.92	-4.081	-4.154	-3.835	-4.492	40.68	16.82	5.828	353.6	92.6	-2.836
30	-43.97	-4.258	-4.324	-4.069	-4.577	40.66	13.92	5.89	97.7	73.03	-2.928
31	-46.08	-4.176	-4.2	-3.984	-4.492	40.68	10.36	5.601	355.4	34.7	-3.081
32	-55.29	-4.19	-4.258	-3.984	-4.534	40.6	13.34	7.377	12.62	19.26	-3.258
33	-54.65	-4.537	-4.527	-4.111	-5.192	40.42	16.05	8	35.77	38.28	-3.464
34	-47.99	-4.838	-4.89	-4.725	-5.277	40.57	23.74	8.75	29.12	84.3	-3.545
35	-50.51	-5.254	-5.347	-4.917	-5.849	40.49	34.41	12.77	176.5	64.42	-3.548
36	-58.48	-5.062	-5.1	-4.895	-5.573	40.53	16.16	8.45	89.9	80.4	-3.558
37	-55.31	-4.695	-4.706	-4.26	-5.001	40.57	32.27	18.12	186.2	42.01	-3.428
38	-50.49	-4.469	-4.535	-4.154	-4.917	40.56	35.03	25.37	178.2	12.3	-3.215
39	-55.56	-4.396	-4.47	-4.069	-4.768	40.54	36.14	26.22	182.4	14.83	-2.921
40											0.851

Figure 3. Hourly Measurements

2 SOFTWARE AND TOOLS

2.1 Software and Tools

Data are accessible with Microsoft Excel.

3 DATA ACQUISITION AND PROCESSING

3.1 Data Acquisition Methods

A Campbell Scientific CR1000 data logger and associated sensors mounted on a standard Campbell Scientific 3-m tripod collected meteorological data once every minute. The interval averages and minimum and maximum values for the variables were recorded every 30 minutes. See Table 4 for a list of the sensors and refer to Andersen, et al. 2015 for more information about the sensors and data collection methods.

Table 4. Sensor Description

Sensor	Parameter Measured	Description
Campbell Scientific 43347-VX RTD Temperature Probe	Air Temperature	Mounted 2.2 m above ground. Uses a 1000 Ω platinum resistance temperature device (RTD) with a stated error of $\pm 0.3^\circ$ C
Onset HOBO Proair	Air Temperature Relative Humidity	Housed in an unventilated sunshield; error is $\pm 0.1^\circ$ C or up to 2° C during bright sun conditions; relative humidity error is $\pm 5\%$
Campbell 107 Thermistor Probe	Ground Temperature	1 cm below the surface; stated uncertainty of $\pm 0.2^\circ$ C
Campbell CS300-L Apogee PYR-P Pyranometer	Solar Flux	Measures the solar radiation incident on a flat, cosine-corrected head, level with respect to the ground; detects solar flux from 300 to 1100 nm; calibrated by Campbell with respect to a Kipp and Zonen CM21 thermopile pyranometer under natural solar flux; absolute accuracy is stated as $\pm 5\%$
R.M. Young 05103 Wind Monitor (Alpine model)	Wind Speed Wind Direction	Mounted 3.0 m above the ground; speed sensitivity is 1.0 m/s; direction set to $\pm 3^\circ$ of true North with a Garmin 60CSx handheld GPS (Baxter 2001)
Campbell Scientific CS106	Barometric Pressure	Measures barometric pressure for the range of 500 to 1100 MB; data are a part of the archival data set

4 REFERENCES AND RELATED PUBLICATIONS

Andersen, Dale T., Christopher P. McKay, and Victor Lagun. 2015. Climate Conditions at Perennially Ice-Covered Lake Untersee, East Antarctica. *Journal of Applied Meteorology and Climatology* 54(7), doi: <http://dx.doi.org/10.1175/jamc-d-14-0251.1>.

Baxter, R. A., 2001. [A simple step by step method for the alignment of wind sensors to true north](#). Extended Abstracts, 11th Symposium on Meteorological Observations and Instrumentation, Albuquerque, NM, American Meteorological Society, 1.2.

Campbell Scientific, Inc. 2013. [CR1000 Measurement and Control System Operator's Manual](#).

Onset Computer Corporation. 2014. [HOBO® Pro v2 \(U23-00x\) Manual](#).

5 CONTACTS AND ACKNOWLEDGMENTS

Dale T. Andersen

Carl Sagan Center, SETI Institute
189 Bernardo Ave., Suite 100
Mountain View, CA 94043 U. S.

Christopher P. McKay

NASA Ames Research Center
Moffatt Blvd. Moffatt Field, CA

Victor Lagun

Arctic and Antarctic Research Institute
Beringa St., 38 St. Petersburg, Russia 199397

Acknowledgments:

These data were generated through support from the NASA Astrobiology/ASTEP program (NNX09AE77A), Tawani Foundation, Trottier Family Foundation, and the Arctic and Antarctic Research Institute (AARI).

6 DOCUMENT INFORMATION

6.1 Publication Date

31 March 2016

6.2 Date Last Updated

December 2020