TITLE

CAMP_Tibet_ANNI-AWS_20021001_20030331.sfc

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DATE OF THIS DOCUMENT

02 Sep. 2004
(Updated 23 Jun. 06)
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1. 0 DATASET OVERVIEW

1.1 Introduction

To clarify the energy and water cycle in the Tibetan Plateau, it is important to understand the characteristics of the basic meteorological elements and surface fluxes.

The purpose of Tibet AWS (Automatic Weather Station) observation is to improve the quantitative understanding of land-atmosphere interactions over the Tibetan Plateau and develop the land surface process models by monitoring these meteorological values.

1.2 Time period covered by the data

Start: 1 October 2002, 00:00
End: 31 March 2003, 23:00

1.3 Temporal characteristics of the data

All parameters are recoded every hour.

1.4 Physical location of the measurement

Latitude : 31.25442 N
Longitude : 92.17241 E
Elevation : 4480 m a.s.l.
Landscape : Bare land (with the thin weed-like plant): Plain land
Canopy height : Less than 5cm.
Soil Characteristics: Silt loam

1.5 Data source

1.6 Website address references

http://monsoon.t.u-tokyo.ac.jp/camp/tibets/

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

The AWS of this site was constructed in summer 2002 as a part of the meso-scale triangle network around the city of Naqu. The site is about 30 km southeast away from Naqu. This system is same as D105, MS3478 (N-PAM) and BJ site. The sensors are mounted on several heights.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Station Pressure	PTB220C	VAISALA
Air Temperature	TS-801(Pt100)	Okazaki
Relative Humidity	HMP-45D	VAISALA
Wind Speed	WS-D32	Komatsu
Wind Direction	WS-D32	Komatsu
Precipitation	NOAH-II	ETI
Snow Depth	SR-50	CAMPBEL
Incoming Shortwave	CM21	Kipp & Zonen)
Outgoing Shortwave	CM21	Kipp & Zonen)
Incoming Longwave	Precision Infrared Radiometer	Eppley
Outgoing Longwave	Precision Infrared Radiometer	Eppley
Skin Temperature	IRt/C 1X-T50F	Exergen

2.3 Instrumentation specification

Station Pressure (0.5m)	: Station Pressure at the 0.5m height (hPa)
Air Temperature (1.0m)	: Air Temperature at the 1.0m height (deg.C)
Relative Humidity (1.0m)	: Relative Humidity at the 1.0m height (%)
Wind Speed (10.0m)	: Wind Speed at the 10.0m height (m/s)
Wind Direction (10.0m)	: Wind Direction at the 10.0m height (deg.)
Precipitation (1.0m)	: Precipitation at the 1.0m height (mm)
Snow Depth (3m)	: Snow depth senced at the 3m height (cm)
Incoming Shortwave (1.58m)	: Shortwave Downward Radiation senced at the 1.58m height (W/m^2)
Outgoing Shortwave (1.28m)	: Shortwave Upward Radiation senced at the 1.28m height (W/m^2)
Incoming Longwave (1.58m)	: Longwave Downword Radiation senced at the 1.58m height (W/m^2)
Outgoing Longwave (1.28m)	: Longwave Upword Radiation senced at the 1.28m height (W/m^2)
Skin Temperature (1.42m)	: Surface Temperature senced at the 1.42m height (deg.C)

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Original data are sampled at every 5 second (0.2Hz) average is computed and stored in a data logger (Campbell CR-10X).
Data are downloaded from the Tower twice every year, in spring and summer. Then, data are sent to Japan, where they are processed.

3.2 Description of derived parameters and processing techniques used

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One humidity sensor is set up for the comparison the performance of No.1 (8.2 m) and No.2 (1.0m) humidity sensor. This reference sensor is exchanged its level (From 1.0 m to 8.2 m) or down (From 8.2m to 1.0m) for every operation. We selected the couple of dataset (No.1 main sensor and No.1 reference sensor; No2. main sensor and No. 2 reference sensor) just before or after 5 days of the operation, and made the linear regressions.
RH1 = a1*RH_ref + b1
RH2 = a1*RH_ref + b2
From these two equations, the regression function between RH1 and RH2 can be derived as
RH2 = a*RH1 + b
RH2 (1.0 m) was corrected as a reference of RH1 using above relation and put the data flag “I”.

And the Two parameters indicated below were computed by using “CEOP Derived Parameter Equations : http://www.joss.ucar.edu/ghp/ceopdm/refdata_report/eqns.html” . also put the data flag “I”,

U,V Components were computed by using (GEMPAK):
U = -sin(direction) * wind_speed;
V = -cos(direction) * wind_speed;

Net radiation were computed by using (GEMPAK):
NET_radiation = down(in)short + down(in)long - up(out)short - up(out)long;

Specific Humidity (Qv) was computed by using
Qv = 0.622 Rv / (1 + Rv)
Rv = Evap / Air_Pressure
Evap = Rh * 0.01 * Evap_sat
Evap_sat = 6.1078^(a*Air_Temp/(b+Air_Temp))
(a = 7.5, b = 237.3 for Air_Temp >= 0 degC; a = 9.5, b = 265.3 for Air_Temp < 0)

4.0 QUALITY CONTROL PROCEDURES

For all parameters, the data has been visually checked, looking for extremely and unusual low/high values and/or periods with constant values thorough the CAMP Quality Control Web Interface.
The quality control flags follow the CEOP data flag definition document.

5.0 GAP FILLING PROCEDURES

No gap filling procedure was applied.

6.0 DATA REMARKS

6.1 PI's assessment of the data

6.1.1 Instruments problems

6.1.2 Quality issues

Precipitation was measured by weight-type gauge, and data noise due to freezing-melting was found. Those noise was changed as 0 mm/h manually, but the process was imperfect and accumulated amount will be underestimated. Therefore, D flag was put. (actually, the I+D flag will be better).

Relative humidity data more than 100% was replaced 100% and data flag was put “I”.

Snow depth was measured by ultra-sonic sensor. The data was corrected by filtering the relative distance between land surface or vegetation surface, but still the noise was found due to scattering of precipitation, movement of arm with strong wind, or short-term movement of vegetation. The noise was removed manually, but this process is imperfect. Therefore, D flag was put. Snow depth in the warm season (June-Sep.) are supposed to be 0 cm, except for hail due to sporadic Cumulonimbus activity.

6.2 Missing data periods

None

7.0 REFERENCE REQUIREMENTS

Original data was collected and is provided within the framework of GAME/CAMP Tibet Scientific and Technological Research Project, funded by the Ministry of Education, Culture, Sports, Science and Technology; the Japan Science and Technology Agency; the Frontier Research System for Global Change; the Japan Aerospace Exploration Agency; the Chinese Academy of Sciences; and the Chinese Academy of Meteorological Sciences.

8.0 REFERENCES

H. Ishikawa and GAME-Tibet Boundary Layer Group, 2001: What has been known and what has not in GAME/Tibet BL observation, Proceedings of the Fifth International Study Conference on GEWEX in Asia and GAME, 691.

Ma, Yaoming, O. Tsukamoto， H. Ishikawa, Z. Su, M. Menenti, J. Wang and J. Wen, 2002: Determination of regional land surface heat flux densities over heterogeneous landscape of HEIFE integrating satellite remote sensing with field observations, Jour. Meteorol. Soc. Japan, 80(3), 485-501.

K. Tanaka, I. Tamagawa, H. Ishikawa, Y. Ma and Z. Hu, 2003: Surface energy and closure of the eastern Tibetan Plateau during the GAME-Tibet IOP 1998, J. Hydrology, vol. 283, pp. 169-183

K. Tanaka and H. Ishikawa, 2001: Long term monitoring of surface energy fluxes of the Amdo PBL site in the eastern Tibetan Plateau, Proceedings of the Fifth International Study Conference on GEWEX in Asia and GAME, 384-388.

Ueno, K., H. Fujii, H. Yamada and L. Liu, （2001） Weak and Frequent Monsoon Precipitation over the Tibetan Plateau. J. Meteor. Soc. Japan, 79, 1B, 419-434.

TITLE

CAMP_Tibet_ANNI-AWS_20030401_20030930.sfc

CONTACT

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DATE OF THIS DOCUMENT

19 Apr. 2006
(Updated 23 Jun. 06)
(Updated 05 Sep. 2006)

1. 0 DATASET OVERVIEW

1.7 Introduction

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1.8 Time period covered by the data

Start: 1 October 2002, 00:00
End: 30 September 2003, 23:00

1.9 Temporal characteristics of the data

All parameters are recoded every hour.

1.10 Physical location of the measurement

Latitude : 31.25442 N
Longitude : 92.17241 E
Elevation : 4480 m a.s.l.
Landscape : Bare land (with the thin weed-like plant): Plain land
Canopy height : Less than 5cm.
Soil Characteristics: Silt loam

1.11 Data source

1.12 Website address references

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Snow Depth	SR-50	CAMPBEL
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Skin Temperature	IRt/C 1X-T50F	Exergen

2.4 Instrumentation specification

Station Pressure (0.5m) : Station Pressure at the 0.5m height (hPa)

Air Temperature (1.0m)	: Air Temperature at the 1.0m height (deg.C)
Relative Humidity (1.0m)	: Relative Humidity at the 1.0m height (%)
Wind Speed (10.0m)	: Wind Speed at the 10.0m height (m/s)
Wind Direction (10.0m)	: Wind Direction at the 10.0m height (deg.)
Precipitation (1.0m)	: Precipitation at the 1.0m height (mm)
Snow Depth (3m)	: Snow depth senced at the 3m height (cm)
Incoming Shortwave (1.58m)	: Shortwave Downward Radiation senced at the 1.58m height (W/m^2)
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Air Temperature, relative humidity, radiation, Wind speed, Wind direction and Skin Temperature are averaged over the previous hour. Air pressure and Snow depth are instantaneous values of each 1 hour. Precipitation is accumulated over the previous 1 hour.

One humidity sensor is set up for the comparison the performance of No.1 (8.2 m) and No.2 (1.0m) humidity sensor. This reference sensor is exchanged its level (From 1.0 m to 8.2 m) or down (From 8.2m to 1.0m) for every operation. We selected the couple of dataset (No.1 main sensor and No.1 reference sensor; No2. main sensor and No. 2 reference sensor) just before or after 5 days of the operation, and made the linear regressions.
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From these two equations, the regression function between RH1 and RH2 can be derived as
RH2 = a*RH1 + b
RH2 (1.0 m) was corrected as a reference of RH1 using above relation and put the data flag “I”.

Because of the calibration coefficients were changed very slowly, monthly value was computed linearly.

	A	B
2003-Apr	0.9976	0.0310
2003-May	0.9973	0.0349
2003-Jun	0.9970	0.0387
2003-Jul	0.9967	0.0426
2003-Aug	0.9964	0.0464
2003-Sep	0.9961	0.0504

And the Two parameters indicated below were computed by using "CEOP Derived Parameter Equations : http://www.joss.ucar.edu/ghp/ceopdm/refdata_report/eqns.html" . also put the data flag "I",

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NET_radiation = down(in)short + down(in)long - up(out)short - up(out)long;

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Qv = 0.622 Rv / (1 + Rv)
Rv = Evap / Air_Pressure
Evap = Rh * 0.01 * Evap_sat
Evap_sat = 6.1078^(a*Air_Temp/(b+Air_Temp))
(a = 7.5, b = 237.3 for Air_Temp >= 0 degC; a = 9.5, b = 265.3 for Air_Temp < 0)

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The quality control flags follow the CEOP data flag definition document.

5.0 GAP FILLING PROCEDURES

No gap filling procedure was applied.

6.0 DATA REMARKS

6.1 PI's assessment of the data

6.1.1 Instruments problems

Regarding the snow depth there is sporadic noise in the data and the reason is still not be sure. Then the Quality control flag was put "D".

6.1.2 Quality issues

Outgoing longwave sensor was trouble during EOP3 second half. Then the regular sensor correction was not executed. But this effect is not so serious (several tens of W/m2) Then data flag was put "I". (Actually, the "I"+"G" flag will be better.)

Precipitation was measured by weight-type gauge, and data noise due to freezing-melting was found. Those noise was changed as 0 mm/h manually, but the process was imperfect and accumulated amount will be underestimated. Therefore, D flag was put. (actually, the I+D flag will be better).

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6.2 Missing data periods

Please see the chapter 9.0.

7.0 REFERENCE REQUIREMENTS

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Ueno, K., H. Fujii, H. Yamada and L. Liu, （2001） Weak and Frequent Monsoon Precipitation over the Tibetan Plateau. J. Meteor. Soc. Japan, 79, 1B, 419-434.

9.0 Missing data periods

Precipitation
2003/04/01 00:00 - 2003/04/19 15:00 (448)except for 2002/08/11-1002/10/09

Snow Depth

2003/05/14 01:00
2003/05/16 09:00
2003/06/22 01:00 - 2003/06/22 02:00 (2)
2003/07/15 00:00 - 2003/07/15 01:00 (2)
2003/08/19 02:00 - 2003/09/30 23:00 (1030)

TITLE

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DATE OF THIS DOCUMENT

7 July. 2006
Updated 07 October 2006

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1.14 Time period covered by the data

Start: 1 October 2003, 00:00
End: 14 August 2004, 23:00

1.15 Temporal characteristics of the data

All parameters are recoded every hour.

1.16 Physical location of the measurement

Latitude : 31.25442 N
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Elevation : 4480 m a.s.l.
Landscape : Bare land (with the thin weed-like plant): Plain land
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NET_radiation = down(in)short + down(in)long - up(out)short - up(out)long;

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Qv = 0.622 Rv / (1 + Rv)
Rv = Evap / Air_Pressure
Evap = Rh * 0.01 * Evap_sat
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5.0 GAP FILLING PROCEDURES

No gap filling procedure was applied.

6.0 DATA REMARKS

6.1 PI's assessment of the data

6.1.1 Instruments problems

Regarding the snow depth there is sporadic noise in the data and the reason is still not be sure. Then the Quality control flag was put “D”.

6.1.2 Quality issues

The incoming longwave values seem low during part of February 2004. Then the data flag “D” was put during this period. There was the same phenomenon in Amdo station in 1998 winter season. Then this ANNI stations phenomenon is probable. But we could not specify this phenomenon is correct or not. Then data flag was put “D”.

Outgoing longwave sensor was trouble during EOP4. Then the regular sensor correction was not executed. But this effect is not so serious (several tens of W/m2) Then data flag was put “I”. (Actually, the “I”+”G” flag will be better.)

6.2 Missing data periods

Please see the chapter 9.0.

7.0 REFERENCE REQUIREMENTS

Original data was collected and is provided within the framework of GAME/CAMP Tibet Scientific and Technological Research Project, funded by the Ministry of Education, Culture, Sports, Science and Technology; the Japan Science and Technology Agency; the Frontier Research System for Global Change; the Japan Aerospace Exploration Agency; the Chinese Academy of Sciences; and the Chinese Academy of Meteorological Sciences.

8.0 REFERENCES

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9.0 Missing data periods

File Name : CAMP_Tibet_ANNI-AWS_20031001_20040814.sfc
Data Period : 2003/10/01 00:00 - 2004/08/14 23:00

Station Pressure
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Air Temperature
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Dew Point Temperature
2003/10/01 00:00 - 2004/08/14 23:00 (ALL)

Relative Humidity
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Specific Humidity

2004/08/14 08:00 - 2004/08/14 23:00 (16)

Wind Speed
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Wind Direction
2004/08/14 08:00 - 2004/08/14 23:00 (16)

U Wind Component
2004/08/14 08:00 - 2004/08/14 23:00 (16)

V Wind Component
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Precipitation
2003/10/01 00:00 - 2004/02/05 15:00 (3064)
2004/03/31 17:00 - 2004/08/14 23:00 (3271)

Snow Depth
No missing data.

Incoming Shortwave
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Outgoing Shortwave
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Incoming Longwave
2004/04/12 07:00
2004/08/14 05:00 - 2004/08/14 06:00 (2)
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Outgoing Longwave
2004/04/12 06:00 - 2004/04/12 13:00 (8)
2004/04/12 20:00 - 2004/04/12 22:00 (3)
2004/04/13 03:00 - 2004/04/13 05:00 (3)
2004/04/13 20:00 - 2004/04/13 21:00 (2)
2004/04/14 01:00 - 2004/04/14 03:00 (3)
2004/04/14 05:00 - 2004/04/14 13:00 (9)
2004/04/15 05:00 - 2004/04/15 12:00 (8)
2004/04/16 02:00
2004/04/16 04:00 - 2004/04/16 06:00 (3)
2004/08/14 06:00 - 2004/08/14 23:00 (18)

Net Radiation
2004/04/12 06:00 - 2004/04/12 13:00 (8)
2004/04/12 20:00 - 2004/04/12 22:00 (3)
2004/04/13 03:00 - 2004/04/13 05:00 (3)
2004/04/13 20:00 - 2004/04/13 21:00 (2)
2004/04/14 01:00 - 2004/04/14 03:00 (3)
2004/04/14 05:00 - 2004/04/14 13:00 (9)
2004/04/15 05:00 - 2004/04/15 12:00 (8)
2004/04/16 02:00
2004/04/16 04:00 - 2004/04/16 06:00 (3)
2004/08/14 05:00 - 2004/08/14 23:00 (19)

Skin Temperature
2004/08/14 08:00 - 2004/08/14 23:00 (16)

Incoming PAR
2003/10/01 00:00 - 2004/08/14 23:00 (ALL)

Outgoing PAR
    2003/10/01 00:00 - 2004/08/14 23:00 (ALL)