TITLE

CAMP_Tibet_MS3478-AWS_20021001_20030331.sfc

CONTACT

Hirohiko Ishikawa
Disaster Prevention Research Institute, Kyoto University
okasho, Uji, Kyoto Pref.,611-0011 Japan
Phone: +81-774-38-4159
Fax : +81-774-38-4158
Email: ishikawa@storm.dpri.kyoto-u.ac.jp

Ken'ich UENO
University of Shiga Prefecture
Hassaka 2500 Hikone,Shiga 522-8533, Japan
Phone: +81-749-28-8312
Fax : +81-749-28-8477
Email: kueno@ses.usp.ac.jp

Yaoming MA
Institute for Tibetan Plateau Research
P.O. Box 2871, Beijing 100085, China.
Phone: +86-10-6284-9294
Fax : +86-10-6284-9886
Email: ymma@itp.cas.ac.cn

Kenji Tanaka
Department of Civil and Environmental Engineering, Kumamoto Univsersity
Kurokami 2-39-1, Kumamoto, Kumamoto Pref., 860-8555, Japan
Phone: +81-96-342-3601
Fax : +81-96-342-3601
Email: ktanaka@gpo.kumamoto-u.ac.jp

DATE OF THIS DOCUMENT

02 Sep. 2004 (Updated 05 Sep. 2006)

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 : 31.92623 N
Longitude : 91.71468 E
Elevation : 4619.5 m a.s.l.
Landscape : Grass land
Canopy height : 15 – 30 cm.
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

This system was constructed in summer 2000. The site is located about 90 km north of the city of Naqu along the highway. The site is to represent cold and flat location in the east middle Tibetan Plateau. 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 sensed at the 3m height (cm)
Incoming Shortwave (1.58m)	: Shortwave Downward Radiation sensed at the 1.58m height (W/m^2)
Outgoing Shortwave (1.28m)	: Shortwave Upward Radiation sensed at the 1.28m height (W/m^2)
Incoming Longwave (1.58m)	: Longwave Downward Radiation sensed at the 1.58m height (W/m^2)
Outgoing Longwave (1.28m)	: Longwave Upward Radiation sensed at the 1.28m height (W/m^2)
Skin Temperature (1.42m)	: Surface Temperature sensed 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 seconds (0.2Hz) and 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

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.
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

Rain gauge problem: the liquid inside the gauge was frozen during winter.
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

Condition of the snow depth sensor was better than at D105 or BJ sites, but the sensor condition is the same as at ANNI site.
Relative distance between the sensor and ground surface was determined during the warm season, and deduced from the original data. The flag was put “I”.

The incoming and outgoing shortwave data at night time was replaced 0 w/m2 and data flag were put "I".

6.2 Missing data periods

Dew Point Temperature
2002/10/01 00:00 - 2003/03/31 23:00 (ALL)

Precipitation
2002/10/04 17:00 - 2003/03/31 23:00 (4279)

Snow Depth
2002/11/03 04:00 - 2002/11/03 06:00 (3)
2002/11/08 06:00 - 2002/11/08 07:00 (2)

Incoming PAR
2002/10/01 00:00 - 2003/03/31 23:00 (ALL)

Outgoing PAR
2002/10/01 00:00 - 2003/03/31 23:00 (ALL)

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

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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.

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CAMP_Tibet_MS3478-AWS_20030401_20030930.sfc

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Ken'ich UENO
University of Tsukuba
Tennoudai 1-1-1 Tsukuba, Ibaraki 305-8572, Japan
Phone/Fax: +8129-853-4399
Email: kenueno@sakura.cc.tsukuba.ac.jp

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Email: ymma@itp.cas.ac.cn

Kenji Tanaka
Department of Civil and Environmental Engineering, Kumamoto University
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Phone/Fax: +81-96-342-3601
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DATE OF THIS DOCUMENT

19 Apr. 2006 (Updated 05 Sep. 2006)

1. 0 DATASET OVERVIEW

1.7 Introduction

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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.

1.8 Time period covered by the data

Start: 1 April 2003, 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 : 31.92623 N
Longitude : 91.71468 E
Elevation : 4619.5 m a.s.l.
Landscape : Grass land
Canopy height : 15 – 30 cm.
Soil Characteristics: Silt loam

1.11 Data source

1.12 Website address references

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Outgoing Shortwave	CM21	Kipp & Zonen)
Incoming Longwave	Precision Infrared Radiometer	Eppley
Outgoing Longwave	Precision Infrared Radiometer	Eppley
Skin Temperature	IRt/C 1X-T50F	Exergen

2.4 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 sensed at the 3m height (cm)
Incoming Shortwave (1.58m)	: Shortwave Downward Radiation sensed at the 1.58m height (W/m^2)
Outgoing Shortwave (1.28m)	: Shortwave Upward Radiation sensed at the 1.28m height (W/m^2)
Incoming Longwave (1.58m)	: Longwave Downward Radiation sensed at the 1.58m height (W/m^2)
Outgoing Longwave (1.28m)	: Longwave Upward Radiation sensed at the 1.28m height (W/m^2)
Skin Temperature (1.42m)	: Surface Temperature sensed at the 1.42m height (deg.C)

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3.1 Description of data collection

Original data are sampled at every 5 seconds (0.2Hz) and 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

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.
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”.

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

	a	b
2003-Apr	1.0076	1.3746
2003-May	1.0080	1.3448
2003-Jun	1.0085	1.3150
2003-Jul	1.0089	1.2853
2003-Aug	1.0093	1.2554
2003-Sep	1.0097	1.2257

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;

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

Rain gauge problem: the liquid inside the gauge was frozen during winter.
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

We have corrected the humidity value, using a reference sensor, during the EOP-3 second-half; we found out that the relative humidity quality at 1.0 meters high was unequal between first-half and second-half in EOP-3.

Condition of the snow depth sensor was better than at D105 or BJ sites, but the sensor condition is the same as at ANNI site.
Relative distance between the sensor and ground surface was determined during the warm season, and deduced from the original data. The flag was put “I”, except that sporadic noise data were treated as missing.

The incoming and outgoing shortwave data at night time was replaced 0 w/m2 and data flag were put "I".

6.2 Missing data periods

Missing data periods listed in 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.

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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

Dew Point Temperature
2003/04/01 00:00 - 2003/09/30 23:00 (ALL)

Precipitation
2003/04/01 00:00 - 2003/04/25 16:00 (593)

Snow Depth
2003/05/05 00:00
2003/05/05 03:00 - 2003/05/05 04:00 (2)
2003/05/05 06:00
2003/05/05 23:00

2003/05/06 01:00
2003/05/06 03:00 - 2003/05/06 04:00 (2)
2003/05/06 11:00
2003/05/06 18:00 - 2003/05/06 19:00 (2)
2003/05/11 09:00
2003/05/14 22:00 - 2003/05/15 00:00 (3)
2003/05/15 03:00
2003/05/16 10:00 - 2003/05/16 11:00 (2)
2003/07/04 01:00 - 2003/07/04 02:00 (2)
2003/09/12 05:00 - 2003/09/12 06:00 (2)

Incoming PAR
2003/04/01 00:00 - 2003/09/30 23:00 (ALL)

Outgoing PAR
2003/04/01 00:00 - 2003/09/30 23:00 (ALL)

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CONTACT

Hirohiko Ishikawa
Disaster Prevention Research Institute, Kyoto University
Gokasho, Uji, Kyoto Pref.,611-0011 Japan
Phone: +81-774-38-4159
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Kenji Tanaka
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DATE OF THIS DOCUMENT

7 July. 2006

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1.14 Time period covered by the data

Start: 1 October 2003, 00:00
End: 31 December 2004, 23:00

1.15 Temporal characteristics of the data

All parameters are recoded every hour.

1.16 Physical location of the measurement

Latitude : 31.92623 N
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Elevation : 4619.5 m a.s.l.
Landscape : Grass land
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2003-Jul	1.0089	1.2853
2003-Aug	1.0093	1.2554
2003-Sep	1.0097	1.2257

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Rv = Evap / Air_Pressure
Evap = Rh * 0.01 * Evap_sat
Evap_sat = 6.1078^(a*Air_Temp/(b+Air_Temp))
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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_MS3478-AWS_20031001_20041231.sfc
Data Period : 2003/10/01 00:00 - 2004/12/31 23:00
-----------------------------------------------------------

Station Pressure
   No missing data.

Air Temperature
   No missing data.

Dew Point Temperature
   2003/10/01 00:00 - 2004/12/31 23:00 (ALL)

Relative Humidity
   No missing data.

Specific Humidity
   No missing data.

Wind Speed
   No missing data.

Wind Direction
   No missing data.
```

U Wind Component
No missing data.

V Wind Component
No missing data.

Precipitation
2003/10/01 00:00 - 2004/02/08 15:00 (3136)
2004/03/31 17:00 - 2004/12/31 23:00 (6607)

Snow Depth
2003/10/01 00:00 - 2004/12/31 23:00 (ALL)

Incoming Shortwave
No missing data.

Outgoing Shortwave
No missing data.

Incoming Longwave
No missing data.

Outgoing Longwave
No missing data.

Net Radiation
No missing data.

Skin Temperature
No missing data.

Incoming PAR
2003/10/01 00:00 - 2004/12/31 23:00 (ALL)

Outgoing PAR
2003/10/01 00:00 - 2004/12/31 23:00 (ALL)