TITLE

CAMP_Tibet_Amdo-Tower_20021001_20030331.sfc

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DATE OF THIS DOCUMENT

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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 : 32.24096 N
Longitude : 91.62493 E
Elevation : 4695.2 m a.s.l.
Landscape : Bare land (with the thin weed-like plant)
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 was constructed in summer 1997, and started continuous observation in May 1998. The site is located in the wide valley running from northeast to southwest, in the middle of the Tibetan Plateau. The AWS is consisted of the 14-m boundary layer tower and the 4-component radiation system. The sensors are mounted on several heights.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Station Pressure	DPA21	VAISALA
Air Temperature	HMP35D	VAISALA
Relative Humidity	Electric Capacitance	ibid
Wind Speed	aerobane FF-11	OGASAWARA
Wind Direction	aerobane FF-11	OGASAWARA
Precipitation	RG-13	VAISALA
Snow Depth	N/A	N/A
Incoming Shortwave	CM21	Kipp & Zonen
Outgoing Shortwave	CM21	Kipp & Zonen
Incoming Longwave	Precision Infrared Radiometer	Eppley
Outgoing Longwave	Precision Infrared Radiometer	Eppley
Skin Temperature	MF-81	Optex

2.3 Instrumentation specification

Station Pressure (1.0m)	: Station Pressure at the 1.0m height (hPa)
Air Temperature (1.55m)	: Air Temperature at the 1.55m height (deg.C)
Relative Humidity (1.55m)	: Relative Humidity at the 1.55m height (%)
Wind Speed (14.1m)	: Wind Speed at the 14.1m height (m/s)
Wind Direction (14.1m)	: Wind Direction at the 14.1m height (deg.)
Precipitation (0.5m)	: Precipitation at the 0.5m height (mm)
Snow Depth	: No observation
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 (1.9m)	: Surface Temperature senced at the 1.9 m height (deg.C)

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Original data are sampled at every 1 second (1.0 Hz), and 10-minute average is computed and stored in a datalogger (VAISALA MILoS500).
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 is instantaneous values of each 1 hour. Precipitation is accumulated over the previous 1 hour.

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;
```

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

Regarding the Skin Temperature, the guarantee temperature range by the low temperature of a sensor is to -20 degrees C. Then the output of a radiation thermometer is not stable on the whole under the weather in the first half of EOP-3. Then the Quality control flag was put “D”.

None.

6.1.2 Quality issues

As there were noise upward and downward shortwave radiation in the night-time, the data night time was replaced in the value 0.00 and flagged I.

Precipitation was measured by tipping bucket type gauge.
In the Amdo area, solid precipitation, such as hail, sometimes prevails even in the warm season. Therefore, the flag of precipitation data are D.

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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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.

9.0 Missing data periods

File Name : CAMP_Tibet_Amdo-Tower_20021001_20030331.sfc
Data Period : 2002/10/01 00:00 - 2003/03/31 23:00

Station Pressure
2002/11/23 09:00 - 2002/11/28 03:00 (115)
2002/12/20 21:00 - 2002/12/21 02:00 (6)
2002/12/21 18:00 - 2002/12/22 01:00 (8)
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Dew Point Temperature
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Relative Humidity
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2003/01/23 22:00 - 2003/01/24 03:00 (6)
2003/01/24 19:00 - 2003/01/25 02:00 (8)
2003/01/26 00:00 - 2003/01/26 02:00 (3)
2003/01/27 00:00 - 2003/01/27 02:00 (3)
2003/01/28 01:00 - 2003/01/28 02:00 (2)
2003/01/29 16:00 - 2003/01/30 02:00 (11)
2003/01/30 23:00 - 2003/01/31 05:00 (7)
2003/02/01 00:00 - 2003/02/01 05:00 (6)
2003/02/01 17:00 - 2003/02/02 02:00 (10)
2003/02/03 00:00 - 2003/02/03 02:00 (3)
2003/02/04 01:00 - 2003/02/04 02:00 (2)
2003/02/05 01:00 - 2003/02/05 02:00 (2)
2003/02/05 23:00 - 2003/02/06 02:00 (4)
2003/02/06 23:00 - 2003/02/07 02:00 (4)
2003/02/08 00:00 - 2003/02/08 02:00 (3)
2003/02/09 00:00 - 2003/02/09 02:00 (3)
2003/02/10 23:00 - 2003/02/11 02:00 (4)
2003/02/12 00:00 - 2003/02/12 02:00 (3)
2003/02/12 21:00 - 2003/02/13 02:00 (6)
2003/02/13 22:00 - 2003/02/14 03:00 (6)
2003/02/14 15:00 - 2003/02/15 03:00 (13)
2003/02/15 23:00 - 2003/02/16 02:00 (4)
2003/02/17 00:00 - 2003/02/17 01:00 (2)
2003/02/18 00:00 - 2003/02/18 02:00 (3)
2003/02/20 21:00 - 2003/02/21 02:00 (6)
2003/02/21 20:00 - 2003/02/22 02:00 (7)
2003/02/23 00:00 - 2003/02/23 02:00 (3)
2003/02/24 00:00 - 2003/02/24 02:00 (3)
2003/02/25 23:00 - 2003/02/26 02:00 (4)
2003/02/26 22:00 - 2003/02/27 02:00 (5)
2003/02/27 20:00 - 2003/02/28 02:00 (7)
2003/03/01 01:00
2003/03/05 23:00 - 2003/03/06 02:00 (4)
2003/03/07 00:00 - 2003/03/07 02:00 (3)
2003/03/08 20:00 - 2003/03/09 02:00 (7)
2003/03/11 19:00 - 2003/03/12 01:00 (7)

2003/03/13 23:00 - 2003/03/14 02:00 (4)
2003/03/15 01:00
2003/03/17 01:00
2003/03/21 23:00 - 2003/03/22 02:00 (4)
2003/03/23 01:00
2003/03/26 01:00
2003/03/27 02:00
2003/03/28 01:00

V Wind Component
2002/10/01 00:00
2002/11/23 08:00 - 2002/11/28 04:00 (117)
2002/12/11 01:00 - 2002/12/11 02:00 (2)
2002/12/18 01:00 - 2002/12/18 02:00 (2)
2002/12/20 20:00 - 2002/12/21 03:00 (8)
2002/12/21 17:00 - 2002/12/22 02:00 (10)
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2002/12/27 20:00 - 2002/12/28 02:00 (7)
2002/12/28 23:00 - 2002/12/29 02:00 (4)
2002/12/29 22:00 - 2002/12/30 02:00 (5)
2002/12/30 23:00 - 2002/12/31 02:00 (4)
2003/01/01 01:00 - 2003/01/01 02:00 (2)
2003/01/01 17:00 - 2003/01/02 02:00 (10)
2003/01/02 21:00 - 2003/01/03 02:00 (6)
2003/01/03 21:00 - 2003/01/04 02:00 (6)
2003/01/04 22:00 - 2003/01/05 02:00 (5)
2003/01/05 21:00 - 2003/01/06 02:00 (6)
2003/01/06 22:00 - 2003/01/07 02:00 (5)
2003/01/08 00:00 - 2003/01/08 01:00 (2)
2003/01/09 00:00 - 2003/01/09 02:00 (3)
2003/01/10 00:00 - 2003/01/10 02:00 (3)
2003/01/11 00:00 - 2003/01/11 02:00 (3)
2003/01/12 00:00 - 2003/01/12 02:00 (3)
2003/01/12 23:00 - 2003/01/13 02:00 (4)
2003/01/14 00:00 - 2003/01/14 02:00 (3)
2003/01/14 23:00 - 2003/01/15 02:00 (4)
2003/01/16 01:00 - 2003/01/16 02:00 (2)
2003/01/17 01:00 - 2003/01/17 02:00 (2)
2003/01/22 01:00 - 2003/01/22 02:00 (2)
2003/01/23 22:00 - 2003/01/24 03:00 (6)
2003/01/24 19:00 - 2003/01/25 02:00 (8)
2003/01/26 00:00 - 2003/01/26 02:00 (3)
2003/01/27 00:00 - 2003/01/27 02:00 (3)
2003/01/28 01:00 - 2003/01/28 02:00 (2)
2003/01/29 16:00 - 2003/01/30 02:00 (11)
2003/01/30 23:00 - 2003/01/31 05:00 (7)
2003/02/01 00:00 - 2003/02/01 05:00 (6)
2003/02/01 17:00 - 2003/02/02 02:00 (10)
2003/02/03 00:00 - 2003/02/03 02:00 (3)
2003/02/04 01:00 - 2003/02/04 02:00 (2)
2003/02/05 01:00 - 2003/02/05 02:00 (2)
2003/02/05 23:00 - 2003/02/06 02:00 (4)
2003/02/06 23:00 - 2003/02/07 02:00 (4)
2003/02/08 00:00 - 2003/02/08 02:00 (3)
2003/02/09 00:00 - 2003/02/09 02:00 (3)
2003/02/10 23:00 - 2003/02/11 02:00 (4)

2003/02/12 00:00 - 2003/02/12 02:00 (3)
2003/02/12 21:00 - 2003/02/13 02:00 (6)
2003/02/13 22:00 - 2003/02/14 03:00 (6)
2003/02/14 15:00 - 2003/02/15 03:00 (13)
2003/02/15 23:00 - 2003/02/16 02:00 (4)
2003/02/17 00:00 - 2003/02/17 01:00 (2)
2003/02/18 00:00 - 2003/02/18 02:00 (3)
2003/02/20 21:00 - 2003/02/21 02:00 (6)
2003/02/21 20:00 - 2003/02/22 02:00 (7)
2003/02/23 00:00 - 2003/02/23 02:00 (3)
2003/02/24 00:00 - 2003/02/24 02:00 (3)
2003/02/25 23:00 - 2003/02/26 02:00 (4)
2003/02/26 22:00 - 2003/02/27 02:00 (5)
2003/02/27 20:00 - 2003/02/28 02:00 (7)
2003/03/01 01:00
2003/03/05 23:00 - 2003/03/06 02:00 (4)
2003/03/07 00:00 - 2003/03/07 02:00 (3)
2003/03/08 20:00 - 2003/03/09 02:00 (7)
2003/03/11 19:00 - 2003/03/12 01:00 (7)
2003/03/13 23:00 - 2003/03/14 02:00 (4)
2003/03/15 01:00
2003/03/17 01:00
2003/03/21 23:00 - 2003/03/22 02:00 (4)
2003/03/23 01:00
2003/03/26 01:00
2003/03/27 02:00
2003/03/28 01:00

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

Snow Depth
2002/10/01 00:00 - 2003/03/31 23:00 (ALL)

Incoming Shortwave
2002/12/23 17:00 - 2002/12/31 15:00 (191)

Outgoing Shortwave
2002/12/23 17:00 - 2002/12/31 15:00 (191)

Incoming Longwave
2002/12/23 17:00 - 2002/12/31 15:00 (191)

Outgoing Longwave
2002/12/23 17:00 - 2002/12/31 15:00 (191)

Net Radiation
2002/10/01 00:00
2002/11/23 08:00
2002/12/21 15:00
2002/12/23 16:00 - 2002/12/31 16:00 (193)

Skin Temperature
2002/11/23 09:00 - 2002/11/28 03:00 (115)
2002/12/20 21:00 - 2002/12/21 02:00 (6)
2002/12/21 18:00 - 2002/12/22 01:00 (8)

2002/12/27 21:00 - 2002/12/28 01:00 (5)
2002/12/29 00:00 - 2002/12/29 01:00 (2)
2002/12/29 23:00 - 2002/12/30 01:00 (3)
2002/12/31 00:00 - 2002/12/31 01:00 (2)
2003/01/01 18:00 - 2003/01/02 01:00 (8)
2003/01/02 23:00 - 2003/01/03 01:00 (3)
2003/01/03 23:00
2003/01/04 01:00
2003/01/04 23:00 - 2003/01/05 01:00 (3)
2003/01/05 22:00 - 2003/01/06 01:00 (4)
2003/01/06 22:00 - 2003/01/06 23:00 (2)
2003/01/07 01:00
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2003/01/09 01:00
2003/01/10 00:00 - 2003/01/10 01:00 (2)
2003/01/11 01:00
2003/01/12 01:00
2003/01/12 23:00 - 2003/01/13 01:00 (3)
2003/01/14 01:00
2003/01/15 00:00 - 2003/01/15 01:00 (2)
2003/01/16 01:00
2003/01/23 23:00 - 2003/01/24 02:00 (4)
2003/01/24 20:00 - 2003/01/25 01:00 (6)
2003/01/26 01:00
2003/01/27 01:00
2003/01/28 01:00
2003/01/29 17:00 - 2003/01/30 01:00 (9)
2003/01/31 00:00 - 2003/01/31 03:00 (4)
2003/02/01 01:00 - 2003/02/01 04:00 (4)
2003/02/01 18:00 - 2003/02/02 01:00 (8)
2003/02/03 01:00
2003/02/04 01:00
2003/02/05 02:00
2003/02/06 00:00 - 2003/02/06 01:00 (2)
2003/02/07 00:00 - 2003/02/07 01:00 (2)
2003/02/08 01:00
2003/02/09 01:00
2003/02/10 23:00 - 2003/02/11 01:00 (3)
2003/02/12 00:00 - 2003/02/12 02:00 (3)
2003/02/12 22:00 - 2003/02/13 01:00 (4)
2003/02/13 22:00 - 2003/02/14 02:00 (5)
2003/02/14 16:00 - 2003/02/15 01:00 (10)
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2003/02/17 01:00
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2003/02/20 21:00 - 2003/02/21 01:00 (5)
2003/02/21 21:00 - 2003/02/22 01:00 (5)
2003/02/23 01:00
2003/02/24 01:00
2003/02/25 23:00 - 2003/02/26 01:00 (3)
2003/02/26 23:00 - 2003/02/27 02:00 (4)
2003/02/27 21:00 - 2003/02/28 01:00 (5)
2003/03/05 23:00 - 2003/03/06 01:00 (3)
2003/03/07 00:00 - 2003/03/07 01:00 (2)
2003/03/08 21:00 - 2003/03/09 01:00 (5)
2003/03/11 20:00 - 2003/03/12 01:00 (6)

2003/03/14 00:00 - 2003/03/14 01:00 (2)
2003/03/22 00:00

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)

TITLE

CAMP_Tibet_Amdo-Tower_20021001_20030930.sfc_r00.doc

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DATE OF THIS DOCUMENT

19 Apr. 2006 (Updated 31 Aug. 2006)

1. 0 DATASET OVERVIEW

1.7 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.

1.8 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 : 32.24096 N
Longitude : 91.62493 E
Elevation : 4695.2 m a.s.l.
Landscape : Bare land (with the thin weed-like plant)
Canopy height : Less than 5cm.
Soil Characteristics: Silt loam

1.11 Data source

1.12 Website address references

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

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

The AWS was constructed in summer 1997, and started continuous observation in May 1998. The site is located in the wide valley running from northeast to southwest, in the middle of the Tibetan Plateau. The AWS is consisted of the 14-m boundary layer tower and the 4-component radiation system. The sensors are mounted on several heights.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Station Pressure	DPA21	VAISALA
Air Temperature	HMP35D	VAISALA
Relative Humidity	Electric Capacitance	ibid
Wind Speed	aerobane FF-11	OGASAWARA
Wind Direction	aerobane FF-11	OGASAWARA
Precipitation	RG-13	VAISALA
Snow Depth	N/A	N/A
Incoming Shortwave	CM21	Kipp & Zonen
Outgoing Shortwave	CM21	Kipp & Zonen
Incoming Longwave	Precision Infrared Radiometer	Eppley
Outgoing Longwave	Precision Infrared Radiometer	Eppley
Skin Temperature	MF-81	Optex

2.4 Instrumentation specification

Station Pressure (1.0m) : Station Pressure at the 1.0m height (hPa)
Air Temperature (1.55m) : Air Temperature at the 1.55m height (deg.C)
Relative Humidity (1.55m) : Relative Humidity at the 1.55m height (%)

Wind Speed (14.1m)	: Wind Speed at the 14.1m height (m/s)
Wind Direction (14.1m)	: Wind Direction at the 14.1m height (deg.)
Precipitation (0.5m)	: Precipitation at the 0.5m height (mm)
Snow Depth	: No observation
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 (1.9m)	: Surface Temperature senced at the 1.9 m height (deg.C)

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Original data are sampled at every 1 second (1.0 Hz), and 10-minute average is computed and stored in a datalogger (VAISALA MILoS500).
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 is instantaneous values of each 1 hour. Precipitation is accumulated over the previous 1 hour.

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;
```

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

Regarding the Skin Temperature, the guarantee temperature range by the low temperature of a sensor is to -20 degrees C. Then the output of a radiation thermometer is not stable on the whole under the weather in the first half of EOP-3. Then the Quality control flag was put “D”.

6.1.2 Quality issues

As there were noise upward and downward shortwave radiation in the night-time, the data night time was replaced in the value 0.00 and flagged I.

Precipitation was measured by tipping bucket type gauge.In the Amdo area, solid precipitation sometimes prevails even in the warm season.
Therefore, the flag of precipitation data are D after June 1, 2003.

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

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.

9.0 Missing data periods

File Name : CAMP_Tibet_Amdo-Tower_20030401_20030930.sfc
Data Period : 2003/04/01 00:00 - 2003/09/30 23:00

Station Pressure
2003/04/02 00:00 - 2003/04/02 01:00 (2)
2003/04/21 02:00 - 2003/04/21 15:00 (14)
2003/05/30 04:00
2003/09/04 13:00 - 2003/09/30 23:00 (635)

Air Temperature
2003/04/02 00:00 - 2003/04/02 01:00 (2)
2003/04/21 02:00 - 2003/04/21 15:00 (14)
2003/05/30 04:00
2003/09/04 13:00 - 2003/09/30 23:00 (635)

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

Relative Humidity
2003/04/02 00:00 - 2003/04/02 01:00 (2)
2003/04/21 02:00 - 2003/04/21 15:00 (14)
2003/05/30 04:00
2003/09/04 13:00 - 2003/09/30 23:00 (635)

Specific Humidity
2003/04/01 00:00 - 2003/09/30 23:00 (ALL)

Wind Speed
2003/04/02 00:00 - 2003/04/02 01:00 (2)
2003/04/21 02:00 - 2003/04/21 15:00 (14)
2003/05/30 04:00
2003/09/04 13:00 - 2003/09/30 23:00 (635)

Wind Direction
2003/04/02 00:00 - 2003/04/02 01:00 (2)
2003/04/21 02:00 - 2003/04/21 15:00 (14)
2003/05/30 04:00
2003/09/04 13:00 - 2003/09/30 23:00 (635)

U Wind Component
2003/04/02 00:00 - 2003/04/02 01:00 (2)
2003/04/21 02:00 - 2003/04/21 15:00 (14)
2003/05/30 04:00

2003/09/04 13:00 - 2003/09/30 23:00 (635)

V Wind Component
2003/04/02 00:00 - 2003/04/02 01:00 (2)
2003/04/21 02:00 - 2003/04/21 15:00 (14)
2003/05/30 04:00
2003/09/04 13:00 - 2003/09/30 23:00 (635)

Precipitation
2003/04/01 00:00 - 2003/05/31 15:00 (1456)

Snow Depth
2003/04/01 00:00 - 2003/09/30 23:00 (ALL)

Incoming Shortwave
2003/05/30 04:00 - 2003/09/30 23:00 (2972)

Outgoing Shortwave
2003/05/30 04:00 - 2003/09/30 23:00 (2972)

Incoming Longwave
2003/05/30 04:00 - 2003/09/30 23:00 (2972)

Outgoing Longwave
2003/05/30 04:00 - 2003/09/30 23:00 (2972)

Net Radiation
2003/05/30 04:00 - 2003/09/30 23:00 (2972)

Skin Temperature
2003/04/02 00:00 - 2003/04/02 01:00 (2)
2003/04/21 02:00 - 2003/04/21 15:00 (14)
2003/05/30 04:00
2003/09/04 13:00 - 2003/09/30 23:00 (635)

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)

TITLE

CAMP_Tibet_Amdo-Tower_20040421_20041231.sfc

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DATE OF THIS DOCUMENT

7 July. 2006
Updated 06 October 2006

1. 0 DATASET OVERVIEW

1.13 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.

1.14 Time period covered by the data

Start: 21 April 2004, 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 : 32.24096 N
Longitude : 91.62493 E
Elevation : 4695.2 m a.s.l.
Landscape : Bare land (with the thin weed-like plant)
Canopy height : Less than 5cm.
Soil Characteristics: Silt loam

1.17 Data source

1.18 Website address references

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

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

The AWS was constructed in summer 1997, and started continuous observation in May 1998. The site is located in the wide valley running from northeast to southwest, in the middle of the Tibetan Plateau. The AWS is consisted of the 14-m boundary layer tower and the 4-component radiation system. The sensors are mounted on several heights.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Station Pressure	DPA21	VAISALA
Air Temperature	HMP35D	VAISALA
Relative Humidity	Electric Capacitance	ibid
Wind Speed	aerobane FF-11	OGASAWARA
Wind Direction	aerobane FF-11	OGASAWARA
Precipitation	RG-13	VAISALA
Incoming Shortwave	CM21	Kipp & Zonen
Outgoing Shortwave	CM21	Kipp & Zonen
Incoming Longwave	Precision Infrared Radiometer	Eppley
Outgoing Longwave	Precision Infrared Radiometer	Eppley
Skin Temperature	MF-81	Optex

2.5 Instrumentation specification

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Relative Humidity (1.55m) : Relative Humidity at the 1.55m height (%)

Wind Speed (14.1m) : Wind Speed at the 14.1m height (m/s)
Wind Direction (14.1m) : Wind Direction at the 14.1m height (deg.)
Precipitation (0.5m) : Precipitation at the 0.5m height (mm)
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 (1.9m) : Surface Temperature senced at the 1.9 m height (deg.C)

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Original data are sampled at every 1 second (1.0 Hz), and 10-minute average is computed and stored in a datalogger (VAISALA MILoS500).
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 is instantaneous values of each 1 hour. Precipitation is accumulated over the previous 1 hour.

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;

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

None.

6.1.2 Quality issues

The wind direction data was pretty constant from October to December 2004. Then these data flag was put as follows.

"D" flag was put from 2004/10/02 - 2004/10/03, because the constant activity of wind direction 0 degree in a few hours.

"B" flag was put from 2004/10/04 - 2004/12/31, because the constant activity of wind direction around 80 degree for long time.

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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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.

9.0 Missing data periods

File Name : CAMP_Tibet_Amdo-Tower_20040421_20041231.sfc
Data Period : 2004/04/21 00:00 - 2004/12/31 23:00

Station Pressure
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 06:00 (1520)

Air Temperature
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 06:00 (1520)

Dew Point Temperature
2004/04/21 00:00 - 2004/12/31 23:00 (ALL)

Relative Humidity
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/04/28 11:00 - 2004/04/28 15:00 (5)
2004/04/28 17:00 - 2004/04/28 18:00 (2)
2004/04/28 22:00 - 2004/04/29 03:00 (6)
2004/04/30 01:00
2004/05/22 20:00
2004/05/23 04:00
2004/05/23 09:00
2004/05/24 19:00 - 2004/05/24 22:00 (4)
2004/05/26 19:00 - 2004/05/27 00:00 (6)
2004/05/28 17:00 - 2004/05/28 19:00 (3)
2004/05/29 05:00 - 2004/05/29 06:00 (2)
2004/05/29 16:00
2004/05/29 20:00 - 2004/05/29 21:00 (2)
2004/05/31 14:00
2004/06/01 14:00 - 2004/06/02 00:00 (11)
2004/06/07 23:00 - 2004/06/08 01:00 (3)
2004/06/09 20:00 - 2004/08/12 07:00 (1524)
2004/09/17 23:00 - 2004/09/18 01:00 (3)
2004/09/19 02:00
2004/09/20 18:00
2004/10/01 21:00 - 2004/10/01 23:00 (3)
2004/10/02 17:00 - 2004/10/02 22:00 (6)
2004/10/07 23:00

Specific Humidity
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/04/28 11:00 - 2004/04/28 15:00 (5)
2004/04/28 17:00 - 2004/04/28 18:00 (2)
2004/04/28 22:00 - 2004/04/29 03:00 (6)
2004/04/30 01:00
2004/05/22 20:00
2004/05/23 04:00
2004/05/23 09:00
2004/05/24 19:00 - 2004/05/24 22:00 (4)
2004/05/26 19:00 - 2004/05/27 00:00 (6)
2004/05/28 17:00 - 2004/05/28 19:00 (3)
2004/05/29 05:00 - 2004/05/29 06:00 (2)
2004/05/29 16:00

2004/05/29 20:00 - 2004/05/29 21:00 (2)
2004/05/31 14:00
2004/06/01 14:00 - 2004/06/02 00:00 (11)
2004/06/07 23:00 - 2004/06/08 01:00 (3)
2004/06/09 20:00 - 2004/08/12 07:00 (1524)
2004/09/17 23:00 - 2004/09/18 01:00 (3)
2004/09/19 02:00
2004/09/20 18:00
2004/10/01 21:00 - 2004/10/01 23:00 (3)
2004/10/02 17:00 - 2004/10/02 22:00 (6)
2004/10/07 23:00

Wind Speed
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 06:00 (1520)
2004/10/04 10:00 - 2004/12/31 23:00 (2126)

Wind Direction
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 06:00 (1520)
2004/10/04 10:00 - 2004/12/31 23:00 (2126)

U Wind Component
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 06:00 (1520)
2004/10/04 10:00 - 2004/12/31 23:00 (2126)

V Wind Component
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 06:00 (1520)
2004/10/04 10:00 - 2004/12/31 23:00 (2126)

Precipitation
2004/04/21 00:00 - 2004/12/31 23:00 (ALL)

Snow Depth
2004/04/21 00:00 - 2004/12/31 23:00 (ALL)

Incoming Shortwave
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 06:00 (1520)

Outgoing Shortwave
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 07:00 (1521)

Incoming Longwave
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/06/09 23:00 - 2004/08/12 07:00 (1521)

Outgoing Longwave
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/04/22 06:00
2004/04/24 11:00
2004/04/25 18:00 - 2004/04/26 00:00 (7)
2004/04/26 17:00 - 2004/04/26 18:00 (2)
2004/04/27 12:00
2004/04/29 06:00 - 2004/04/29 08:00 (3)
2004/04/29 11:00 - 2004/04/29 13:00 (3)
2004/04/30 04:00 - 2004/04/30 15:00 (12)
2004/05/01 05:00 - 2004/05/01 14:00 (10)

2004/05/02 03:00 - 2004/05/02 14:00 (12)
2004/05/03 05:00 - 2004/05/03 12:00 (8)
2004/05/04 04:00 - 2004/05/04 06:00 (3)
2004/05/04 09:00 - 2004/05/04 11:00 (3)
2004/05/05 05:00 - 2004/05/05 09:00 (5)
2004/05/07 04:00 - 2004/05/07 12:00 (9)
2004/05/08 03:00 - 2004/05/08 12:00 (10)
2004/05/09 04:00 - 2004/05/09 13:00 (10)
2004/05/10 03:00 - 2004/05/10 14:00 (12)
2004/05/11 02:00 - 2004/05/11 14:00 (13)
2004/05/12 02:00 - 2004/05/12 05:00 (4)
2004/05/12 09:00 - 2004/05/12 11:00 (3)
2004/05/13 03:00 - 2004/05/13 10:00 (8)
2004/05/14 02:00 - 2004/05/14 11:00 (10)
2004/05/15 03:00 - 2004/05/15 11:00 (9)
2004/05/16 03:00 - 2004/05/16 11:00 (9)
2004/05/17 05:00 - 2004/05/17 06:00 (2)
2004/05/17 09:00
2004/05/23 08:00
2004/06/01 13:00
2004/06/09 23:00 - 2004/08/12 07:00 (1521)
2004/08/14 16:00
2004/08/15 00:00
2004/08/20 01:00
2004/09/22 02:00 - 2004/09/22 03:00 (2)

Net Radiation
2004/04/21 00:00 - 2004/04/21 06:00 (7)
2004/04/22 06:00
2004/04/29 06:00 - 2004/04/29 08:00 (3)
2004/04/30 04:00 - 2004/04/30 15:00 (12)
2004/05/01 05:00 - 2004/05/01 14:00 (10)
2004/05/02 03:00 - 2004/05/02 14:00 (12)
2004/05/03 05:00 - 2004/05/03 12:00 (8)
2004/05/04 04:00 - 2004/05/04 06:00 (3)
2004/05/04 09:00 - 2004/05/04 11:00 (3)
2004/05/05 05:00 - 2004/05/05 09:00 (5)
2004/05/07 04:00 - 2004/05/07 12:00 (9)
2004/05/08 03:00 - 2004/05/08 12:00 (10)
2004/05/09 04:00 - 2004/05/09 13:00 (10)
2004/05/10 03:00 - 2004/05/10 14:00 (12)
2004/05/11 11:00 - 2004/05/11 14:00 (4)
2004/05/12 02:00 - 2004/05/12 05:00 (4)
2004/05/12 09:00 - 2004/05/12 11:00 (3)
2004/05/13 03:00 - 2004/05/13 10:00 (8)
2004/05/14 02:00 - 2004/05/14 11:00 (10)
2004/05/15 03:00 - 2004/05/15 11:00 (9)
2004/05/16 03:00 - 2004/05/16 11:00 (9)
2004/05/17 05:00 - 2004/05/17 06:00 (2)
2004/05/17 09:00
2004/06/09 23:00 - 2004/08/12 07:00 (1521)
2004/08/14 16:00
2004/08/15 00:00
2004/08/20 01:00
2004/09/22 02:00 - 2004/09/22 03:00 (2)

Skin Temperature
2004/04/21 00:00 - 2004/12/31 23:00 (ALL)

Incoming PAR
2004/04/21 00:00 - 2004/12/31 23:00 (ALL)

Outgoing PAR
2004/04/21 00:00 - 2004/12/31 23:00 (ALL)