TITLE

CAMP_Tibet_BJ-Tower_20021001_20030331.flx

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DATE OF THIS DOCUMENT

22 Nov. 2004 (Updated 04. Aug, 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, 23:30

1.3 Temporal characteristics of the data

All parameters are recoded every 30 minutes.

1.4 Physical location of the measurement

Latitude : 31.36866 N
Longitude : 91.89871 E
Elevation : 4509.2 m a.s.l.
Landscape : Bare land (with the thin weed-like plant)
Canopy height : Less than 5cm.
Soil Characteristics: Sand

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 BJ site is located about 20 km southwest from the city of Naqu in the eastern Tibetan Plateau. This AWS was constructed in summer 2000. The system is originally same as that of D105, MS3478 (N-PAM) and ANNI. The direct incoming solar radiation and the scattered solar radiation measurement were added in June 2002. BJ site is the most enhanced observation site in the Tibetan Plateau: not only hydro-meteorological observation by AWS and SMTMS system, but atmospheric profile measurement by wind profiler, radiosonde, etc.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Sensible Heat Flux	DA-600	Kaijo
Latent Heat Flux	LI-7500	LI-Cor
Soil Heat Flux	MF-81	EKO

2.3 Instrumentation specification

Sensible Heat Flux (20.0m) : Sensible heat flux (Wm^-2) at 20.0m height
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Soil Heat Flux (0.20m) : Soil heat flux at 0.2 m below the ground surface (Wm^-2)

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

The turbulent flux system originally measures the 3-dimensional component of wind, air temperature and absolute water vapour density. The original data sampled at every 0.1 second (10 Hz). The original data are stored at every 0.1 second into the IBM PC till Sep 8, 2003. Since Sep. 22, 2003, the CR-5000 (Campbell) has been used as the data logger. Original data of the soil heat flux are sampled and stored at every 5 seconds (0.2 Hz) and 10 minute average is stored in the data logger (CR-10X, Campbell).
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

The sensible heat flux was computed by using
H = (Rho_d * C_pd + Rho_v * C_pv) <w’ T’> (3.2.1),
where the bracket <s> represents the 30-min average of the scalar s and the prime ‘ represents the deviation from the 30-min average.
C_pd (1005 J kg^-1 K^-1) is the specific heat capacity of the dry air under constant pressure, and C_pv (1847 J kg^-1 K^-1) is the specific heat capacity of the vapour, respectively.
The latent heat flux was computed by using
lE = Rho_a * l * <w’q’> (3.2.2)
l (= 2.508*10^6 J kg^-1) is the latent heat of the water vapour.

Before computing the sensible and latent heat flux, following process was conducted.

First, the 3-dimensional component of the wind speed was translated of the coordinate with the axis of mainstream (U-dir), across the mainstream in horizontal plane (V-dir), and normal to the U-V plane (W-dir). Then the temperature measured by the sonic anemo-thermometer was corrected using the traverse wind.

The total air density (Rho_a) was computed by using
Rho_a = p / R_d (T_s+273.15)
P is the 30-minute average of the barometric pressure. T_s is the (virtual) temperature in degC measured by sonic anemo-thermometer. R_d is the gas constant of dry air.
The specific humidity q was computed after computed Rho_a by using
q = Rho_v / (Rho_a + Rho_v)
Rho_v is the absolute vapour density sampled by infrared hygrometer (LI-7500).

The temperature measured by sonic anemo-thermometer was corrected using the specific humidity as
T_cor = (T_s+273.15)*(1-b*q) where b = 0.3192/0.622
T_cor is the corrected air temperature in Kelvin.

Before computing the statistic parameter like <w’T’>, the trend was removed using the linear function of time like for each variable S
S(time) = a * time + b
S_calc = S_cor – S(time)

The coefficient a, b was determined using least-squares method from 10 Hz data after correction.

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

According to the performance of the PC system and electrical power supply, the turbulent flux data was obtained limitedly. The missing data period are listed in Section 6.2

6.1.1 Instruments problems

6.1.2 Quality issues

6.2 Missing data periods

Sensible Heat Flux (3.00m)
2002/10/01 00:00 - 2002/11/24 04:00 (2601)
2002/11/27 02:30 - 2002/11/27 04:30 (5)
2002/12/21 02:00 - 2003/03/31 23:30 (4844)

Sensible Heat Flux (20.00m)
2002/10/01 00:00 - 2002/11/24 04:00 (2601)
2002/11/27 02:30 - 2002/11/27 04:30 (5)
2002/12/21 02:30 - 2003/03/31 23:30 (4843)

Latent Heat Flux (3.00m)
2002/10/01 00:00 - 2002/11/24 04:00 (2601)
2002/11/27 02:30 - 2002/11/27 04:30 (5)
2002/12/21 02:00 - 2003/03/31 23:30 (4844)

Latent Heat Flux (20.00m)
2002/10/01 00:00 - 2002/11/24 04:00 (2601)
2002/11/27 02:30 - 2002/11/27 04:30 (5)
2002/12/21 02:30 - 2003/03/31 23:30 (4843)

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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19 Apr. 2006(Updated 31. Aug, 2006)

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1.8 Time period covered by the data

Start: 1 October 2002, 00:00
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1.9 Temporal characteristics of the data

All parameters are recoded every 30 minutes.

1.10 Physical location of the measurement

Latitude : 31.36866 N
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S_calc = S_cor – S(time)

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The soil heat flux below 0.10 m was computed from
G = G_raw / c (3.2.3)
G_raw is the average voltage output from the sensor in mV and the c = 22.7×10^-3 (W^-1m^2 mV) for 0.20 m sensor and c = 27.4×10^-3 (W^-1m^2 mV) for 0.04 m sensor represents the calibration coefficient.

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5.0 GAP FILLING PROCEDURES

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6.1.2 Quality issues

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The missing data period are listed in chapter 9.0.

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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

For the sensible flux and the latent heat flux, following periods were missed data.
Oct 1, 2002 – Nov. 24, 2002
Dec. 21, 2002 – Mar 31, 2003.

and

Sensible Heat Flux (3.00m)
2003/04/01 00:00 - 2003/05/28 01:00 (2739)
2003/05/29 17:00 - 2003/06/01 03:00 (117)
2003/06/30 16:30 - 2003/09/30 23:30 (4431)

Sensible Heat Flux (20.00m)
2003/04/01 00:00 - 2003/05/28 01:00 (2739)
2003/05/29 17:00 - 2003/06/01 03:00 (117)
2003/06/30 16:30 - 2003/09/22 10:30 (4021)
2003/09/26 10:00
2003/09/27 03:30
2003/09/29 10:30

Latent Heat Flux (3.00m)
2003/04/01 00:00 - 2003/05/28 01:00 (2739)
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2003/06/30 16:30 - 2003/09/22 10:30 (4021)
2003/09/26 10:00
2003/09/27 03:30
2003/09/29 10:30

CO2 Flux
2003/04/01 00:00 - 2003/09/30 23:30 (ALL)

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7 July. 2006

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6.1 PI's assessment of the data

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9.0 Missing data periods

For the sensible flux and the latent heat flux, EOP4 all periods were missed data.

Soil Heat Flux (-0.20m)
2004/04/25 03:00 - 2004/06/06 20:00 (2051)
2004/08/30 02:00 - 2004/08/30 23:30 (44)

Soil Heat Flux (-0.10m)
2004/04/25 03:00 - 2004/06/06 20:00 (2051)
2004/08/30 02:00 - 2004/08/30 23:30 (44)