

TITLE

CEOP_Tsukuba_TERC-UT_20090701_20091231.twr

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1. 0 DATASET OVERVIEW

1.1 Introduction

Terrestrial Environment Research Center (TERC) started its long-term measurement of the surface heat and water balance at its surface heat and water balance field in 1981, and is continuing the observation. The field is circle in shape and has a 30-meter tower at its center. On the tower, profiles of air temperature, humidity and turbulence fluxes are measured and while, on the ground of the field, various measurements relevant to the surface heat and water budget are also being made. These include radiation components, ground water levels, soil temperature and soil heat flux. The measured data averaged over various time scale (30min., 1hour, 1day) are available on the web page (<http://www.suii.tsukuba.ac.jp>). Some of the can be dated back to 1980's. Among the measurements, basic meteorological and hydrological parameters are provided for CEOP2.

1.2 Time period covered by the data

Start: 1 July 2009, 00:00 UTC
End: 31 December 2009, 00:00 UTC

1.3 Temporal characteristics of the data

Original data, from which the data submitted to CEOP2, is averaged for 30 minutes.

1.4 Physical location of the measurement

Latitude: 36°06'35" N
Longitude: 140°06'00" E
Altitude: 27.0 m a.s.l.

1.5 Data source

Original data provided by the Terrestrial Environment Research Center, University of Tsukuba. Dew-point temperature, specific humidity are calculated using the original data.

1.6 WWW address references

<http://www.suiri.tsukuba.ac.jp/>

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

On the tower, thermometers and humidity-meters are mounted at the 3 vertical levels, namely, 1.6, 12.3 and 29.5 m above the ground. Also, 3 sonic anemometer-thermometers are mounted at 2 vertical levels, 1 at 1.6 m and 2 at 29.5m. The one of the 2 sonic anemometers at 29.5 m is facing southeast, while the other faces toward northwest.

2.2 Description of the instrumentation

| Parameter | Model | Manufacturer |
|-------------------|---------|--------------|
| Wind Speed | DA-600 | Kaijo Inc |
| Air temperature | HMP-45D | Vaisala |
| Relative Humidity | HMP-45D | Vaisala |
| Air pressure | PTB-210 | Vaisala |

2.3 Instrumentation specification

| Parameter | Sensor Type | Height of sensor (m) | Accuracy | Resolution |
|-------------------|------------------------------|----------------------|--------------------------------|------------|
| Wind Speed | Sonic Anemometer-thermometer | 1.6, 29.5 | 0.005m/s | 0.1m/s |
| Air temperature | | 1.6, 12.3, 29.5 | 0.2 deg | 0.1 deg |
| Relative Humidity | High polymer film | 1.6, 12.3, 29.5 | 2 % (0-90%) 3 % (above 90%) | 1% |
| Air pressure | silicon capacitive sensor | 1.5 | 0.30 hPa | 0.1hPa |

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Measurements of sonic anemometers are sampled at 10Hz, and those of the other sensors at every 10 seconds, and they are averaged over 30 minutes in the loggers. Averaged data stored in the these loggers are retrieved simultaneously through the local network and they are stored in the data server of TERC. These data are subject to the post-processed for CEOP2

3.2 Description of derived parameters and processing techniques used

The observations from the two sonic anemometers at 29.5 m on the tower are both recorded, and one of the two was selected with the wind direction as a reference during the post-processing. Dew point temperature, specific humidity were computed from the

relative humidity and the temperature, and the air pressure at 1.5 m was used when necessary

4.0 QUALITY CONTROL PROCEDURES

Measurements during the maintenance of the instruments as well as other possible causes such as electric shutdown are marked as “M” (missing), and the data value is replaced with the value -999.99. The measurements that are out of the ordinary range are also marked as “M” (missing). Some abnormal data are marked as “D”(dubious). Otherwise, the data is marked as “G” (good).

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

Wind direction at 29.5 m has been mentioned to be biased when compared with a nearby meteorological station operated by Meteorological Agency (Watarai et al, 2006). However, this has not been found in this data set, and further investigation are needed.

Regular maintenance was made on Jul. 10th, 24th, Sep 11th, 24th, Oct 15th, 28th, Nov 9th, 13th, 24th, Dec 10th, and 18th.

Scheduled electric shutdown occurred between Oct 17th and 18th, Dec 21st and 22nd. No data were recorded during this time.

Grass mowing works on July 14-15.

Quality flags are marked “D”, “M” or “G” depending on the possible influence on the measured values.

Relative humidity (RH) data at 1.6 m, 12.3 m and 29.5 m include a small drift due to deterioration of the sensor. For instance, the maximum value for each year at three levels had decreased from 2007 to 2010 as listed below.

| | 1.6m | 12.3m | 29.5m |
|------|------|-------|-------|
| 2007 | 99.9 | 99.8 | 100.5 |
| 2008 | 98 | 96.9 | 97.3 |
| 2009 | 96.3 | 94.8 | 94.6 |
| 2010 | 95.9 | 102.9 | 93.7 |

Also, you may see that RH at 12.3 meter gives a larger value than 100 %, and the sensor was replaced during 2010.

6.2 Missing data periods

As noted above, some data during instrumental maintenance are marked as missing.

7.0 REFERENCE REQUIREMENTS

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