TITLE: CEOP First Half EOP-3 CAMP Equatorial Island Surface Meteorology and Radiation Data Set

CAMP_Equatorial_ILD_20021001_20030331.sfc

CONTACT

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DATE OF THIS DOCUMENT

17 February 2004

1. 0 DATASET OVERVIEW

1.1 Introduction

Meteorological (atmospheric RADAR) observations at Bukit Kototabang in Sumatera Island, Indonesia have been conducted since 1998 by Radio Science Center for Space and Atmosphere (RASC), Kyoto University. An Automatic Weather Station (AWS) has also been established in 1999. Observational station is located on the mountainous range of steep mountains along to the western coast of Sumatera Island.

Frontier Observational Research System for Global Change (FORSGC) of Japan Marine Science and Technology Center (JAMSTEC) has been conducted surface and upper air observations to examine the distribution and the transportation processes of water vapour over the Indonesian maritime continent since 2001 under the research collaborations with the Indonesian Agency for the Assessment and Application of Technology (BPPT) and RASC, Kyoto University.

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 30 minutes.

1.4 Physical location of the measurement

Latitude: 0.20° S
Longitude: 100.32° E
Elevation: 865 m a.s.l.

1.5 Data source

Original data provided by the Frontier Observational Research System for Global Change (FORSGC), Japan Marine Science and Technology Center (JAMSTEC) under the research collaboration with Radio Science Center for Space and Atmosphere (RASC), Kyoto University.

1.6 WWW address references

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

The sensors are mounted on a 1.5-m height arms and a 2-m height mast.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Air Temperature	HMP45D	VAISALA (Finland)
Precipitation	Rain-O-Matic Professional	Pronamic
Relative Humidity	HMP45D	VAISALA (Finland)
Atmospheric Pressure	PMT16A	VAISALA (Finland)
Wind Speed	WMS302	VAISALA (Finland)
Wind Direction	WMS302	VAISALA (Finland)
Global Solar Radiation	SP Lite	Kipp&Zonen (The Netherlands)

2.3 Instrumentation specification

Parameter	Sensor Type	Sensor Height (m)	Accuracy	Resolution
Air Temperature	Resistive platinum 100Ω	1.5	0.3°C	0.1°C
Precipitation	Tipping Spoon	1.5	5% (<24mm/h); 10% (<120 mm/h)	0.2 mm
Relative Humidity	Capacitive thin film polymer	1.5	2% (0-90%); 3% (90-100%)	1%
Atmospheric Pressure	Silicon capacitive pressure sensor	1.5	0.3 hPa	0.1 hPa
Wind Speed	Rotating cup anemometer	2	0.3 m/s (<10m/s) 2% (>10m/s)	0.1 m/s
Wind Direction	Vane	2	3°	1°
Global Solar Radiation	Photodiode	1.5	1% to 2000W/m2	1W/m2

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Data are downloaded from the AWS every week. Then, data are sent to

Japan, where they are processed.

3.2 Description of derived parameters and processing techniques used

Temperature, relative humidity, pressure, wind speed, wind direction, and solar radiation are averaged over the previous 30-minutes. Precipitation is accumulated over the previous 30 minutes.

This format is described in detail as part of the CEOP Reference Site Data Set Procedures Report which is available at the following URL:
http://www.atd.ucar.edu/projects/ceop/dm/documents/refdata_report/ceop_sfc_met_format.html

4.0 QUALITY CONTROL PROCEDURES

4.1 CAMP QC/QA PROCEDURES

Though period has been limited, for all parameters, the data has been visually checked, looking for extremely and unusual low/high values and/or periods with constant values.

4.2 NCAR/EOL QC/QA PROCEDURES

NCAR/EOL conducted two primary quality assurance/control procedures on the reference site data. First the data has been evaluated by a detailed QA algorithm that verifies the format is correct, examines any QC flags, and conducts basic checks on data values. Second, JOSS conducts a manual inspection of time series plots of each parameter.

NCAR/EOL did not change any QC flags applied by CAMP.

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

6.2 Missing data periods

7.0 REFERENCE REQUIREMENTS

Original data was collected and is provided within the framework of

the research collaboration between Frontier Observational Research System for Global Change (FORSGC), Japan Marine Science and Technology Center (JAMSTEC) and Radio Science Center for Space and Atmosphere (RASC), Kyoto University, financially supported by the Japanese Ministry of Education, Science and Culture.

8.0 REFERENCES

Mori S., J. -I. Hamada, Y. I. Tauhid, M. D. Yamanaka, N. Okamoto, F. Murata, N. Sakurai, H. Hashiguchi, and T. Sribimawati, 2004: Diurnal land-sea rainfall peak migration over Sumatera Island, Indonesian maritime continent observed by TRMM satellite and intensive rawinsonde soundings, Mon. Wea. Rev., accepted

Murata F., M. D. Yamanaka, M. Fujiwara, S. -Y. Ogino, H. Hashiguchi, S. Fukao, M. Kudsy, T. Sribimwati, S. W. B. Harijono, and E. Kelana, 2002: Relationship between wind and precipitation observed with a UHF radar, GPS rawinsonde and surface meteorological instruments at Kototabang, West Sumatera during September-October 1998, J. Meteor. Soc. Japan, 80, 347-360.

Renggono F., H. Hashiguchi, S. Fukao, M. D. Yamanaka, S. -Y Ogino, N. Okamoto, F. Murata, S. W. B. Harijono, M. Kudsy, M. Kartasasmita, and G. Ibrahim, 2001: Precipitating clouds observed by 1.3-GHz L-band boundary layer radars in equatorial Indonesia, Ann. Geophys., 19, 889-897.

Widiyatomi I., H. Hashiguchi, S. Fukao, M. D. Yamanaka, S. -Y. Ogino, K. S. Gage, S. W. B. Harijono, S. Diharto, and H. Djojodiharjo, 2001: Examination of 3-6 day disturbances over equatorial Indonesia based on boundary layer radar observations during 1996-1999 at Serpong, Biak and Bukittinggi, J. Meteor. Soc. Japan, 79, 317-331.

Wu P., J. -I. Hamada, S. Mori, Y. I. Tauhid, M. D. Yamanaka, and F. Kimura, 2003: Diurnal variation of precipitable water over a mountainous area of Sumatra Island, J. Appl. Meteor., 42, 1107-1105.

TITLE

CAMP_Equatorial_ILD_Kototabang_20030401_20030930

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DATE OF THIS DOCUMENT

06 January 2005（Updated 10 February 2005）

1. 0 DATASET OVERVIEW

1.1 Introduction

Meteorological (atmospheric RADAR) observations at Bukit Kototabang in Sumatera Island, Indonesia have been conducted since 1998 by Research Institute for Sustainable Humanosphere (RISH), Kyoto University. An Automatic Weather Station (AWS) has also been established in 1999. Observational station is located on the mountainous range of steep mountains along to the western coast of Sumatera Island (Renggono et al., 2001; Widiyatmi et al., 2001; Murata et al., 2002).

Institute of Observational Research for Global Change (IORGC) of Japan Agency for Marine-Earth Science and Technology (JAMSTEC) has been conducted surface and upper air observations to examine the distribution and the transportation processes of water vapour over the Indonesian maritime continent since 2001 under the research collaborations with the Indonesian Agency for the Assessment and Application of Technology (BPPT) and RISH, Kyoto University (Wu et al., 2003; Mori et al., 2004).

1.2 Time period covered by the data

Start: 1 April 2003, 00:00
End: 30 September 2003, 23:00

1.3 Temporal characteristics of the data

All parameters are recoded every minute.

1.4 Physical location of the measurement

Latitude: 0.20° S
Longitude: 100.32° E
Elevation: 865m a.s.l.

1.5 Data source

Original data provided by the Institute of Observational Research for Global Change (IORGC), Japan Agency for Marine-Earth Science and Technology (JAMSTEC) under the research collaboration with Research Institute for Sustainable Humanosphere (RISH), Kyoto University.

1.6 WWW address references

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

The sensors are mounted on a 1.5-m height arms and a 2-m height mast.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Air Temperature	HMP45D	VAISALA (Finland)
Precipitation	Rain-O-Matic Professional	Pronamic
Relative Humidity	HMP45D	VAISALA (Finland)
Atmospheric Pressure	PMT16A	VAISALA (Finland)
Wind Speed	WMS302	VAISALA (Finland)
Wind Direction	WMS302	VAISALA (Finland)
Global Solar Radiation	SP Lite	Kipp&Zonen (The Netherlands)

2.3 Instrumentation specification

Parameter	Sensor Type	Height of sensor (m)	Accuracy	Resolution
Air Temperature	Resistive platinum 100Ω	1.5	0.3°C	0.1°C
Precipitation	Tipping Spoon	1.5	5% (<24mm/h); 10% (<120 mm/h)	0.2 mm
Relative Humidity	Capacitive thin film polymer	1.5	2% (0-90%); 3% (90-100%)	1%
Atmospheric Pressure	Silicon capacitive pressure sensor	1.5	0.3 hPa	0.1 hPa
Wind Speed	Rotating cup anemometer	2	0.3 m/s (<10m/s); 2% (>10m/s)	0.1 m/s

Wind Direction	Vane	2	3°	1°
Global Solar Radiation	Photodiode	1.5	1% up to 2000W/m^2	1W/m^2

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Data are downloaded from the AWS every week. Then, data are sent to Japan, where they are processed.

3.2 Description of derived parameters and processing techniques used

Original data were recorded every minute.
Temperature, relative humidity, pressure, solar radiation, wind speed and direction are averaged previous 30 minutes. Precipitation is accumulated on the previous 30 minutes.

4.0 QUALITY CONTROL PROCEDURES

Though period has been limited, for all parameters, the data has been visually checked, looking for extremely and unusual low/high values and/or periods with constant values.

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

6.2 Missing data periods

May 30 11:00 – May 30 17:00
June 09 17:30 – July 10 17:00
August 15 22:00 – August 16 00:30
August 16 02:00 – August 16 04:00
August 20 12:30 – August 21 09:30
September 20 07:00 – September 20 17:00
September 21 17:00 – September 22 05:30

7.0 REFERENCE REQUIREMENTS

Original data was collected and is provided within the framework of the research collaboration between Institute of Observational Research for Global Change (IORGC) of Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and Research Institute for Sustainable Humanosphere (RISH), Kyoto University, financially supported by the Japanese Ministry of Education, Science and Culture.

8.0 REFERENCES

Mori S., Hamada J.-I., Y. I. Tauhid, M. D. Yamanaka, N. Okamoto, F. Murata, N. Sakurai, H. Hashiguchi, and T. Sribimawati, 2004: Diurnal land-sea rainfall peak migration over Sumatera Island, Indonesian maritime continent observed by TRMM satellite and intensive rawinsonde soundings, *Mon. Wea. Rev.*, **132**, 2021–2039.

Murata F., M. D. Yamanaka, M. Fujiwara, S. –Y. Ogino, H. Hashiguchi, S. Fukao, M. Kudsy, T. Sribimwati, S. W. B. Harijono, and E. Kelana, 2002: Relationship between wind and precipitation observed with a UHF radar, GPS rawinsonde and surface meteorological instruments at Kototabang, West Sumatera during September – October 1998, *J. Meteor. Soc. Japan*, **80**, 347-360.

Renggono F., H. Hashiguchi, S. Fukao, M. D. Yamanaka, S. –Y Ogino, N. Okamoto, F. Murata, S. W. B. Harijono, M. Kudsy, M. Kartasasmita, and G. Ibrahim, 2001: Precipitating clouds observed by 1.3-GHz L-band boundary layer radars in equatorial Indonesia, *Ann. Geophys.*, **19**, 889-897.

Widiyatomi I., H. Hashiguchi, S. Fukao, M. D. Yamanaka, S. –Y. Ogino, K. S. Gage, S. W. B. Harijono, S. Diharto, and H. Djojodiharjo, 2001: Examination of 3-6 day disturbances over equatorial Indonesia based on boundary layer radar observations during 1996 – 1999 at Serpong, Biak and Bukittinggi, *J. Meteor. Soc. Japan*, **79**, 317-331.

Wu P., J. –I. Hamada, S. Mori, Y. I. Tauhid, M. D. Yamanaka, and F. Kimura, 2003: Diurnal variation of precipitable water over a mountainous area of Sumatra Island, *J. Appl. Meteor.*, **42**, 1107-1105.

TITLE

CAMP_Equatorial_ILD_Kototabang_20031001_20040331.sfc

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DATE OF THIS DOCUMENT

17 May 2006

1. 0 DATASET OVERVIEW

1.7 Introduction

Meteorological (atmospheric RADAR) observations at Bukit Kototabang in Sumatera Island, Indonesia have been conducted since 1998 by Research Institute for Sustainable Humanosphere (RISH), Kyoto University. An Automatic Weather Station (AWS) has also been established in 1999. Observational station is located on the mountainous range of steep mountains along to the western coast of Sumatera Island (Renggono et al., 2001; Widiyatmi et al., 2001; Murata et al., 2002).

Institute of Observational Research for Global Change (IORGC) of Japan Agency for Marine-Earth Science and Technology (JAMSTEC) has been conducted surface and upper air observations to examine the distribution and the transportation processes of water vapour over the Indonesian maritime continent since 2001 under the research collaborations with the Indonesian Agency for the Assessment and Application of Technology (BPPT) and RISH, Kyoto University (Wu et al., 2003; Mori et al., 2004; Sasaki et al., 2004; Sakurai et al., 2005).

1.8 Time period covered by the data

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

1.9 Temporal characteristics of the data

All parameters are recoded every minute.

1.10 Physical location of the measurement

Latitude: 0.20° S
Longitude: 100.32° E
Elevation: 865m a.s.l.

1.11 Data source

Original data provided by the Institute of Observational Research for Global Change (IORGC), Japan Agency for Marine-Earth Science and Technology (JAMSTEC) under the research collaboration with Research Institute for Sustainable Humanosphere (RISH), Kyoto University.

1.12 WWW address references

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

The sensors are mounted on a 1.5-m height arms and a 2-m height mast.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Air Temperature	HMP45D	VAISALA (Finland)
Precipitation	Rain-O-Matic Professional	Pronamic
Relative Humidity	HMP45D	VAISALA (Finland)
Atmospheric Pressure	PMT16A	VAISALA (Finland)
Wind Speed	WMS302	VAISALA (Finland)
Wind Direction	WMS302	VAISALA (Finland)
Global Solar Radiation	SP Lite	Kipp&Zonen (The Netherlands)

2.4 Instrumentation specification

Parameter	Sensor Type	Height of sensor (m)	Accuracy	Resolution
Air Temperature	Resistive platinum 100Ω	1.5	0.3°C	0.1°C
Precipitation	Tipping Spoon	1.5	5% (<24mm/h); 10% (<120 mm/h)	0.2 mm
Relative Humidity	Capacitive thin film polymer	1.5	2% (0-90%); 3% (90-100%)	1%

Atmospheric Pressure	Silicon capacitive pressure sensor	1.5	0.3 hPa	0.1 hPa
Wind Speed	Rotating cup anemometer	2	0.3 m/s (<10m/s); 2% (>10m/s)	0.1 m/s
Wind Direction	Vane	2	3°	1°
Global Solar Radiation	Photodiode	1.5	1% up to 2000W/m^2	1W/m^2

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Data are downloaded from the AWS every week. Then, data are sent to Japan, where they are processed.

3.2 Description of derived parameters and processing techniques used

The original data are recoded by minute. The temperature, relative humidity, pressure and solar radiation, wind speed and wind direction are averaged 30 minutes. The “00” data is averaged by the previous 30 minutes (from 30 to 59), and the “30” data is averaged by previous 30 minutes (from 00 to 29). Precipitation is accumulated on the previous 30 minutes.

And the Four 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”, In the case of calculated by using dubious value fagged “D”, the computed data flag was put “D”.

Dew Point Temperature is computed by using (Bolton 1980):

```
es = 6.112 * exp((17.67 * T)/(T + 243.5));
e = es * (RH/100.0);
Td = log(e/6.112)*243.5/(17.67-log(e/6.112));
```

where:

- T = temperature in deg C;
- es = saturation vapor pressure in mb;
- e = vapor pressure in mb;
- RH = Relative Humidity in percent;
- Td = dew point in deg C

Specific Humidity is computed by using (Bolton 1980):

```
e = 6.112*exp((17.67*Td)/(Td + 243.5));
q = (0.622 * e)/(p - (0.378 * e));
```

where:

- e = vapor pressure in mb;
- Td = dew point in deg C;
- p = surface pressure in mb;
- q = specific humidity in kg/kg.

U and V Components were computed by using (GEMPAK):

```
U = -sin(direction) * wind_speed;
V = -cos(direction) * wind_speed;
```

4.0 QUALITY CONTROL PROCEDURES

Though period has been limited, for all parameters, the data has been visually checked, looking for extremely and unusual low/high values and/or periods with constant values.

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

6.2 Missing data periods

The missing data period are listed in chapter 9.0.

7.0 REFERENCE REQUIREMENTS

Original data was collected and is provided within the framework of the research collaboration between Institute of Observational Research for Global Change (IORGC) of Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and Research Institute for Sustainable Humanosphere (RISH), Kyoto University, financially supported by the Japanese Ministry of Education, Science and Culture.

8.0 REFERENCES

Mori S., Hamada J.-I., Y. I. Tauhid, M. D. Yamanaka, N. Okamoto, F. Murata, N. Sakurai, H. Hashiguchi, and T. Sribimawati, 2004: Diurnal land-sea rainfall peak migration over Sumatera Island, Indonesian maritime continent observed by TRMM satellite and intensive rawinsonde soundings, *Mon. Wea. Rev.*, **132**, 2021–2039.

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Renggono F., H. Hashiguchi, S. Fukao, M. D. Yamanaka, S. –Y Ogino, N. Okamoto, F. Murata, S. W. B. Harijono, M. Kudsy, M. Kartasasmita, and G. Ibrahim, 2001: Precipitating

clouds observed by 1.3-GHz L-band boundary layer radars in equatorial Indonesia, *Ann. Geophys.*, **19**, 889-897.
Sakurai N., F. Murata, M. D. Yamanaka, S. Mori, J. –I. Hamada, H. Hashiguchi, Y. I. Tauhid, T. Sribimawati and B. Suhardi, 2005: Diurnal cycle of cloud system migration over Sumatera Island, *J. Meteorol. Soc. Japan*, **83**, 835-850.

Sasaki T., P. Wu, S. Mori, J. –I. Hamada, Y. I. Tauhid, M. D. Yamanaka, T. Sribimawati, T. Yoshikane and F. Kimura, 2004: Vertical moisture transport above the mixed layer around the mountains in western Sumatra. *Geophys. Res. Lett.,* **31**, L08106, doi:10.1029/2004GL019730.

Widiyatomi I., H. Hashiguchi, S. Fukao, M. D. Yamanaka, S. –Y. Ogino, K. S. Gage, S. W. B. Harijono, S. Diharto, and H. Djojodiharjo, 2001: Examination of 3-6 day disturbances over equatorial Indonesia based on boundary layer radar observations during 1996 – 1999 at Serpong, Biak and Bukittinggi, *J. Meteor. Soc. Japan*, **79**, 317-331.

Wu P., J. –I. Hamada, S. Mori, Y. I. Tauhid, M. D. Yamanaka, and F. Kimura, 2003: Diurnal variation of precipitable water over a mountainous area of Sumatra Island, *J. Appl. Meteor.*, **42**, 1107-1105.

9.0 Missing Data Periods

File Name : CAMP_Equatorial_ILD_Kototabang_20031001_20040331.sfc
Data Period : 2003/10/01 00:00 - 2004/03/31 23:30

Station Pressure
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

Air Temperature
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

Dew Point Temperature
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

Relative Humidity
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

Specific Humidity
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)

2003/12/30 04:30 - 2004/01/03 03:00 (190)

Wind Speed
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

Wind Direction
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

U Wind Component
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

V Wind Component
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

Precipitation
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

Snow Depth
2003/10/01 00:00 - 2004/03/31 23:30 (ALL)

Incoming Shortwave
2003/11/09 00:30 - 2003/11/09 17:00 (34)
2003/11/25 17:30 - 2003/11/26 17:00 (48)
2003/12/30 04:30 - 2004/01/03 03:00 (190)

Outgoing Shortwave
2003/10/01 00:00 - 2004/03/31 23:30 (ALL)

Incoming Longwave
2003/10/01 00:00 - 2004/03/31 23:30 (ALL)

Outgoing Longwave
2003/10/01 00:00 - 2004/03/31 23:30 (ALL)

Net Radiation
2003/10/01 00:00 - 2004/03/31 23:30 (ALL)

Skin Temperature
2003/10/01 00:00 - 2004/03/31 23:30 (ALL)

Incoming PAR

2003/10/01 00:00 - 2004/03/31 23:30 (ALL)

Outgoing PAR
2003/10/01 00:00 - 2004/03/31 23:30 (ALL)

TITLE

CAMP_Equatorial_ILD_Kototabang_20040401_20041231.sfc

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1. 0 DATASET OVERVIEW

1.13 Introduction

Meteorological (atmospheric RADAR) observations at Bukit Kototabang in Sumatera Island, Indonesia have been conducted since 1998 by Research Institute for Sustainable Humanosphere (RISH), Kyoto University. An Automatic Weather Station (AWS) has also been established in 1999. Observational station is located on the mountainous range of steep mountains along to the western coast of Sumatera Island (Renggono et al., 2001; Widiyatmi et al., 2001; Murata et al., 2002).

Institute of Observational Research for Global Change (IORGC) of Japan Agency for Marine-Earth Science and Technology (JAMSTEC) has been conducted surface and upper air observations to examine the distribution and the transportation processes of water vapour over the Indonesian maritime continent since 2001 under the research collaborations with the Indonesian Agency for the Assessment and Application of Technology (BPPT) and RISH, Kyoto University (Wu et al., 2003; Mori et al., 2004; Sasaki et al., 2004; Sakurai et al., 2005).

1.14 Time period covered by the data

Start: 1 April 2004, 00:00
End: 31 December 2004, 23:00

1.15 Temporal characteristics of the data

All parameters are recoded every minute.

1.16 Physical location of the measurement

Latitude: 0.20° S
Longitude: 100.32° E
Elevation: 865m a.s.l.

1.17 Data source

Original data provided by the Institute of Observational Research for Global Change (IORGC), Japan Agency for Marine-Earth Science and Technology (JAMSTEC) under the research collaboration with Research Institute for Sustainable Humanosphere (RISH), Kyoto University.

1.18 WWW address references

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

The sensors are mounted on a 1.5-m height arms and a 2-m height mast.

2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Air Temperature	HMP45D	VAISALA (Finland)
Precipitation	Rain-O-Matic Professional	Pronamic
Relative Humidity	HMP45D	VAISALA (Finland)
Atmospheric Pressure	PMT16A	VAISALA (Finland)
Wind Speed	WMS302	VAISALA (Finland)
Wind Direction	WMS302	VAISALA (Finland)
Global Solar Radiation	SP Lite	Kipp&Zonen (The Netherlands)

2.5 Instrumentation specification

Parameter	Sensor Type	Height of sensor (m)	Accuracy	Resolution
Air Temperature	Resistive platinum 100Ω	1.5	0.3°C	0.1°C
Precipitation	Tipping Spoon	1.5	5% (<24mm/h); 10% (<120 mm/h)	0.2 mm
Relative Humidity	Capacitive thin film polymer	1.5	2% (0-90%); 3% (90-100%)	1%

Atmospheric Pressure	Silicon capacitive pressure sensor	1.5	0.3 hPa	0.1 hPa
Wind Speed	Rotating cup anemometer	2	0.3 m/s (<10m/s); 2% (>10m/s)	0.1 m/s
Wind Direction	Vane	2	3°	1°
Global Solar Radiation	Photodiode	1.5	1% up to 2000W/m^2	1W/m^2

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Data are downloaded from the AWS every week. Then, data are sent to Japan, where they are processed.

3.2 Description of derived parameters and processing techniques used

The original data are recoded by minute. The temperature, relative humidity, pressure and solar radiation, wind speed and wind direction are averaged 30 minutes. The “00” data is averaged by the previous 30 minutes (from 30 to 59), and the “30” data is averaged by previous 30 minutes (from 00 to 29). Precipitation is accumulated on the previous 30 minutes.

And the Four 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”, In the case of calculated by using dubious value fagged “D”, the computed data flag was put “D”.

Dew Point Temperature is computed by using (Bolton 1980):

```
es = 6.112 * exp((17.67 * T)/(T + 243.5));
e = es * (RH/100.0);
Td = log(e/6.112)*243.5/(17.67-log(e/6.112));
```

where:

- T = temperature in deg C;
- es = saturation vapor pressure in mb;
- e = vapor pressure in mb;
- RH = Relative Humidity in percent;
- Td = dew point in deg C

Specific Humidity is computed by using (Bolton 1980):

```
e = 6.112*exp((17.67*Td)/(Td + 243.5));
q = (0.622 * e)/(p - (0.378 * e));
```

where:

- e = vapor pressure in mb;
- Td = dew point in deg C;
- p = surface pressure in mb;
- q = specific humidity in kg/kg.

U and V Components were computed by using (GEMPAK):

```
U = -sin(direction) * wind_speed;
V = -cos(direction) * wind_speed;
```

4.0 QUALITY CONTROL PROCEDURES

Though period has been limited, for all parameters, the data has been visually checked, looking for extremely and unusual low/high values and/or periods with constant values.

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

6.2 Missing data periods

The missing data period are listed in chapter 9.0.

7.0 REFERENCE REQUIREMENTS

Original data was collected and is provided within the framework of the research collaboration between Institute of Observational Research for Global Change (IORGC) of Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and Research Institute for Sustainable Humanosphere (RISH), Kyoto University, financially supported by the Japanese Ministry of Education, Science and Culture.

8.0 REFERENCES

Mori S., Hamada J.-I., Y. I. Tauhid, M. D. Yamanaka, N. Okamoto, F. Murata, N. Sakurai, H. Hashiguchi, and T. Sribimawati, 2004: Diurnal land-sea rainfall peak migration over Sumatera Island, Indonesian maritime continent observed by TRMM satellite and intensive rawinsonde soundings, *Mon. Wea. Rev.*, **132**, 2021–2039.

Murata F., M. D. Yamanaka, M. Fujiwara, S. –Y. Ogino, H. Hashiguchi, S. Fukao, M. Kudsy, T. Sribimwati, S. W. B. Harijono, and E. Kelana, 2002: Relationship between wind and precipitation observed with a UHF radar, GPS rawinsonde and surface meteorological instruments at Kototabang, West Sumatera during September – October 1998, *J. Meteor. Soc. Japan*, **80**, 347-360.

Renggono F., H. Hashiguchi, S. Fukao, M. D. Yamanaka, S. –Y Ogino, N. Okamoto, F. Murata, S. W. B. Harijono, M. Kudsy, M. Kartasasmita, and G. Ibrahim, 2001: Precipitating

clouds observed by 1.3-GHz L-band boundary layer radars in equatorial Indonesia, *Ann. Geophys.*, **19**, 889-897.
Sakurai N., F. Murata, M. D. Yamanaka, S. Mori, J. –I. Hamada, H. Hashiguchi, Y. I. Tauhid, T. Sribimawati and B. Suhardi, 2005: Diurnal cycle of cloud system migration over Sumatera Island, *J. Meteorol. Soc. Japan*, **83**, 835-850.

Sasaki T., P. Wu, S. Mori, J. –I. Hamada, Y. I. Tauhid, M. D. Yamanaka, T. Sribimawati, T. Yoshikane and F. Kimura, 2004: Vertical moisture transport above the mixed layer around the mountains in western Sumatra. *Geophys. Res. Lett.,* **31**, L08106, doi:10.1029/2004GL019730.

Widiyatomi I., H. Hashiguchi, S. Fukao, M. D. Yamanaka, S. –Y. Ogino, K. S. Gage, S. W. B. Harijono, S. Diharto, and H. Djojodiharjo, 2001: Examination of 3-6 day disturbances over equatorial Indonesia based on boundary layer radar observations during 1996 – 1999 at Serpong, Biak and Bukittinggi, *J. Meteor. Soc. Japan*, **79**, 317-331.

Wu P., J. –I. Hamada, S. Mori, Y. I. Tauhid, M. D. Yamanaka, and F. Kimura, 2003: Diurnal variation of precipitable water over a mountainous area of Sumatra Island, *J. Appl. Meteor.*, **42**, 1107-1105.

9.0 Missing Data Periods

File Name : CAMP_Equatorial_ILD_Kototabang_20040401_20041231.sfc
Data Period : 2004/04/01 00:00 - 2004/12/31 23:30

Station Pressure
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Air Temperature
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Dew Point Temperature
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Relative Humidity
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Specific Humidity
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Wind Speed

2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Wind Direction
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

U Wind Component
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

V Wind Component
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Precipitation
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Snow Depth
2004/04/01 00:00 - 2004/12/31 23:30 (ALL)

Incoming Shortwave
2004/04/20 17:30 - 2004/04/22 17:00 (96)
2004/10/02 02:30 - 2004/10/04 07:30 (107)
2004/10/16 03:30 - 2004/10/17 02:30 (47)

Outgoing Shortwave
2004/04/01 00:00 - 2004/12/31 23:30 (ALL)

Incoming Longwave
2004/04/01 00:00 - 2004/12/31 23:30 (ALL)

Outgoing Longwave
2004/04/01 00:00 - 2004/12/31 23:30 (ALL)

Net Radiation
2004/04/01 00:00 - 2004/12/31 23:30 (ALL)

Skin Temperature
2004/04/01 00:00 - 2004/12/31 23:30 (ALL)

Incoming PAR
2004/04/01 00:00 - 2004/12/31 23:30 (ALL)

Outgoing PAR
2004/04/01 00:00 - 2004/12/31 23:30 (ALL)