

For Using Data

Data Policy	JAMSTEC
Principal Investigator	Data Management Office
Use Constraints	See Terms and Conditions about constrain of use.
Data Citation	See Terms and Conditions about data citation.

Quality

DMO-Processed

Instrument

General maritime meteorological observation system



Overview

The data provided here is a set of "suitably composed data" which consists of 10-minute-average corrected Atmospheric Pressure, Air Temperature, Relative Humidity, Wind Direction and Speed, Precipitation, Radiation, Sea Surface Temperature, and Wave Height observed by R/V KAIMEI. See "Flow of Meteorological Data Processing" for detailed correction and processing method.

Measurement System

Sensors	Manufacturer	Type	Location (from sea surface)
Anemometer	Vaisala, Finland	WMT700	Foremast (23m), Compass deck (28m)
Tair/RH	Vaisala, Finland	HMP155 with DTR13 radiation shield	Foremast (22m), Compass deck (18m)
Thermometer (SST)	Sea-Bird Electronics, USA	SBE-38	Bow thruster room (-3m)
Barometer	Vaisala, Finland	PTB330	Navigation bridge deck (15m)
Rain gauge	R.M. Young, USA	50202	Compass deck (18m)
Radiometer (shortwave)	Kipp & Zonen, The Netherlands	CMP-22	Foremast (22m)
Radiometer (long-wave)	Kipp & Zonen, The Netherlands	CGR-4	Foremast (22m)
Wave height meter	MIROS, Norway	PR-002	Radar mast (23m)

Calibration Information

- 1) Tair/RH sensor calibration date

Foremast :	2022/7/15
Compass deck :	2021/6/9
- 2) Rain gauge calibration (Using the revision of rain data)

Minimum value (0.0 cc) :	0.00 mm
Maximum value (495.0 cc) :	48.6 mm
Date :	2023/5/14

Note

- 1) During the following period, data acquisition was suspended due to anchoring in port.
2023/05/12 00:10 - 2023/05/16 00:00
- 2) During the following period, the rainfall intensity is invalid due to exceeding the range of measurement.
2023/05/19 11:50 - 2023/05/22 14:00
2023/05/22 19:00 - 2023/05/22 20:10
- 3) If you would like the raw data set, please contact DMO at "dmo@jamstec.go.jp".

Flow of Meteorological Data Processing

"The R/V KAIMEI meteorological data set" is processed with following methods.



1. 1-min Processing

A) Data contained after processing

Date&Time (UTC), Julianday, Longitude (degE; 0 to 360), Latitude (degN; -90 to +90), Atmospheric pressure (hPa), Air temperature (deg-C), Dew-point temperature (deg-C), Relative Humidity (%), Sea surface temperature (deg-C), Wind velocity components U & V (m/s), An hour amount of Optical Rain Gauge (mm), Rainfall of Capacitance Rain Gauge (mm), Down welling Short wave radiation (W/m2), Down welling Long wave radiation (W/m2), Relative Wind speed (m/s), Relative Wind direction (deg)

B) Averaging algorithm

One-minute mean data are produced from raw 6-second data. After maximum and minimum values are removed from each 1-minute data sets to remove noise data, 1-minute mean value is calculated as a simple average of the rest of data (usually 8 samples). Note that if the number of good data is less than 5, we considered them as missing value.

C) Definition of 1-minute mean value

One-minute mean value is defined as a average of past 1 minute from the time (i.e., time stamp at end of average).

D) Sensor adoption

R/V KAIMEI has two anemometers and two temperature and humidity sensors, which are installed in the foremast and compass deck, respectively.

Air temperature/Relative humidity - Adopted foremast sensor with relatively less impact by the hull (ex. influence of anomalous heating; the hull and the sun).

Anemometer - Adopted foremast sensor which is free from the influence of obstacle (ex. mast).

E) Air temperature and Relative Humidity calculation

An air temperature and a relative humidity are calculated based on average handling of B). Once we obtain 1-minute mean data for temperature and relative humidity, we calculate a dew point temperature using them from a formula described in the Guide of WMO (WMO, 1996; Guide to meteorological instruments and methods of observations. WMO-No.8, 6th Edition.)

When relative humidity data shows the value in the range of 100-104%, we assume them as result of supersaturation and set them as 100%. As for data over 104%, we set as a missing value.

F) Rainfall data calculation

The Capacitance Rain Gauge (CRG) data are corrected using a result of manual calibration at port. In addition, when only 1-minute CRG data shows a value, it is regarded as an error. All suspicious data are manually checked using other field records such as log book, ceilometer data, and so on.

G) Wave data

The wave data provided here is significant wave height and significant wave period calculated every 2-minutes. The 1-minute combination data is made by picked up the latest significant wave height and period.

H) Position data

Since the missing data for position are originally recorded as (0, 0), it causes an error of position when averaging. Those values are detected by checking the ship's speed limit (25kt), and then expressed as "9999".

2. 10-min Average

A) Data contained after processing (10-minute mean value produced from 1-minute mean data)

Date&Time (UTC), Julian day, Longitude (degE; 0 to 360), Latitude (degN; -90 to +90), Atmospheric pressure (hPa), Air temperature (deg-C), Dew-point temperature (deg-C), Relative Humidity (%), Sea surface temperature (deg-C), Wind velocity components U & V (m/s), An hour amount of Optical Rain Gauge (mm), Rainfall of Capacitance Rain Gauge (mm), Down welling Short wave radiation (W/m^2), Down welling Long wave radiation (W/m^2), Relative Wind speed (m/s), Relative Wind direction (deg), Quality flag

B) Averaging algorithm

Ten-minute mean value is produced from 1-minute mean data as a simple average of 10 data, requiring minimum 5 samples.

C) Definition of 10-minute mean value

Ten-minute mean value is defined as a average of past 10 minutes from the time (i.e., time stamp at end of average).

D) Air temperature and Relative Humidity calculation

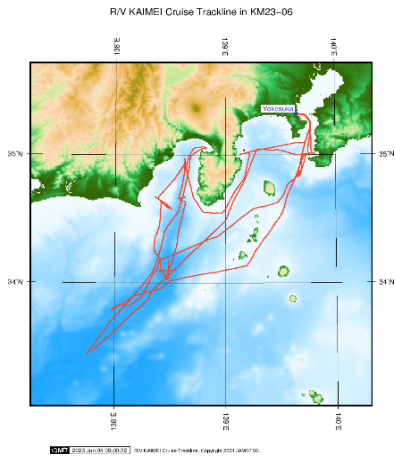
Since adopting a temperature and humidity sensor installed on the foremast, when the wind from the stern side, the temperature value is influenced by the hull (influence of anomalous heating; the hull and the sun). Therefore, when the relative wind direction is 90 degrees to 270 degrees (the bow is 0 degree), quality flag 4 (Questionable) is added.

In R/V KAIMEI, the temperature and humidity sensor is installed within an enclosure that relies on natural ventilation. An air temperature in such a simple housing has been shown to rise several degrees above the true air temperature when in the weak wind. Therefore, when the relative wind speed is less than 2 m/s, quality flag 4 (Questionable) is added.

E) Quality flag

Quality flag 4 (Questionable) is added to each observation item for suspicious data. In the case of an anomalous value or in the case of missing data due to a system error or non-use of a system, quality flag 8 (bad) is added.

Related Information



KM23-06

Ship Name:	KAIMEI
Period:	2023/05/10 - 2023/05/23
Chief Scientist:	Kyoma Takahashi (JAMSTEC)
Proposal:	R/V Kaimei & KM-ROV & Jinbei Engineering cruise

Format Description for Meteorology Corrected (KAIMEI)

Single space separated.

Data part

No.	Column	Content	Format (nodata or baddata)	Unit	Remarks
1	1-12	Date and time [YYYYMMDDhhmm]	i4,i2,i2,i2,i2		Every 10 minutes*
2	14-21	Julian day [DDD.DDDD]	f8.4		Every 10 minutes*
3	23-29	Longitude [0 to 360]	f7.3 (999.999)	degree	Location at time stamp East longitude
4	31-37	Latitude [-90 to 90]	f7.3 (999.999)	degree	Location at time stamp +: North latitude -: South latitude
5	39-44	Atmospheric pressure	f6.1 (9999.9)	hPa	10-minute mean*
6	46-50	Air temperature	f5.1 (999.9)	deg-C	10-minute mean*
7	52-56	Dewpoint temperature	f5.1 (999.9)	deg-C	10-minute mean* Calculated from 'Air temperature' and 'Relative humidity' using WMO's Formula** for liquid water
8	58-62	Relative humidity	f5.1 (999.9)	%	10-minute mean*
9	64-70	Sea surface temperature (SST)	f7.4 (99.9999)	deg-C	10-minute mean* From TSG
10	72-76	Wind speed (zonal)	f5.1 (999.9)	m/sec	10-minute mean* No anemometer height adjustment
11	78-82	Wind speed (meridional)	f5.1 (999.9)	m/sec	10-minute mean* No anemometer height adjustment
12	84-89	Rainfall intensity	f6.2 (999.99)	mm/hr	10-minute mean*
13	91-96	Short wave radiation	f6.1 (9999.9)	W/m2	10-minute mean*
14	98-102	Long wave radiation	f5.1 (999.9)	W/m2	10-minute mean*
15	104-108	Significant wave height	f5.2 (99.99)	m	10-minute mean*
16	110-114	Wave period	f5.2 (99.99)	second	10-minute mean*
17	116-119	Relative wind speed	f4.1 (99.9)	m/sec	10-minute mean* No anemometer height adjustment
18	121-123	Relative wind direction	i3 (999)	degree	10-minute mean* No anemometer height adjustment

* Time stamp is set at the end of average

** WMO-No.8 (Guide to Meteorological Instruments and Methods of Observation)

Flag part

No.	Column	Content	Format	Remarks
19	125	Flag 1	i1	QC flag for 'Atmospheric pressure'
20	126	Flag 2	i1	QC flag for 'Air temperature' and 'Relative humidity'
21	127	Flag 3	i1	QC flag for 'Wind speed'
22	128	Flag 4	i1	QC flag for 'Rainfall intensity'
23	129	Flag 5	i1	QC flag for 'Shortwave radiation'
24	130	Flag 6	i1	QC flag for 'Long-wave radiation'
25	131	Flag 7	i1	QC flag for 'Significant wave height' and 'Wave period'

Definition of Quality Control Flags

Flag 1 : Atmospheric pressure

- 0 - accepted
- 4 - questionable
- 8 - bad (system error or non-use)

Flag 2 : Air temperature and Relative humidity

- 0 - accepted
- 4 - questionable
- 8 - bad (system error or non-use)

Flag 3 : Wind speed

- 0 - accepted
- 4 - questionable
- 8 - bad (system error or non-use)

Flag 4 : Rainfall intensity

- 0 - accepted
- 4 - questionable
- 8 - bad (system error or non-use)

Flag 5 : Shortwave radiation

- 0 - accepted
- 4 - questionable
- 8 - bad (system error or non-use)

Flag 6 : Long-wave radiation

- 0 - accepted
- 4 - questionable
- 8 - bad (system error or non-use)

Flag 7 : Significant wave height and period

- 0 - accepted
- 4 - questionable
- 8 - bad (system error or non-use)