

## For Using Data

Data Policy	JURCAOS-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 level

Processed (DMO)-QCed

## Instrument

Radio navigation system

NO IMAGE

## Overview

The following information is continuously collected and recorded as the Navigation QCed data during the cruise of R/V HAKUHO MARU.

Location  
Meteorological elements  
Surface temperature  
Current direction and velocity  
Water depth

## System

Data are recorded every one minute, and data file named after cruise code.

Manufacturer: Clover Tech  
Model: DL1800

## Sensor specifications

## 1) GPS receiver

Manufacturer: Trimble Navigation Limited  
FURUNO ELECTRIC CO., LTD.  
Model: SPS356  
GP-170

Receiver location:

## 2) Seawater Temperature

Manufacturer: Murayama DENKI Ltd.  
Model: RK(C)  
S/No.: 084.2  
Measurement range: -10 ~ +40°C  
Accuracy: +/-0.5%  
Sensor location: Outer Panel [port side] (near Fr.64)

## 3) Doppler sonar

Manufacturer: FURUNO ELECTRIC CO., LTD.  
Model: DS-60  
Range: Ship speed: -10.00 - +40.00knot [Cross direction]  
-9.99 - +9.99knot [Horizontal direction]  
Current direction and speed: 0.0 - 9.9knot [All direction]  
Accuracy: Water tracking: +/-1.0% or +/-0.1 knot, whichever is greater

## 4) Multi narrow beam echo sounder

Manufacturer: ELAC  
Model: SeaBeam 2120/3000  
Frequency: 20kHz  
Range: 20m - 11,000m

## 5) Single beam echo sounder

Manufacturer: Kongsberg Maritime

Model:	EA600	
Frequency:	12kHz	
6) Anemometer		
Manufacturer:	NIPPON ELECTRIC INSTRUMENT, INC.	
Model:	N-162A	
Altitude:	17m	
Range:	Wind direction:	all direction
	Wind speed:	2 - 60m/s
Accuracy:	Wind speed:	+/- 0.5m/s (less 10m/s)
		10m/s or more +/-5%

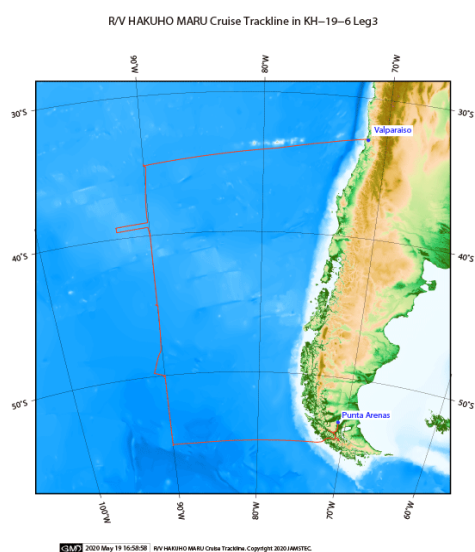
**Note**

Please see the 'data set' and 'readme' for the detail of the following observation.

Water depth:	Bathymetry (MBES)
Current direction/ speed:	Shipboard Acoustic Doppler Current Profiler (ADCP)

## Related Information

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### KH-19-6 Leg3

Ship Name:

HAKUHO MARU

Period:

2019/10/29 - 2019/11/23

Chief Scientist:

Atsushi Tsuda (AORI, The University of Tokyo)

Proposal:

Interdisciplinary research on oceanography and earth science in Weddell Sea and southern Pacific -Around the world cruise for anniversary of 30 years of R.V. Hakuho Maru-

Turbulence observation in the Southern Ocean west of South America using CTD-attached fast-response thermistors

Exploring the dynamics of planktonic larvae responsible for the biogeographic subdivision of deep-sea benthic fauna

Do submarine volcanism in mid-ocean ridges impact global climate change?

Float observation of mesoscale eddies in Southern Ocean

## Format Description for QCed Data of Navigation

The one record of this data has 117 bytes of data part and 12 bytes of flag part.

### Data part

No.	Column	Content	Format	Unit	Remarks
1	1 - 8	Date	i4,i2,i2		YYYYMMDD (UTC)
2	10 - 15	Time	i2,i2,i2		hhmmss (UTC)
3	17 - 19	Datum	a3		W84:WGS84 TD_:TOKYO DATUM
4	21 - 31	Latitude	i2,x1,f7.4,a1	degree - minute	dd-mm.mmmmmN(S)
5	33 - 44	Longitude	i3,x1,f7.4,a1	degree - minute	ddd-mm.mmmmmE(W)
6	46 - 49	Ship speed(Ground)	f4.1	knot	
7	51 - 55	Course(Ground)	f5.1	degree	
8	57 - 60	Ship speed(Water)	f4.1	knot	*1
9	62 - 66	Gyro	f5.1	degree	
10	68 - 72	Air temperature	f5.1	deg-C	
11	74 - 78	Sea surface temperature(SST)	f5.2	deg-C	
12	80 - 85	Atmospheric pressure	f6.1	hPa	Adjusted to the sea surface level
13	87 - 89	Relative humidity	i3	%	
14	91 - 93	True wind direction	i3	degree	Averaged over the previous 6 seconds *2
15	95 - 98	True wind speed	f4.1	m/sec	Averaged over the previous 6 seconds *2 No anemometer height adjustment
16	100 - 106	Depth	f7.1	m	
17	108 - 112	Current direction	f5.1	degree	Calculated value
18	114 - 117	Current speed	f4.1	knot	Calculated value

### Flag part

No.	Column	Content	Format	Remarks
19	119	Flag 1	i1	QC flag for 'Latitude' and 'Longitude'
20	120	Flag 2	i1	QC flag for 'Ship speed (Ground)'
21	121	Flag 3	i1	QC flag for 'Course (Ground)'
22	122	Flag 4	i1	QC flag for 'Ship speed (Water)'
23	123	Flag 5	i1	QC flag for 'Gyro'
24	124	Flag 6	i1	QC flag for 'Air temperature'
25	125	Flag 7	i1	QC flag for 'Sea Surface Temperature (SST)'
26	126	Flag 8	i1	QC flag for 'Atmospheric pressure'
27	127	Flag 9	i1	QC flag for 'Relative humidity'
28	128	Flag 10	i1	QC flag for 'Wind direction' and 'Wind speed'
29	129	Flag 11	i1	QC flag for 'Depth'
30	130	Flag 12	i1	QC flag for 'Current direction' and 'Current speed'

\*1 The plus and minus sign of No.8 [Ship speed (Water)] about R/V KAIREI indicates the velocity of direction of a bow and stem.

\*2 No.14 [True wind direction] and No.15 [True wind speed] about R/V SHINSEI MARU are instantaneous value.

\* The terminator of each record is 'CR+LF' code.

\* Missing value and format error value are filled with '9'.

### Definition of Quality Control Flags

Flag 1 : Longitude and Latitude

- 1 - accepted
- 2 - questionable value
- 4 - failed in location check
- 9 - system error or input error

Flag 2 : Ship speed (ground)

- 1 - accepted
  - 2 - questionable value
  - 4 - failed range check (under 20 knots)
  - 9 - system error or input error
- Flag 3 : Course (ground)
- 1 - accepted
  - 2 - questionable value
  - 4 - failed range check (0 ~ 360 degree)
  - 9 - system error or input error
- Flag 4 : Ship speed (water)
- 1 - accepted
  - 4 - failed range check (under 20 knots)
  - 9 - system error or input error
- Flag 5 : Gyro
- 1 - accepted
  - 4 - failed range check (0 ~ 360 degree)
  - 9 - system error or input error
- Flag 6 : Air temperature
- 3 - assumed good\*
  - 4 - failed range check (-20 ~ 40 degC)
  - 9 - system error or input error
- Flag 7 : Sea surface temperature
- 3 - assumed good\*
  - 4 - failed range check (-3 ~ 37 degC)
  - 9 - system error or input error
- Flag 8 : Atmospheric pressure
- 3 - assumed good\*
  - 4 - failed range check (890 ~ 1040 hPa)
  - 9 - system error or input error
- Flag 9 : Relative humidity
- 3 - assumed good\*
  - 4 - failed range check (0 ~ 100 %)
  - 9 - system error or input error
- Flag 10 : Wind direction and wind speed
- 3 - assumed good\*
  - 4 - failed range check (0 ~ 360 degree : wind direction, 0 ~ 60 m/s : wind speed)
  - 9 - system error or input error
- Flag 11 : Depth
- 3 - assumed good\*
  - 4 - failed range check (4 ~ 11000 m)
  - 9 - system error or input error
- Flag 12 : Current direction and current speed
- 3 - assumed good\*
  - 4 - failed range check (0 ~ 360 degree : current direction, 0 ~ 5 knots : current speed)
  - 9 - system error or input error

\* 'assumed good' means that this data passed range check but may contains leap or inappropriate zero.