

## 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: Kongsberg Maritime  
 Model: EM124  
 Frequency: 12kHz  
 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%     |

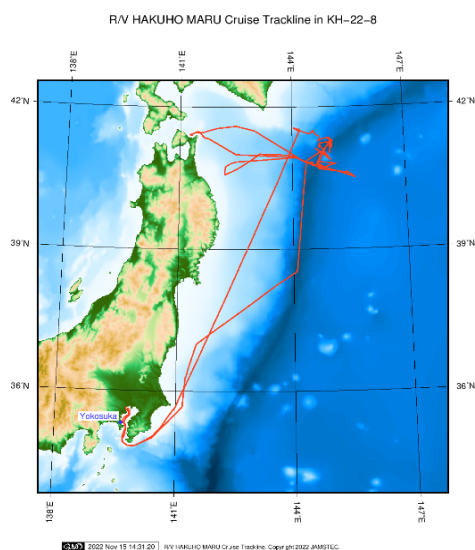
#### Note

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

|                              |  |
|------------------------------|--|
| Water depth:                 | Bathymetry (MBES)                                  |
| Current direction/<br>speed: | Shipboard Acoustic Doppler Current Profiler (ADCP) |

## Related Information

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### KH-22-8

Ship Name: HAKUHO MARU  
Period: 2022/09/30 - 2022/10/17  
Chief Scientist: Shigeaki Kojima (Graduate School of Frontier Sciences, The University of Tokyo)  
Proposal: Fauna and evolution of benthic organisms inhabiting trench areas in the northwestern Pacific

Study on the turbulence and double-diffusive mixing and impacts with fast-response thermistors

Diversification of fatty acid synthesis mechanisms in deep-sea amphipods

## 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<br>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<br>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.