

MIRAI MR10-06 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

[ReadMe](#) [Observation Data](#) [Data Format](#) [Quality Information](#)

Cruise ID: [MR10-06](#)

Bottle Sampling Water Chemical Analysis: Processed (DMO/PI)

Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Fluorescence, Chlorophyll, PAR, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, CFC11, CFC12, CFC113, Total inorganic carbon, Alkalinity, pH, DOC, Potential temperature, Density

Science Keywords:

OCEANS > OCEAN CHEMISTRY > AMMONIA
OCEANS > OCEAN CHEMISTRY > DISSOLVED GASES
OCEANS > OCEAN CHEMISTRY > INORGANIC CARBON
OCEANS > OCEAN CHEMISTRY > NITRITE
OCEANS > OCEAN CHEMISTRY > NITRATE
OCEANS > OCEAN CHEMISTRY > NUTRIENTS
OCEANS > OCEAN CHEMISTRY > OXYGEN
OCEANS > OCEAN CHEMISTRY > pH
OCEANS > OCEAN CHEMISTRY > PHOSPHATE
OCEANS > OCEAN CHEMISTRY > SILICATE
OCEANS > OCEAN CHEMISTRY > SALINITY
OCEANS > OCEAN CHEMISTRY > CHLOROPHYLL
OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE
OCEANS > SALINITY/DENSITY > SALINITY
OCEANS > OCEAN OPTICS > PHOTOSYNTHETICALLY ACTIVE RADIATION
OCEANS > OCEAN CHEMISTRY > ALKALINITY
OCEANS > OCEAN CHEMISTRY > CARBON
OCEANS > OCEAN CHEMISTRY > OCEAN TRACERS
OCEANS > OCEAN OPTICS > FLUORESCENCE
OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

Cruise Report

http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR10-06_all.pdf

For Using Data

Principal Investigator

CTDTMP : Masahide Wakita (JAMSTEC)
SBE35 : Masahide Wakita (JAMSTEC)
CTDSAL : Masahide Wakita (JAMSTEC)
SALNTY : Masahide Wakita (JAMSTEC)
CTDOXY : Masahide Wakita (JAMSTEC)
OXYGEN : Masahide Wakita (JAMSTEC)
OPTOXY : Masahide Wakita (JAMSTEC)
FLUOR : Masahide Wakita (JAMSTEC)
CHLORA : Kazuhiko Matsumoto (JAMSTEC)
CHLWELSH : Kazuhiko Matsumoto (JAMSTEC)
PAR : Masahide Wakita (JAMSTEC)
SILCAT : Michio Aoyama (Meteorological Research Institute)
NITRAT : Michio Aoyama (Meteorological Research Institute)
NITRIT : Michio Aoyama (Meteorological Research Institute)
PHSPHT : Michio Aoyama (Meteorological Research Institute)
NH4 : Michio Aoyama (Meteorological Research Institute)
CFC-11 : Masahide Wakita (JAMSTEC)
CFC-12 : Masahide Wakita (JAMSTEC)
CFC113 : Masahide Wakita (JAMSTEC)
TCARBN : Masahide Wakita (JAMSTEC)
ALKALI : Masahide Wakita (JAMSTEC)
PH : Masahide Wakita (JAMSTEC)
DOC : Masahide Wakita (JAMSTEC)

Use Constraints

See [Terms and Conditions](#) about constrain of use.

Data Citation

See [Terms and Conditions](#) about data citation.

Instrument

Instrument:
Gas chromatograph



Instrument:
Total dissolved inorganic carbon
measurement system (- MR11-E02)



Instrument:
Salinity measurement system



Instrument:
pH meter (MR02-K03 -)



Instrument:
Nutrient analyzer(5ch) (MR09-02 -)



Instrument:
Titrator for DO (- MR11-05 Leg2)





Instrument:
Fluorometer (TURNER DESIGNS)



Notice

- Temperature data measured by a mercury thermometer is listed in CTDMP column at SAMPNO 0 which means sampled by bucket. Please notice that this data is different from other data in format (f9.1) and instrument.
- 11 Jul. 2013 The nutrients concentration data are changed.

The concentration of nutrients was calculated to correct the overestimate within 0.7%. It was caused for several calculation steps. First, the temperature used for density calculation was the laboratory ambient temperature (20 - 27 degrees C) instead of 20 degrees C. Then, the density was used for converting from mol/cm^3 to mol/kg .

Information on CTD data

(1) Temperature sensor

Model : SBE03-04/F, Sea-Bird Electronics, Inc.
Measurement range : -5.0 to +35degC
Accuracy : 0.001degC
Resolution : 0.0002degC

(2) Salinity sensor

Model : SBE4, Sea-Bird Electronics, Inc.
Measurement range : 0.0 to 7 S/m
Accuracy : 0.0003 S/m
Resolution : 0.00004 S/m

(3) Pressure sensor

Model : SBE9plus, Sea-Bird Electronics, Inc.
Measurement range : up to 10500m
Accuracy : 0.015% F.S.
Resolution : 0.001% F.S.

(4) DO sensor

Model : SBE43, Sea-Bird Electronics, Inc.
Measurement range : 0 to 15ml/l
Accuracy : 0.1ml/l
Resolution : 0.01ml/l

(5) Optode DO sensor

Model : RINKOIII, Alec Electronics Co.Ltd.

(6) Deep Ocean Standards Thermometer

Model : SBE 35, Sea-Bird Electronics, Inc.

(7) PAR :

Model : Satlantic Inc.

(8) Fluorometer

Model : Seapoint Sensors, Inc.

Information on Chemical and Biological data

1. Dissolved Oxygen

(1) Instruments :

Burette: APB-510 manufactured by Kyoto Electronic Co. Ltd. / 10 cm^3 of titration vessel
Detector : Automatic photometric titrator DOT-01 (Kimoto Electronic Co. Ltd)
Software : DOT controller Ver.2.2.1

(2) Methods : Winkler method/photometric methods

(3) Precision : 0.20 umol kg^{-1} (Standard deviation of the replicate measurement)

(4) Reference Material/Calibration : CSK standard of potassium iodate Lot TSK3592 (Wako Pure Chemical Industries Ltd.,)0.0100N

2. Salinity

(1) Instruments : Autosal salinometer model 8400B (Guildline Instruments Ltd.)

(2) Methods : -

(3) Precision : Average 0.0003, Standard deviation 0.0002

(4) Reference Material/Calibration : IAPSO Standard Sea Water batch P152

3. Silicate

(1)Instruments : SEAL OuAAtro 2-HR

- (2)Methods : Molybdenum blue method
(3)Precision : C.V. 0.11%
(4)Reference Material/Calibration : RMNS, Silicon standard solution SiO₂ in NaOH 0.5 mol/L CertiPURR (Merck)

4. Nitrate

- (1)Instruments : SEAL QuAAtro 2-HR
(2)Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)
(3)Precision : C.V. 0.07%
(4)Reference Material/Calibration : RMNS, potassium nitrate 99.995 suprapurR (Merck)

5. Nitrite

- (1)Instruments : SEAL QuAAtro 2-HR
(2)Methods : Diazotization method
(3)Precision : C.V. 0.11%
(4)Reference Material/Calibration : RMNS, sodium nitrite (Wako)

6. Phosphate

- (1)Instruments : SEAL QuAAtro 2-HR
(2)Methods : Molybdenum blue method
(3)Precision : C.V. 0.07%
(4)Reference Material/Calibration : RMNS, potassium dihydrogen phosphate anhydrous 99.995 suprapurR (Merck)

7. Ammonia

- (1)Instruments : SEAL QuAAtro 2-HR
(2)Methods : Indophenol method
(3)Precision : C.V. 0.24%
(4)Reference Material/Calibration : ammonium sulfate (Wako)

8. Total inorganic carbon

- (1) Instruments : Automated TCO₂ analyzer (Nippon ANS, Inc.) equipped with carbon coulometer 5012 (UIC Inc.)
(2) Methods : coulometry
(3) Precision : Average 0.7 umol kg⁻¹, Standard deviation 0.6 umol kg⁻¹
(4) Reference Material/Calibration : The CRM provided by Dr. Dickson in Scripps Institute of Oceanography

9. Total Alkalinity

- (1) Instruments : Spectrophotometry using a custom-made system (Nippon ANS, Inc.)
The system comprises of a water dispensing unit and a spectrophotometer (Cary 50 Scan, Varian)
(2) Methods : Single step acid additional procedure/spectrophotometry
(3) Precision : Average 0.6 umol kg⁻¹, Standard deviation 0.5 umol kg⁻¹
(4) Reference Material/Calibration : Na₂CO₃ solution and the CRM provided by Dr. Dickson in Scripps Institute of Oceanography

10. pH

- (1)Instruments : pH/Ion meter Radiometer PHM240 (Radiometer Analytical SAS)
(2)Methods : potentiometric methods
(3)Precision : average 0.001 pH units, standard deviation 0.001 pH units
(4)Reference Material/Calibration : -

11.CFCs

- (1)Instruments : Gas chromatograph (GC-14B: Shimadzu Ltd.)
(2)Methods : see "Cruise report"
(3)Precision : -
(4)Reference Material/Calibration :-

12. Chlorophyll a

- (1) Instruments : Fluorophotometer model 10-AU-005 (Turner design)
(2) Methods : Extract in N,N-dimethylformamide /fluorometric determination (Non-acidification method and Acidification method)
(3) Precision : -
(4) Reference Material/Calibration : pure chl-a (Sigma-Aldrich Co.)

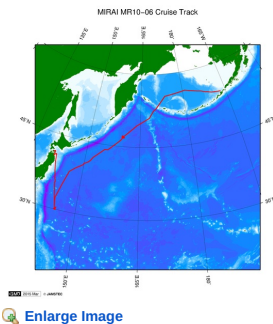
13. Dissolved organic carbon

- (1)Instruments : Shimadzu TOC-V (Shimadzu)
(2)Methods : High temperature catalytic oxidation
(3)Precision : -
(4)Reference Material/Calibration :-

About this data

There are some description error for nutrient data of this cruise.
Please refer to the errata of the cruise report.

Related Information



MR10-06

Ship Name: MIRAI

Period: 2010-10-18 - 2010-11-16

Chief Scientist: Makio Honda (JAMSTEC)

Project Name: [Station K2, Station S1, Station KEO, Station KNOT]

Proposal ▶ Change in material cycles and ecosystem by the climate change and its feedback

Title:

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Privacy Policy

Application for Data and

Samples

Data Policy

What's New

Update History

Feeds

Lists

Publication List

Amount of Public Info.

Data

Map Search

Data Tree

Detailed Search

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NATSUSHIMA

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YOKOSUKA

MIRAI

KAIREI

CHIKYU

KAIMEI

SHINSEI MARU

HAKUHO MARU

Information of the

Submersibles

KAIKO

SHINKAI 2000

SHINKAI 6500

DEEP TOW

HYPER-DOLPHIN

URASHIMA

YOKOSUKA DEEP TOW

6K Camera DEEP TOW

6K Sonar DEEP TOW

KM-ROV

POWER GRAB SAMPLER

(SHELL)

POWER GRAB SAMPLER

(CLOW)

BMS

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Cruise ID:

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Cruise ID: **MR10-06**

Bottle Sampling Water Chemical Analysis: Processed (DMO/PI)

Data Policy: **JAMSTEC**

Exchange Format

Provided in the Exchange Format of CCHDO (CLIVAR and Carbon Hydrographic Data Office).

Please see the following link for details of Exchange Format.

[CCHDO | CLIVAR & Carbon Hydrographic Data Office](#)

Format Information

Column No.	Column Heading Mnemonic	Units Mnemonic	Reporting Precision FORTRAN Format	Comments
1	EXPCODE		A14	Expedition code
2	SECT		A6	For WOCE data the WHP section identifier
3	STNNBR		A6	Station number
4	CASTNO		I3	Cast number
5	SAMPNO		A7	Sample number
6	BTLNBR		A7	Bottle identification number
7	BTLNBR_FLAG_W		I1	Bottle quality flag
8	DATE		I8	Cast date(UTC)
9	TIME	UTC	I4	Cast time (UTC)
10	LATITUDE	DEG	F8.3	LATITUDE
11	LONGITUDE	DEG	F9.3	LONGITUDE
12	DEPTH	M	I5	Reported depth to bottom.
13	CTDDPT	M	F9.1	Depth
14	CTDDPT_FLAG_W		I1	Quality flag for CTD data
15	CTDPRS	DBAR	F9.1	Pressure
16	CTDPRS_FLAG_W		I1	Quality flag for CTD data
17	CTDTMP	ITS-90	F9.4	Temperature
18	CTDTMP_FLAG_W		I1	Quality flag for CTD data
19	SBE35	ITS-90	F10.5	Temperature from Deep Ocean Standards Thermometer
20	SBE35_FLAG_W		I1	Quality flag for CTD data
21	CTDSAL	PSS-78	F9.4	CTD Salinity sensor
22	CTDSAL_FLAG_W		I1	Quality flag for CTD data
23	SALNTY	PSS-78	F9.4	Salinity
24	SALNTY_FLAG_W		I1	Quality flags for water samples
25	CTDOXY	UMOL/KG	F9.2	CTD Oxygen sensor
26	CTDOXY_FLAG_W		I1	Quality flag for CTD data
27	OPTOXY	UMOL/KG	F9.2	Optode oxygen
28	OPTOXY_FLAG_W		I1	Quality flag for CTD data
29	OXYGEN	UMOL/KG	F9.2	Oxygen
30	OXYGEN_FLAG_W		I1	Quality flags for water samples
31	FLUOR	UG/L	F9.3	Fluorometer
32	FLUOR_FLAG_W		I1	Quality flag for CTD data
33	CHLORA	MG/CUM	F9.2	Chlorophyll a
34	CHLORA_FLAG_W		I1	Quality flags for water samples
35	CHLWELSH	MG/CUM	F9.2	Chlorophyll a (Welschmeyer method)
36	CHLWELSH_W		I1	Quality flags for water samples
37	EDPAR	UMOL-PHOTONS/M2/S	F9.3	Ed PAR
38	EDPAR_FLAG_W		I1	Quality flag for CTD data
39	SILCAT	UMOL/KG	F9.2	Silicate
40	SILCAT_FLAG_W		I1	Quality flags for water samples
41	SILUNC	UMOL/KG	F9.2	Uncertainty of Silicate data
42	NITRAT	UMOL/KG	F9.2	Nitrate
43	NITRAT_FLAG_W		I1	Quality flags for water samples
44	NRAUNC	UMOL/KG	F9.2	Uncertainty of Nitrate data
45	NITRIT	UMOL/KG	F9.2	Nitrite
46	NITRIT_FLAG_W		I1	Quality flags for water samples
47	NRIUNC	UMOL/KG	F9.2	Uncertainty of Nitrite data
48	PHSPHT	UMOL/KG	F9.3	Phosphate
49	PHSPHT_FLAG_W		I1	Quality flags for water samples
50	PHPUNC	UMOL/KG	F9.3	Uncertainty of Phosphate data
51	NH4	UMOL/KG	F9.2	Ammonium
52	NH4_FLAG_W		I1	Quality flags for water samples
53	NH4UNC	UMOL/KG	F9.1	Uncertainty of Ammonium data
54	CFC-11	PMOL/KG	F9.3	Freon-11
55	CFC-11_FLAG_W		I1	Quality flags for water samples
56	CFC-12	PMOL/KG	F9.3	Freon-12
57	CFC-12_FLAG_W		I1	Quality flags for water samples
58	CFC113	PMOL/KG	F9.3	Freon-113
59	CFC113_FLAG_W		I1	Quality flags for water samples
60	TCARBN	UMOL/KG	F9.1	Total carbon
61	TCARBN_FLAG_W		I1	Quality flags for water samples
62	ALKALI	UMOL/KG	F9.1	Total alkalinity
63	ALKALI_FLAG_W		I1	Quality flags for water samples

Column No.	Column Heading Mnemonic	Units Mnemonic	Reporting Precision FORTRAN Format	Comments
65	PH_FLAG_W		I1	Quality flags for water samples
66	DOC	UMOL/KG	F9.1	DOC
67	DOC_FLAG_W		I1	Quality flags for water samples
68	THETA	DEG C	F9.4	Potential temperature
69	SIG0	KG/CUM	F9.4	Density

ODV Format

Please see the following link for details of ODV Format and ODV Software.

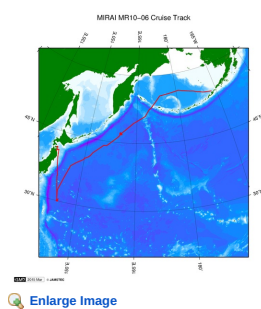
[Ocean Data View \(ODV\)](#)

Format Information

Column No.	Column Heading	Comments
1	Cruise	Cruise Label
2	Station	Station number_Cast number
3	Type	Station type
4	mon/day/yr	Cast date(UTC)
5	hh:mm	Cast time (UTC)
6	Latitude [degrees_north]	LATITUDE
7	Longitude [degrees_east]	LONGITUDE
8	Bot. Depth [m]	Reported depth to bottom.
9	CTDDPT[M]	Depth
10	QF	Quality flag for CTD data
11	CTDPRS[DBAR]	Pressure
12	QF	Quality flag for CTD data
13	CTDTMP[ITS-90]	Temperature
14	QF	Quality flag for CTD data
15	SBE35[ITS-90]	Temperature from Deep Ocean Standards Thermometer
16	QF	Quality flag for CTD data
17	CTDSAL[PSS-78]	CTD Salinity sensor
18	QF	Quality flag for CTD data
19	SALNTY[PSS-78]	Salinity
20	QF	Quality flags for water samples
21	CTDOXY[UMOL/KG]	CTD Oxygen sensor
22	QF	Quality flag for CTD data
23	OPTOXY[UMOL/KG]	Optode oxygen
24	QF	Quality flag for CTD data
25	OXYGEN[UMOL/KG]	Oxygen
26	QF	Quality flags for water samples
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29	CHLORA[MG/CUM]	Chlorophyll a
30	QF	Quality flags for water samples
31	CHLWELSH[MG/CUM]	Chlorophyll a (Welschmeyer method)
32	QF	Quality flags for water samples
33	EDPAR[UMOL-PHOTONS/M2/S]	Ed PAR
34	QF	Quality flag for CTD data
35	SILCAT[UMOL/KG]	Silicate
36	QF	Quality flags for water samples
37	SILUNC	Uncertainty of Silicate data
38	QF	Quality flags for water samples
39	NITRAT[UMOL/KG]	Nitrate
40	QF	Quality flags for water samples
41	NRAUNC	Uncertainty of Nitrate data
42	QF	Quality flags for water samples
43	NITRIT[UMOL/KG]	Nitrite
44	QF	Quality flags for water samples
45	NRIUNC	Uncertainty of Nitrite data
46	QF	Quality flags for water samples
47	PHSPHT[UMOL/KG]	Phosphate
48	QF	Quality flags for water samples
49	PHPUNC	Uncertainty of Phosphate data
50	QF	Quality flags for water samples
51	NH4[UMOL/KG]	Ammonium
52	QF	Quality flags for water samples
53	NH4UNC	Uncertainty of Ammonium data
54	QF	Quality flags for water samples
55	CFC-11[PMOL/KG]	Freon-11
56	QF	Quality flags for water samples
57	CFC-12[PMOL/KG]	Freon-12
58	QF	Quality flags for water samples
59	CFC113[PMOL/KG]	Freon-113
60	QF	Quality flags for water samples
61	TCARBN[UMOL/KG]	Total carbon
62	QF	Quality flags for water samples
63	ALKAL[UMOL/KG]	Total alkalinity
64	QF	Quality flags for water samples
65	PH	pH
66	QF	Quality flags for water samples
67	DOC[UMOL/KG]	DOC
68	QF	Quality flags for water samples
69	THETA[DEG C]	Potential temperature
70	QF	Quality flag for CTD data

Column No.	Column Heading	Comments
71	SIG0[KG/CUM]	Density
72	QF	Quality flag for CTD data
73	SAMPNO	Sample number
74	QF	Bottle quality flag

Related Information



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MR10-06

Ship Name: MIRAI
 Period: 2010-10-18 - 2010-11-16
 Chief Scientist: Makio Honda (JAMSTEC)
 Project Name: [Station K2, Station S1, Station KEO, Station KNOT]
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[What's New](#)
[Update History](#)
[Feeds](#)

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[Publication List](#)
[Amount of Public Info.](#)

Data

[Map Search](#)
[Data Tree](#)
[Detailed Search](#)

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[NATSUSHIMA](#)
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[YOKOSUKA](#)
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[KAIREI](#)
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Information of the Submersibles

[KAIKO](#)
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Go to a Cruise Information

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Dive ID:

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 JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

国立研究開発法人
 海洋研究開発機構

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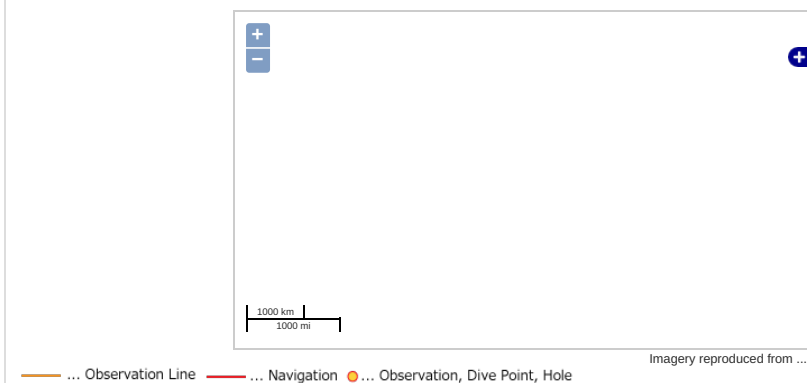
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Observation Map



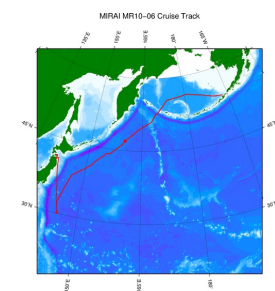
Data List

☐ File names

☐ MR100600_ex_bot.csv

☐ MR100600_odv_bot.txt

Related Information



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MR10-06

Ship Name: MIRAI

Period: 2010-10-18 - 2010-11-16

Chief Scientist: Makio Honda (JAMSTEC)

Project Name: [Station K2, Station S1, Station KEO, Station KNOT]

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[Data Policy](#)

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[Update History](#)

[Feeds](#)

Lists

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[Amount of Public Info.](#)

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[Map Search](#)

[Data Tree](#)

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[HAKUHO MARU](#)

Information of the Submersibles

[KAIKO](#)

[SHINKAI 2000](#)

[SHINKAI 6500](#)

[DEEP TOW](#)

[HYPER-DOLPHIN](#)

[URASHIMA](#)

[YOKOSUKA DEEP TOW](#)

[6K Camera DEEP TOW](#)

[6K Sonar DEEP TOW](#)

[KM-ROV](#)

[POWER GRAB SAMPLER](#)

[\(SHELL\)](#)

[POWER GRAB SAMPLER](#)

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