

MIRAI MR11-02 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

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

Cruise ID: [MR11-02](#)

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/MR11-02_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)/Masahide Wakita (JAMSTEC)
 NITRAT : Michio Aoyama (Meteorological Research Institute)/Masahide Wakita (JAMSTEC)
 NITRIT : Michio Aoyama (Meteorological Research Institute)/Masahide Wakita (JAMSTEC)
 PHSPHT : Michio Aoyama (Meteorological Research Institute)/Masahide Wakita (JAMSTEC)
 NH4 : Michio Aoyama (Meteorological Research Institute)/Masahide Wakita (JAMSTEC)
 CFCs : Masahide Wakita/Ken-ichi Sasaki (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

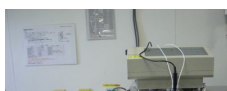
Instrument:

Salinity measurement system



Instrument:

pH meter (MR02-K03 -)



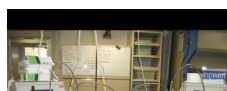
Instrument:

Gas chromatograph



Instrument:

Titration for DO (- MR11-05 Leg2)



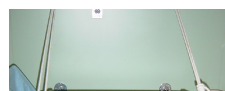
Instrument:

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



Instrument:

Fluorometer (TURNER DESIGNS)





Notice

- Temperature data measured by a mercury thermometer is listed in CTDTMP 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.

Information on CTD data

(1) Temperature sensor

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

(2) Salinity sensor

Model: SBE04-04/0, Sea-Bird Electronics, Inc.
Measurement range: 0.0 to 7S/m
Accuracy: 0.0003S/m
Resolution: 0.00004S/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: 120% of surface saturation
Accuracy: 2% of saturation

(5) Optode oxygen sensor

Model: RINKO-III ARO-CAV(Alec Electronics Co. Ltd.)
Measurement range: 0 to 200%
Accuracy: $\pm 2\%$ F.S.
Resolution: 0.01 to 0.04%

(6) Fluorometer

Model : Seapoint Sensors, Inc.
Measurement range : 0-5 μ g/l
Resolution : 0.02 μ g/l

(7) Deep Ocean Standards Thermometer

Model: SBE35, Sea-Bird Electronics, Inc.
Measurement range: -5.0 to +35degC
Accuracy: 0.001degC
Resolution: 0.000025degC

(8) PAR sensor

Model: (Satlantic Inc.)
Measurement range : 0-6500 μ mol photons/m²/s

Information on Chemical and Biological data

1. Dissolved Oxygen

(1) Instruments :

Burette: APB-510 manufactured by Kyoto Electronic Co. Ltd. / 10 cm³ of titration vessel
Detector : Automatic photometric titrator DOT-01 (Kimoto Electronic Co. Ltd)
Software : DOT controller Ver.2.2.1

(2)Methods: Winkler method

(3)Precision: Standard deviation 0.15 μ mol kg⁻¹

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

2. Salinity

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

(2)Methods: -

(3)Precision: The average and standard deviation of absolute difference were 0.0002 and 0.0003 in salinity.

(4)Reference Material/Calibration: IAPSO Standard Sea Water batch P152 (Ocean Scientific International Ltd.)

3. Silicate

(1)Instruments : BL TEC K.K. QuAAtro 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 CertiPUR® (Merck KGaA)

4. Nitrate

(1)Instruments : BL TEC K.K. QuAAtro 2-HR

(2)Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)

(3)Precision : C.V. 0.08%

(4)Reference Material/Calibration : RMNS, potassium nitrate 99.995 suprapur® (Merck KGaA)

5. Nitrite

(1)Instruments : BL TEC K.K. QuAAtro 2-HR

(2)Methods : Diazotization method
(3)Precision : C.V. 0.19%
(4)Reference Material/Calibration : RMNS, sodium nitrite (Wako Pure Chemical Industries, Ltd.)

6. Phosphate

(1)Instruments : BL TEC K.K QuAAtro 2-HR
(2)Methods : Molybdenum blue method
(3)Precision : C.V. 0.18%
(4)Reference Material/Calibration : RMNS, potassium dihydrogen phosphate anhydrous 99.995suprapur® (Merck KGaA)

7. Ammonia

(1)Instruments : BL TEC K.K QuAAtro 2-HR
(2)Methods : Indophenol method
(3)Precision : C.V. 0.24%
(4)Reference Material/Calibration : ammonium sulfate (Wako Pure Chemical Industries, Ltd.)

8. Total inorganic carbon

(1)Instruments: TCO₂ measuring system (Nippon ANS, Inc.) equipped with coulometer Model seacat2000(Nippon ANS, Inc.)
(2)Methods: coulometry
(3)Precision: average 0.7μmol kg⁻¹, standard deviation 0.6μmol kg⁻¹
(4)Reference Material/Calibration: -

9. Total alkalinity

(1)Instruments: Spectrophotometric system(Nippon ANS, Inc.).
The system comprises of a spectrophotometer (Carry 50 Scan, Varian)
(2)Methods: Single step acid additional procedure/spectrophotometry
(3)Precision: average 0.7μmol kg⁻¹, standard deviation 0.6μmol kg⁻¹
(4)Reference Material/Calibration: 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 0.0001 pH unit, standard deviation 0.001 pH units
(4)Reference Material/Calibration: total hydrogen ion scale

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 chlorophyll a (Sigma chemical Co.)

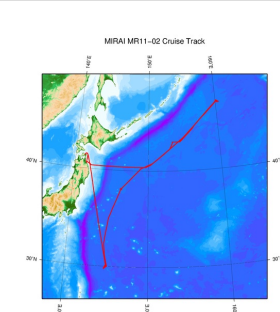
13. DOC

(1)Instruments : Shimadzu TOC-V (Shimadzu Co.)
(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



 [Enlarge Image](#)

MR11-02

Ship Name: MIRAI
Period: 2011-02-11 - 2011-03-09
Chief Scientist: Makio Honda (JAMSTEC)
Project Name: [Station K2, Station S1, Station KEO]
Proposal ▶ Studies on the microbial-geochemical processes that regulate the operation of the biological pump in the subarctic and subtropical regions of the western North Pacific
Title:

Update History

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Cruise ID:

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Dive ID:

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JAMSTEC 国立研究開発法人
海洋研究開発機構
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

MIRAI MR11-02 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

ReadMe Observation Data **Data Format** Quality Information

Cruise ID: [MR11-02](#)

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	F9.2	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	Dissolved organic carbon
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.

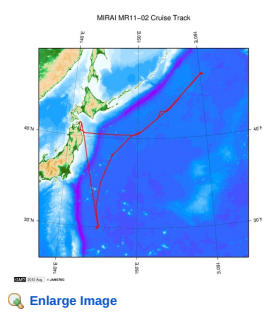
[Ocean Data View \(ODV\)](#)

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
27	FLUOR[UG/L]	Fluorometer
28	QF	Quality flag for CTD data
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]	Dissolved organic carbon
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



MR11-02

Ship Name: MIRAI
 Period: 2011-02-11 - 2011-03-09
 Chief Scientist: Makio Honda (JAMSTEC)
 Project Name: [Station K2, Station S1, Station KEO]
 Proposal ▶ Studies on the microbial-geochemical processes that regulate the operation of the biological pump in the subarctic and subtropical regions of the western North Pacific

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Information of the Ships

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 YOKOSUKA
 MIRAI
 KAIREI
 CHIKYU
 KAIIMEI
 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

Go to a Cruise Information

Cruise ID:

Go to a Dive Information

Dive ID:

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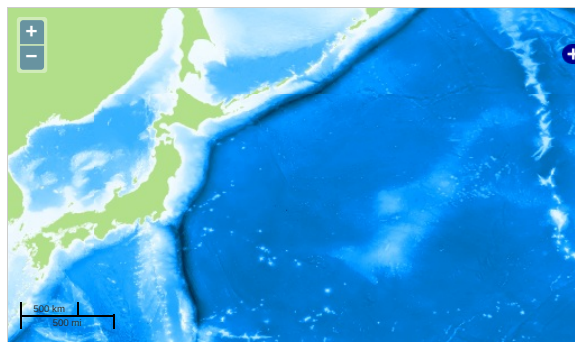
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Observation Items: Temperature, Salinity, Dissolved oxygen, Fluorescence, Chlorophyll, PAR, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, CFC11, CFC12, CFC113, Total inorganic carbon, Alkalinity, pH, DOC Potential temperature, Density

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OCEANS > OCEAN CHEMISTRY	> OXYGEN
OCEANS > OCEAN CHEMISTRY	> pH
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OCEANS > OCEAN CHEMISTRY	> OCEAN TRACERS
OCEANS > OCEAN OPTICS	> FLUORESCENCE
OCEANS > OCEAN TEMPERATURE	> POTENTIAL TEMPERATURE

Observation Map



... Observation Line ... Navigation ... Observation, Dive Point, Hole

Data List

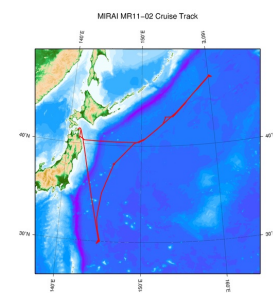
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☐ File names

☐ MR110200_ex_bot.csv

☐ MR110200_odv_bot.txt

Related Information



[Enlarge Image](#)

MR11-02

Ship Name: MIRAI

Period: 2011-02-11 - 2011-03-09

Chief Scientist: Makio Honda (JAMSTEC)

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

Proposal ▶ Studies on the microbial-geochemical processes that regulate the operation of the biological pump in the subarctic and subtropical regions of the western North Pacific

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2015-05-29	An observation data was registerd.

2015-03-05	An observation data was registerd.
2014-02-28	An observation data was registerd.
2013-07-18	An observation data was registerd.

JAMSTEC
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NATSUSHIMA
KAIYO
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

Go to a Cruise Information

Cruise ID:

Go to a Dive Information

Dive ID:

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