

## MIRAI MR15-03 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-05-08

ReadMe Observation Data Data Format Quality Information

Cruise ID: [MR15-03 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Potential temperature, Density, Transmittance, Fluorescence, PAR, Silicate, Nitrate, Nitrite, Phosphate, Ammonia

Science Keywords:

OCEANS > OCEAN CHEMISTRY > AMMONIA  
 OCEANS > OCEAN CHEMISTRY > NITRATE  
 OCEANS > OCEAN CHEMISTRY > NUTRIENTS  
 OCEANS > OCEAN CHEMISTRY > OXYGEN  
 OCEANS > OCEAN CHEMISTRY > PHOSPHATE  
 OCEANS > OCEAN CHEMISTRY > SILICATE  
 OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE  
 OCEANS > SALINITY/DENSITY > SALINITY  
 OCEANS > OCEAN OPTICS > PHOTOSYNTHETICALLY ACTIVE RADIATION  
 OCEANS > OCEAN OPTICS > FLUORESCENCE  
 OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR15-03\\_leg2\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR15-03_leg2_all.pdf)

### For Using Data

Principal Investigator

Shigeto Nishino (JAMSTEC)

Use Constraints

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

Data Citation

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

### Instrument

Instrument:

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



### Information on CTD data

#### Pressure sensor

Model : SBE9plus, Sea-Bird Electronics, Inc.  
 Measurement range : 0 to 10500 m  
 Accuracy : ± 0.015% of full scale range  
 Resolution : 0.001% of full scale

#### Temperature sensor

Model : SBE03-04/F, Sea-Bird Electronics, Inc.  
 Measurement range : -5 to +35 °C  
 Accuracy : ± 0.001 °C  
 Resolution : 0.0002 °C

#### Deep Ocean Standards Thermometer

Model : SBE35, Sea-Bird Electronics, Inc.  
 Measurement range : -5 to +35 °C  
 Accuracy : 0.001 °C  
 Resolution : 0.000025 °C

#### Salinity sensor

Model : SBE04C, Sea-Bird Electronics, Inc.  
 Measurement range : 0 to 7 S/m  
 Accuracy : ± 0.0003 S/m  
 Resolution : 0.00004 S/m

#### DO sensor

Model : SBE43, Sea-Bird Electronics, Inc.  
 Measurement range : 120% of surface saturation  
 Accuracy : ± 2% of saturation

#### DO sensor

Model : RINKO III, JFE Advantech Co. Ltd.  
 Measurement range : 0 to 200 % of surface saturation  
 Accuracy : ± 2 % FS, non linearity  
 Resolution : 0.01 to 0.04 %

#### Transmissometer

Model : C-Star, WET Labs, Inc.  
 Linearity : 99% R<sup>2</sup>

#### Fluorometer

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

Resolution : 0.02 µg/L

#### PAR sensor

Model : Satlantic, Inc.  
Measurement range : 0 - 5000 µmol photons m<sup>-2</sup> s<sup>-1</sup>  
Accuracy : -

#### Information on Chemical and Biological data

##### Silicate

Instruments : BL TEC K.K QuAAtro 2-HR  
Methods : Molybdenum blue method  
Precision : C.V. 0.12 %  
Reference Material/Calibration : RMNS, Silicon standard solution SiO<sub>2</sub> in NaOH 0.5 mol/L CertiPUR® (Merck KGaA)

##### Nitrate

Instruments : BL TEC K.K QuAAtro 2-HR  
Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)  
Precision : C.V. 0.11 %  
Reference Material/Calibration : RMNS, potassium nitrate 99.995 suprapur® (Merck KGaA)

##### Nitrite

Instruments : BL TEC K.K QuAAtro 2-HR  
Methods : Diazotization method  
Precision : C.V. 0.16 %  
Reference Material/Calibration : RMNS, sodium nitrite (Wako Pure Chemical Industries, Ltd.)

##### Phosphate

Instruments : BL TEC K.K QuAAtro 2-HR  
Methods : Molybdenum blue method  
Precision : C.V. 0.12 %  
Reference Material/Calibration : RMNS, potassium dihydrogen phosphate anhydrous 99.995 suprapur® (Merck KGaA)

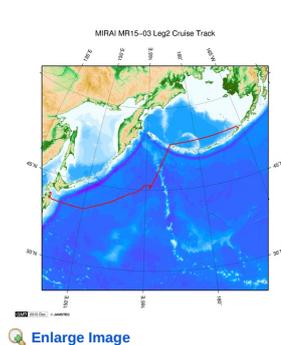
##### Ammonia

Instruments : BL TEC K.K QuAAtro 2-HR  
Methods : Indophenol method  
Precision : C.V. 0.39 %  
Reference Material/Calibration : ammonium chloride (NMIJ CRM)

#### 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



#### MR15-03 Leg2

Ship Name: MIRAI  
Period: 2015-10-09 - 2015-10-21  
Chief Scientist: Shigeto Nishino (JAMSTEC)  
Project Name: [Arctic Ocean Climate System Research]  
Proposal ▶ Observational studies on the Arctic Ocean climate and ecosystem variability  
Title:

#### Update History

2018-05-08	An observation data was registered.
2018-02-28	An observation data was registered.

JAMSTEC  
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Information of the Ships  
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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海洋研究開発機構  
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

**MIRAI MR15-03 Leg2 Bottle Sampling Water Chemical Analysis**

Last Modified: 2018-05-08

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

Cruise ID: **MR15-03 Leg2**

Bottle Sampling Water Chemical Analysis: Processed (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	ExpoCode
2	SECT_ID		A6	Section ID
3	STNNBR		A6	Station Number
4	CASTNO		I3	Cast Number
5	SAMPNO		A7	Sample Number
6	BTLNBR		A7	Bottle Number (S/N fixed to the sampling device)
7	BTLNBR_FLAG_W		I1	Bottle quality flags
8	BOTTLE		A7	bottle
9	DATE		I8	Cast date
10	TIME	UTC	A4	Cast time
11	LATITUDE	DEG	F8.4	Latitude
12	LONGITUDE	DEG	F9.4	Longitude
13	DEPTH	METERS	I5	Bottom depth
14	CTDDPT	METERS	F9.1	Depth
15	CTDDPT_FLAG_W		I1	Quality flags for CTD data
16	CTDPRS	DBAR	F9.1	Pressure
17	CTDPRS_FLAG_W		I1	Quality flags for CTD data
18	CTDTMP	ITS-90	F9.4	Temperature
19	CTDTMP_FLAG_W		I1	Quality flags for CTD data
20	CTDTMP_1	ITS-90	F9.4	Temperature (secondary sensor)
21	CTDTMP_1_FLAG_W		I1	Quality flags for CTD data
22	SBE35	ITS-90	F10.5	Temperature from Deep Ocean Standards Thermometer
23	SBE35_FLAG_W		I1	Quality flags for CTD data
24	CTDSAL	PSS-78	F9.4	Salinity
25	CTDSAL_FLAG_W		I1	Quality flags for CTD data
26	CTDSAL_1	PSS-78	F9.4	Salinity (secondary sensor)
27	CTDSAL_1_FLAG_W		I1	Quality flags for CTD data
28	CTDCND	S/M	F11.6	Conductivity (primary sensor)
29	CTDCND_FLAG_W		I1	Quality flags for CTD data
30	CTDCND_1	S/M	F11.6	Conductivity (secondary sensor)
31	CTDCND_1_FLAG_W		I1	Quality flags for CTD data
32	CTDOXY	UMOL/KG	F9.2	CTD-oxygen (primary sensor of RINKO)
33	CTDOXY_FLAG_W		I1	Quality flags for CTD data
34	CTDOXY_1	UMOL/KG	F9.2	CTD-oxygen (secondary sensor of RINKO)
35	CTDOXY_1_FLAG_W		I1	Quality flags for CTD data
36	CTDOXY_s	UMOL/KG	F9.2	CTD-oxygen (primary sensor of RINKO using secondary T and S)
37	CTDOXY_s_FLAG_W		I1	Quality flags for CTD data
38	CTDOXY_1_s	UMOL/KG	F9.2	CTD-oxygen (secondary sensor of RINKO using secondary T and S)
39	CTDOXY_1_s_FLAG_W		I1	Quality flags for CTD data
40	CTDOXY_2	UMOL/KG	F9.2	CTD-oxygen (primary sensor of SBE43)
41	CTDOXY_2_FLAG_W		I1	Quality flags for CTD data
42	CTDOXY_3	UMOL/KG	F9.2	CTD-oxygen (secondary sensor of SBE43)
43	CTDOXY_3_FLAG_W		I1	Quality flags for CTD data
44	CTDOXV	V	F9.4	CTD-oxygen voltage (primary sensor of RINKO)
45	CTDOXV_FLAG_W		I1	Quality flags for CTD data
46	CTDOXV_1	V	F9.4	CTD-oxygen voltage (secondary sensor of RINKO)
47	CTDOXV_1_FLAG_W		I1	Quality flags for CTD data
48	CTDOXV_2	V	F9.4	CTD-oxygen voltage (primary sensor of SBE43)
49	CTDOXV_2_FLAG_W		I1	Quality flags for CTD data
50	CTDOXV_3	V	F9.4	CTD-oxygen voltage (secondary sensor of SBE43)
51	CTDOXV_3_FLAG_W		I1	Quality flags for CTD data
52	THETA	DEG C	F9.4	Potential temperature
53	THETA_FLAG_W		I1	Quality flags for CTD data
54	THETA_1	DEG C	F9.4	Potential temperature (secondary sensor)
55	THETA_1_FLAG_W		I1	Quality flags for CTD data
56	SIG0	KG/CUM	F9.4	Density
57	SIG0_FLAG_W		I1	Quality flags for CTD data
58	SIG0_1	KG/CUM	F9.4	Density (secondary sensor)
59	SIG0_1_FLAG_W		I1	Quality flags for CTD data
60	XMISS	%TRANS	F9.3	Transmissometer
61	XMISS_FLAG_W		I1	Quality flags for CTD data
62	XMISSCP	/METER	F9.4	Beam attenuation coefficient
63	XMISSCP_FLAG_W		I1	Quality flags for CTD data

Column No.	Column Heading Mnemonic	Units Mnemonic	Reporting Precision FORTRAN Format	Comments
65	XMISSV_FLAG_W		I1	Quality flags for CTD data
66	FLUOR	MG/CUM	F9.3	Fluorescence
67	FLUOR_FLAG_W		I1	Quality flags for CTD data
68	FLUOR_1	MG/CUM	F9.3	Fluorescence (replicate)
69	FLUOR_1_FLAG_W		I1	Quality flags for CTD data
70	PAR	UE/SQM/S	F9.3	PAR
71	PAR_FLAG_W		I1	Quality flags for CTD data
72	SILCAT	UMOL/KG	F9.2	Silicate
73	SILCAT_FLAG_W		I1	Quality flags for water samples
74	SILUNC	UMOL/KG	F9.2	Uncertainty of Silicate data
75	SILCAT2	UMOL/KG	F9.2	Silicate (duplicate)
76	SILCAT2_FLAG_W		I1	Quality flags for water samples
77	SILCAT_AVE	UMOL/KG	F9.2	Silicate (average)
78	SILCAT_AVE_FLAG_W		I1	Quality flags for water samples
79	NITRAT	UMOL/KG	F9.2	Nitrate
80	NITRAT_FLAG_W		I1	Quality flags for water samples
81	NRAUNC	UMOL/KG	F9.2	Uncertainty of Nitrate data
82	NITRAT2	UMOL/KG	F9.2	Nitrate (duplicate)
83	NITRAT2_FLAG_W		I1	Quality flags for water samples
84	NITRAT_AVE	UMOL/KG	F9.2	Nitrate (average)
85	NITRAT_AVE_FLAG_W		I1	Quality flags for water samples
86	NITRIT	UMOL/KG	F9.2	Nitrite
87	NITRIT_FLAG_W		I1	Quality flags for water samples
88	NRIUNC	UMOL/KG	F9.2	Uncertainty of Nitrite data
89	NITRIT2	UMOL/KG	F9.2	Nitrite (duplicate)
90	NITRIT2_FLAG_W		I1	Quality flags for water samples
91	NITRIT_AVE	UMOL/KG	F9.2	Nitrite (average)
92	NITRIT_AVE_FLAG_W		I1	Quality flags for water samples
93	PHSPHT	UMOL/KG	F9.3	Phosphate
94	PHSPHT_FLAG_W		I1	Quality flags for water samples
95	PHPUNC	UMOL/KG	F9.3	Uncertainty of Phosphate data
96	PHSPHT2	UMOL/KG	F9.3	Phosphate (duplicate)
97	PHSPHT2_FLAG_W		I1	Quality flags for water samples
98	PHSPHT_AVE	UMOL/KG	F9.3	Phosphate (average)
99	PHSPHT_AVE_FLAG_W		I1	Quality flags for water samples
100	NH4UNC	UMOL/KG	F9.2	Uncertainty of Ammonium data
101	AMMONIA	UMOL/KG	F9.2	Ammonium
102	AMMONIA_FLAG_W		I1	Quality flags for water samples
103	AMMONIA2	UMOL/KG	F9.2	Ammonium (duplicate)
104	AMMONIA2_FLAG_W		I1	Quality flags for water samples
105	AMMONIA_AVE	UMOL/KG	F9.2	Ammonium (average)
106	AMMONIA_AVE_FLAG_W		I1	Quality flags for water samples

#### ODV Format

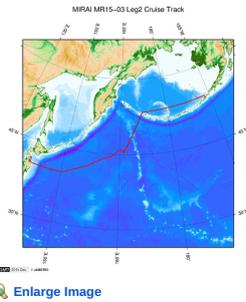
Please see the following link for details of ODV Format and ODV Software.

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

#### Format Information

Column No.	Column Heading	Comments
1	EXPCODE	Cruise Label
2	Cruise	Cruise
3	STNNBR	Station number_Cast number
4	Station	Station
5	Type	Station type
6	Bottle	bottle
7	mon/day/yr	Cast date
8	hh:mm	Cast time
9	Latitude[degrees_north]	Latitude
10	Longitude[degrees_east]	Longitude
11	Bot. Depth[METERS]	Bottom depth
12	CTDDPT[METERS]	Depth
13	QF	Quality flags for CTD data
14	CTDPRS[DBAR]	Pressure
15	QF	Quality flags for CTD data
16	CTDTMP[ITS-90]	Temperature
17	QF	Quality flags for CTD data
18	CTDTMP_1[ITS-90]	Temperature (secondary sensor)
19	QF	Quality flags for CTD data
20	SBE35[ITS-90]	Temperature from Deep Ocean Standards Thermometer
21	QF	Quality flags for CTD data
22	CTDSAL[PSS-78]	Salinity
23	QF	Quality flags for CTD data
24	CTDSAL_1[PSS-78]	Salinity (secondary sensor)
25	QF	Quality flags for CTD data
26	CTDCND[S/M]	Conductivity (primary sensor)
27	QF	Quality flags for CTD data
28	CTDCND_1[S/M]	Conductivity (secondary sensor)
29	QF	Quality flags for CTD data
30	CTDOXY[UMOL/KG]	CTD-oxygen (primary sensor of RINKO)
31	QF	Quality flags for CTD data
32	CTDOXY_1[UMOL/KG]	CTD-oxygen (secondary sensor of RINKO)
33	QF	Quality flags for CTD data

Column No.	Column Heading	Quality flags for CTD data Comments
34	CTDOXY_S[UMOL/KG]	CTD-oxygen (primary sensor of RINKO using secondary T and S)
35	QF	Quality flags for CTD data
36	CTDOXY_1_S[UMOL/KG]	CTD-oxygen (secondary sensor of RINKO using secondary T and S)
37	QF	Quality flags for CTD data
38	CTDOXY_2[UMOL/KG]	CTD-oxygen (primary sensor of SBE43)
39	QF	Quality flags for CTD data
40	CTDOXY_3[UMOL/KG]	CTD-oxygen (secondary sensor of SBE43)
41	QF	Quality flags for CTD data
42	CTDOXV[V]	CTD-oxygen voltage (primary sensor of RINKO)
43	QF	Quality flags for CTD data
44	CTDOXV_1[V]	CTD-oxygen voltage (secondary sensor of RINKO)
45	QF	Quality flags for CTD data
46	CTDOXV_2[V]	CTD-oxygen voltage (primary sensor of SBE43)
47	QF	Quality flags for CTD data
48	CTDOXV_3[V]	CTD-oxygen voltage (secondary sensor of SBE43)
49	QF	Quality flags for CTD data
50	THETA[DEG C]	Potential temperature
51	QF	Quality flags for CTD data
52	THETA_1[DEG C]	Potential temperature (secondary sensor)
53	QF	Quality flags for CTD data
54	SIG0[KG/CUM]	Density
55	QF	Quality flags for CTD data
56	SIG0_1[KG/CUM]	Density (secondary sensor)
57	QF	Quality flags for CTD data
58	XMISS[%TRANS]	Transmissometer
59	QF	Quality flags for CTD data
60	XMISSCP[METER]	Beam attenuation coefficient
61	QF	Quality flags for CTD data
62	XMISSV[V]	Transmissometer voltage
63	QF	Quality flags for CTD data
64	FLUOR[MG/CUM]	Fluorescence
65	QF	Quality flags for CTD data
66	FLUOR_1[MG/CUM]	Fluorescence (replicate)
67	QF	Quality flags for CTD data
68	PAR[UE/SQM/S]	PAR
69	QF	Quality flags for CTD data
70	SILCAT[UMOL/KG]	Silicate
71	QF	Quality flags for water samples
72	SILUNC	Uncertainty of Silicate data
73	QF	Quality flags for water samples
74	SILCAT2[UMOL/KG]	Silicate (duplicate)
75	QF	Quality flags for water samples
76	SILCAT_AVE[UMOL/KG]	Silicate (average)
77	QF	Quality flags for water samples
78	NITRAT[UMOL/KG]	Nitrate
79	QF	Quality flags for water samples
80	NRAUNC	Uncertainty of Nitrate data
81	QF	Quality flags for water samples
82	NITRAT2[UMOL/KG]	Nitrate (duplicate)
83	QF	Quality flags for water samples
84	NITRAT_AVE[UMOL/KG]	Nitrate (average)
85	QF	Quality flags for water samples
86	NITRIT[UMOL/KG]	Nitrite
87	QF	Quality flags for water samples
88	NRIUNC	Uncertainty of Nitrite data
89	QF	Quality flags for water samples
90	NITRIT2[UMOL/KG]	Nitrite (duplicate)
91	QF	Quality flags for water samples
92	NITRIT_AVE[UMOL/KG]	Nitrite (average)
93	QF	Quality flags for water samples
94	PHSPHT[UMOL/KG]	Phosphate
95	QF	Quality flags for water samples
96	PHPUNC	Uncertainty of Phosphate data
97	QF	Quality flags for water samples
98	PHSPHT2[UMOL/KG]	Phosphate (duplicate)
99	QF	Quality flags for water samples
100	PHSPHT_AVE[UMOL/KG]	Phosphate (average)
101	QF	Quality flags for water samples
102	NH4UNC	Uncertainty of Ammonium data
103	QF	Quality flags for water samples
104	AMMONIA[UMOL/KG]	Ammonium
105	QF	Quality flags for water samples
106	AMMONIA2[UMOL/KG]	Ammonium (duplicate)
107	QF	Quality flags for water samples
108	AMMONIA_AVE[UMOL/KG]	Ammonium (average)
109	QF	Quality flags for water samples
110	SAMPNO	Sample Number
111	QF	Bottle quality flags



[Enlarge Image](#)

**MR15-03 Leg2**

Ship Name: MIRAI  
 Period: 2015-10-09 - 2015-10-21  
 Chief Scientist: Shigeto Nishino (JAMSTEC)  
 Project Name: [Arctic Ocean Climate System Research]  
 Proposal ▶ Observational studies on the Arctic Ocean climate and ecosystem variability  
 Title:

**Update History**

2018-05-08	An observation data was registered.
2018-02-28	An observation data was registered.

**JAMSTEC**

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**Lists**

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- [Amount of Public Info.](#)
- Data**
- [Map Search](#)
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- [Detailed Search](#)

**Information of the Ships**

- 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:

## MIRAI MR15-03 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-05-08

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

Cruise ID: [MR15-03 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

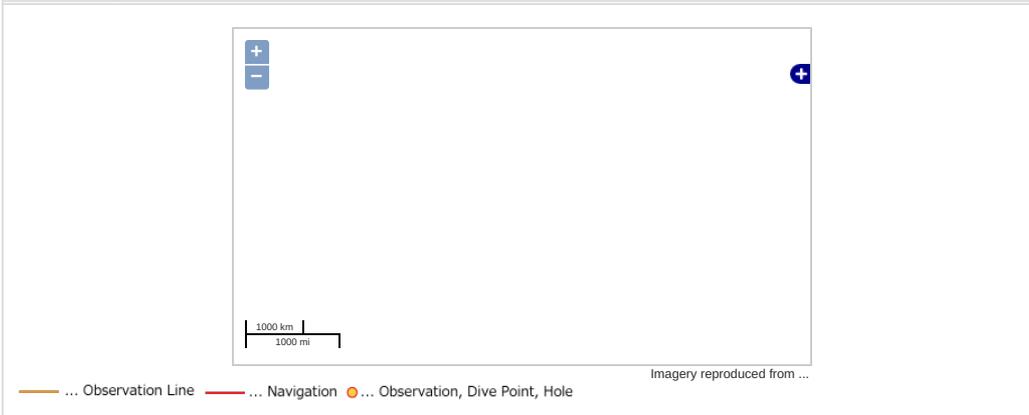
Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Potential temperature, Density, Transmittance, Fluorescence, PAR, Silicate, Nitrate, Nitrite, Phosphate, Ammonia

Science Keywords:

OCEANS > OCEAN CHEMISTRY > AMMONIA  
 OCEANS > OCEAN CHEMISTRY > NITRATE  
 OCEANS > OCEAN CHEMISTRY > NUTRIENTS  
 OCEANS > OCEAN CHEMISTRY > OXYGEN  
 OCEANS > OCEAN CHEMISTRY > PHOSPHATE  
 OCEANS > OCEAN CHEMISTRY > SILICATE  
 OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE  
 OCEANS > SALINITY/DENSITY > SALINITY  
 OCEANS > OCEAN OPTICS > PHOTOSYNTHETICALLY ACTIVE RADIATION  
 OCEANS > OCEAN OPTICS > FLUORESCENCE  
 OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

### Observation Map



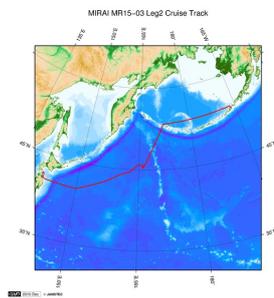
### Data List

File names

MR150302\_ex\_bot.csv

MR150302\_odv\_bot.txt

### Related Information



[Enlarge Image](#)

#### MR15-03 Leg2

Ship Name: MIRAI

Period: 2015-10-09 - 2015-10-21

Chief Scientist: Shigeto Nishino (JAMSTEC)

Project Name: [Arctic Ocean Climate System Reaserch]

Proposal ▶ Observational studies on the Arctic Ocean climate and ecosystem variability

Title:

### Update History

2018-05-08 An observation data was registerd.  
 2018-02-28 An observation data was registerd.

Go to a Cruise Information

Cruise ID:

Go to a Dive Information

Dive ID:

6K Sonar DEEP TOW  
KM-ROV  
POWER GRAB SAMPLER  
(SHELL)  
POWER GRAB SAMPLER  
(CLOW)  
BMS

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