

## MIRAI MR10-05 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

ReadMe Observation Data Data Format Quality Information

Cruise ID: [MR10-05 Leg2](#)

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, Total inorganic carbon, Alkalinity, Potential temperature, Density

Science Keywords:

OCEANS > OCEAN CHEMISTRY > AMMONIA  
 OCEANS > OCEAN CHEMISTRY > INORGANIC CARBON  
 OCEANS > OCEAN CHEMISTRY > NITRITE  
 OCEANS > OCEAN CHEMISTRY > NITRATE  
 OCEANS > OCEAN CHEMISTRY > NUTRIENTS  
 OCEANS > OCEAN CHEMISTRY > OXYGEN  
 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 OPTICS > FLUORESCENCE  
 OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR10-05\\_leg1-2\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR10-05_leg1-2_all.pdf)

### For Using Data

#### Principal Investigator

CTDTMP : Motoyo Itoh (JAMSTEC)  
 SBE35 : Motoyo Itoh (JAMSTEC)  
 CTDSAL : Motoyo Itoh (JAMSTEC)  
 CTDOXY : Motoyo Itoh (JAMSTEC)  
 SALNTY : Shigeto Nishino (JAMSTEC)  
 OXYGEN : Shigeto Nishino (JAMSTEC)  
 FLUOR : Motoyo Itoh (JAMSTEC)  
 CHLWELSH : Shigeto Nishino (JAMSTEC)  
 PAR : Motoyo Itoh (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)  
 TCARBN : Shigeto Nishino (JAMSTEC)  
 ALKALI : Shigeto Nishino (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:

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



Instrument:

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



Instrument:

Titration for DO ( - MR11-05 Leg2)



Instrument:

Fluorometer (TURNER DESIGNS)



## Notice

Upon consultation in advance with the chief of investigation and the person(s) in charge of research issues who gathered that data, we request that the text of the results material contain a statement to the effect that it was obtained during the R/V Mirai cruise of MR10-05, the Chief Scientist, Motoyo Itoh (JAMSTEC), and the following Principal Investigators (PI) for gathering the data.

Chief Scientist  
Motoyo Itoh  
Japan Agency for Marine - Earth Science and Technology (JAMSTEC)  
2-15 Natsushima, Yokosuka, Kanagawa 237-0061, Japan  
Tel: +81-46-867-9488, Fax: +81-46-867-9437  
E-mail: motoyo @ jamstec.go.jp

PI for CTD  
Motoyo Itoh (JAMSTEC)

PI for bottle salinity  
Shigeto Nishino (JAMSTEC)

PI for bottle oxygen  
Shigeto Nishino (JAMSTEC)

PI for total alkalinity  
Shigeto Nishino (JAMSTEC)

PI for total inorganic carbon  
Shigeto Nishino (JAMSTEC)

PI for chlorophyll a  
Shigeto Nishino (JAMSTEC)

## Information on CTD data

### (1) Temperature sensor

Model : SBE3, 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 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) Fluorometer

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

### (6) PAR sensor

Model : Satlantic, Inc.  
Measurement range : 0-5000 $\mu$ mol photons  $m^{-2} s^{-1}$   
Accuracy : 5%

### (7) Deep Ocean Standards Thermometer

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

## 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 and Software: Automatic photometric titrator manufactured by Kimoto Electronic Co. Ltd
- (2) Methods : Winkler method/photometric methods
- (3) Precision : 0.29  $\mu$ mol  $kg^{-1}$
- (4) Reference Material/Calibration : 0.001667M  $KIO_3$  solution

### 2. Salinity

- (1) Instruments : Autosal salinometer model 8400B (Guildline Instruments Ltd.)
- (2) Methods : -
- (3) Precision : 0.0003
- (4) Reference Material/Calibration : IAPSO Standard Sea Water batch P150 (Ocean Scientific International Ltd.)

### 3. Silicate

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Molybdenum blue method
- (3) Precision : C.V. 0.18%
- (4) Reference Material/Calibration : RMNS, Silicon standard solution  $SiO_2$  in NaOH 0.5 mol/L CertiPUR® (Merck)

7. Nitrate

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)
- (3) Precision : C.V. 0.12%
- (4) Reference Material/Calibration : RMNS, potassium nitrate 99.995 suprapur® (Merck)

5. Nitrite

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Diazotization method
- (3) Precision : -
- (4) Reference Material/Calibration : RMNS, sodium nitrite (Wako)

6. Phosphate

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Molybdenum blue method
- (3) Precision : C.V. 0.12%
- (4) Reference Material/Calibration : RMNS, potassium dihydrogen phosphate anhydrous 99.995 suprapur® (Merck)

7. Ammonia

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Indophenol method
- (3) Precision : C.V. 0.37%
- (4) Reference Material/Calibration : ammonium sulfate (Wako)

8. 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 : 0.40  $\mu\text{mol kg}^{-1}$
- (4) Reference Material/Calibration :  $\text{Na}_2\text{CO}_3$  solution and the CRM provided by Dr. Dickson in Scripps Institute of Oceanography

9. Total inorganic carbon

- (1) Instruments : Automated  $\text{TCO}_2$  analyzer (Nippon ANS, Inc.) equipped with carbon coulometer 5012 (UIC Inc.)
- (2) Methods : coulometry
- (3) Precision : 0.94  $\mu\text{mol kg}^{-1}$
- (4) Reference Material/Calibration : The CRM provided by Dr. Dickson in Scripps Institute of Oceanography

10. Chlorophyll a (Welschmeyer method)

- (1) Instruments : Fluorophotometer model 10-AU-005 (Turner design)
- (2) Methods : Extract in N,N-dimethylformamide /fluorometric determination (Welschmeyer non-acidification method)
- (3) Precision : -
- (4) Reference Material/Calibration : Pure chlorophyll a (Sigma chemical Co.)

#### 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](#)

#### MR10-05 Leg2

Ship Name: MIRAI  
Period: 2010-09-02 - 2010-10-16  
Chief Scientist: Motoyo Ito (JAMSTEC)  
Project Name: [Arctic Ocean Climate System Research]  
Proposal ▶ Arctic Climate Oceanography  
Title:

#### Update History

2018-01-25	An observation data was registered.
2015-05-29	An observation data was registered.
2015-03-05	An observation data was registered.
2013-08-29	An observation data was registered.
2013-03-08	An observation data was registered.

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SHINKAI 6500  
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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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**JAMSTEC**

国立研究開発法人  
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**MIRAI MR10-05 Leg2 Bottle Sampling Water Chemical Analysis**

Last Modified: 2018-01-25

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

Cruise ID: **MR10-05 Leg2**  
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	OXYGEN	UMOL/KG	F9.2	Oxygen
28	OXYGEN_FLAG_W		I1	Quality flags for water samples
29	FLUOR	UG/L	F9.3	Fluorometer
30	FLUOR_FLAG_W		I1	Quality flag for CTD data
31	CHLWELSH	UG/L	F9.2	Chlorophyll a (Welschmeyer method)
32	CHLWELSH_W		I1	Quality flags for water samples
33	EDPAR	UMOL-PHOTONS/M2/S	F9.3	Ed PAR
34	EDPAR_FLAG_W		I1	Quality flag for CTD data
35	SILCAT	UMOL/KG	F9.3	Silicate
36	SILCAT_FLAG_W		I1	Quality flags for water samples
37	NITRAT	UMOL/KG	F9.3	Nitrate
38	NITRAT_FLAG_W		I1	Quality flags for water samples
39	NITRIT	UMOL/KG	F9.3	Nitrite
40	NITRIT_FLAG_W		I1	Quality flags for water samples
41	PHSPHT	UMOL/KG	F9.3	Phosphate
42	PHSPHT_FLAG_W		I1	Quality flags for water samples
43	NH4	UMOL/KG	F9.3	
44	NH4_FLAG_W		I1	Quality flags for water samples
45	TCARBN	UMOL/KG	F9.1	Total carbon
46	TCARBN_FLAG_W		I1	Quality flags for water samples
47	ALKALI	UMOL/KG	F9.1	Total alkalinity
48	ALKALI_FLAG_W		I1	Quality flags for water samples
49	THETA	DEG C	F9.1	Potential temperature
50	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

Column No.	Column Heading Bot. Depth [m]	Comments Reported depth to bottom.
8		
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	OXYGEN[UMOL/KG]	Oxygen
24	QF	Quality flags for water samples
25	FLUOR[UG/L]	Fluorometer
26	QF	Quality flag for CTD data
27	CHLWELSH[UG/L]	Chlorophyll a (Welschmeyer method)
28	QF	Quality flags for water samples
29	EDPAR[UMOL-PHOTONS/M2/S]	Ed PAR
30	QF	Quality flag for CTD data
31	SILCAT[UMOL/KG]	Silicate
32	QF	Quality flags for water samples
33	NITRAT[UMOL/KG]	Nitrate
34	QF	Quality flags for water samples
35	NITRIT[UMOL/KG]	Nitrite
36	QF	Quality flags for water samples
37	PHSPHT[UMOL/KG]	Phosphate
38	QF	Quality flags for water samples
39	NH4[UMOL/KG]	Ammonium
40	QF	Quality flags for water samples
41	TCARBN[UMOL/KG]	Total carbon
42	QF	Quality flags for water samples
43	ALKAL[UMOL/KG]	Total alkalinity
44	QF	Quality flags for water samples
45	THETA[DEG C]	Potential temperature
46	QF	Quality flag for CTD data
47	SIG0[KG/CUM]	Density
48	QF	Quality flag for CTD data
49	SAMPNO	Sample number
50	QF	Bottle quality flag

#### Related Information



[Enlarge Image](#)

#### MR10-05 Leg2

Ship Name: MIRAI  
 Period: 2010-09-02 - 2010-10-16  
 Chief Scientist: Motoyo Ito (JAMSTEC)  
 Project Name: [Arctic Ocean Climate System Research]  
 Proposal ▶ Arctic Climate Oceanography  
 Title:

#### Update History

2018-01-25	An observation data was registered.
2015-05-29	An observation data was registered.
2015-03-05	An observation data was registered.
2013-08-29	An observation data was registered.
2013-03-08	An observation data was registered.

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## MIRAI MR10-05 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

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Cruise ID: [MR10-05 Leg2](#)

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

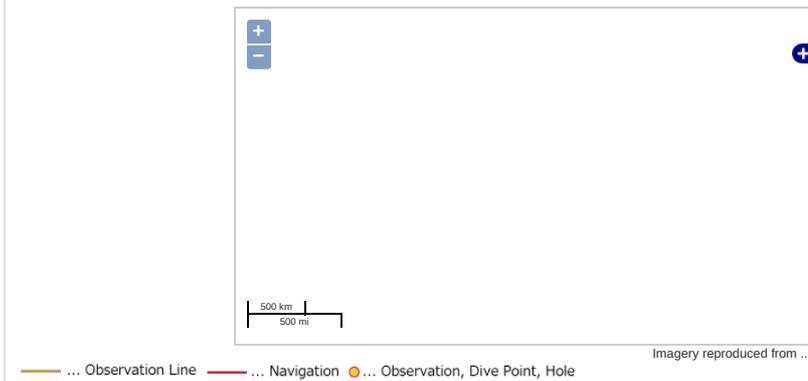
Data Policy: [JAMSTEC](#)

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

Science Keywords:

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- OCEANS > OCEAN CHEMISTRY > SALINITY
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- OCEANS > OCEAN CHEMISTRY > CARBON
- OCEANS > OCEAN OPTICS > FLUORESCENCE
- OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

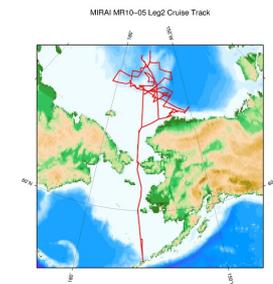
### Observation Map



### Data List

- File names
- MR100502\_ex\_bot.csv
- MR100502\_odv\_bot.txt

### Related Information



#### MR10-05 Leg2

Ship Name: MIRAI  
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 Chief Scientist: Motoyo Ito (JAMSTEC)  
 Project Name: [Arctic Ocean Climate System Research]  
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