

MIRAI MR09-03 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

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Cruise ID: [MR09-03 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (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 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/MR09-03_leg1-3_all.pdf

For Using Data

Principal Investigator

CTDTMP : Takashi Kikuchi (JAMSTEC)
 SBE35 : Takashi Kikuchi (JAMSTEC)
 CTDSAL : Takashi Kikuchi (JAMSTEC)
 SALNTY : Takashi Kikuchi (JAMSTEC)
 CTDOXY : Takashi Kikuchi (JAMSTEC)
 OXYGEN : Shigeto Nishino (JAMSTEC)
 FLUOR : Takashi Kikuchi (JAMSTEC)
 CHLWELSH : Shigeto Nishino (JAMSTEC)
 EDPAR : Takashi Kikuchi (JAMSTEC)
 SILCAT : Shigeto Nishino (JAMSTEC)
 NITRAT : Shigeto Nishino (JAMSTEC)
 NITRIT : Shigeto Nishino (JAMSTEC)
 PHSPHT : Shigeto Nishino (JAMSTEC)
 NH4 : Shigeto Nishino (JAMSTEC)
 TCARBN : Michio Yamamoto-kawai (Institute of Ocean Sciences, Canada)
 ALKALI : Michio Yamamoto-kawai (Institute of Ocean Sciences, Canada)

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)



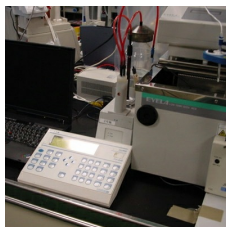
Instrument:

Titration for DO (- MR11-05 Leg2)



Instrument:

Titration for total alkalinity (- MR14-02)



Instrument:

Fluorometer (TURNER DESIGNS)



Notice

Data flags of FLUOR are Unknown (flag1) because of lack of the calibration.

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 : 0-15ml/l
Accuracy : 0.1ml/l
Resolution : 0.01ml/l
- (5) Fluorometer
Model : Seapoint Sensors, Inc.
- (6) PAR sensor
Model : Satlantic Inc.
- (7) Deep Ocean Standards Thermometer
Model : SBE 35, Sea-Bird Electronics, Inc.

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 and Software: Automatic photometric titrator manufactured by Kimoto Electronic Co. Ltd
- (2) Methods : Winkler method/photometric methods
- (3) Precision : 0.21 umol kg⁻¹
- (4) Reference Material/Calibration : 0.001667M KIO₃ solution

2. Salinity

- (1) Instruments : Autosal salinometer model 8400B(Guildline Instruments Ltd.)
- (2) Methods : -
- (3) Precision : 0.0004 PSU
- (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. 0.10% (85.4uM)
- (4) Reference Material/Calibration : RMNS [Aoyama et al., submitted] and Silicate standard solution, the silicate primary standard, was obtained from Merck, Ltd.

This standard solution, traceable to SRM from NIST was 1000 mg per liter.

4. Nitrate

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)
- (3) Precision : C.V. 0.09% (36.7uM)
- (4) Reference Material/Calibration : KNO₃ solution and RMNS [Aoyama et al., submitted]

5. Nitrite

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Diazotization method
- (3) Precision : C.V. 0.15% (0.8uM)
- (4) Reference Material/Calibration : NaNO₂ solution and RMNS [Aoyama et al., submitted]

6. Phosphate

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Molybdenum blue method
- (3) Precision : C.V. 0.11% (3.6uM)
- (4) Reference Material/Calibration : KH₂PO₄ solution and RMNS [Aoyama et al., submitted]

7. Ammonia

- (1) Instruments : SEAL QuAAtro system
- (2) Methods : Indophenol method/gas diffusion method(GDM)
- (3) Precision : C.V. 0.30% (8.0uM)
- (4) Reference Material/Calibration:(NH₄)₂SO₄ solution

8. Total inorganic carbon

- (1) Instruments : automated TCO₂ analyzer (Nippon ANS, Inc.) equipped with carbon coulometer 5012 (UIC Inc.)
- (2) Methods : coulometry
- (3) Precision : 0.5umol kg⁻¹
- (4) Reference Material/Calibration : -

9. Total Alkalinity

- (1) Instruments : Measurement of alkalinity was made based on 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 addition procedure/spectrophotometry

(3) Precision : 0.39 $\mu\text{mol kg}^{-1}$

(4) Reference Material/Calibration : -

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 : 4.8%

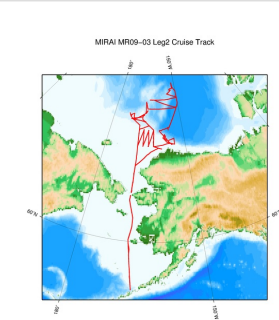
(4) Reference Material/Calibration : pure chlorophyll a (Sigma chemical Co.)

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](#)

MR09-03 Leg2

Ship Name: MIRAI

Period: 2009-09-07 - 2009-10-15

Chief Scientist: Takashi Kikuchi (JAMSTEC)

Project Name: [Arctic Ocean Climate System Reaserch]

Proposal ▶ Multi-disciplinary observation cruise for the Arctic Ocean

Title:

Update History

2018-01-25	An observation data was registerd.
2017-07-28	An observation data was registerd.
2015-05-29	An observation data was registerd.
2013-08-29	An observation data was registerd.
2012-09-28	An observation data was registerd.

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Last Modified: 2018-01-25

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Cruise ID: [MR09-03 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	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	MG/CUM	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	F9.2	Silicate
36	SILCAT_FLAG_W		I1	Quality flags for water samples
37	NITRAT	UMOL/KG	F9.2	Nitrate
38	NITRAT_FLAG_W		I1	Quality flags for water samples
39	NITRIT	UMOL/KG	F9.2	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	F9.2	Ammonium
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	F9.4	Potential temperature
50	SIG0	KG/CUM	F9.4	Density

ODV Format

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

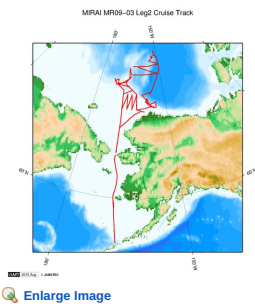
[Ocean Data View \(ODV\)](#)

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	Comments
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	OXYGEN[UMOL/KG]	Oxygen
24	QF	Quality flags for water samples
25	FLUOR[UG/L]	Fluorometer
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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	TCARB[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



MR09-03 Leg2

Ship Name: MIRAI
Period: 2009-09-07 - 2009-10-15
Chief Scientist: Takashi Kikuchi (JAMSTEC)
Project Name: [Arctic Ocean Climate System Reaserch]
Proposal ▶ Multi-disciplinary observation cruise for the Arctic Ocean
Title:

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MIRAI MR09-03 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

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Bottle Sampling Water Chemical Analysis: Processed (PI)

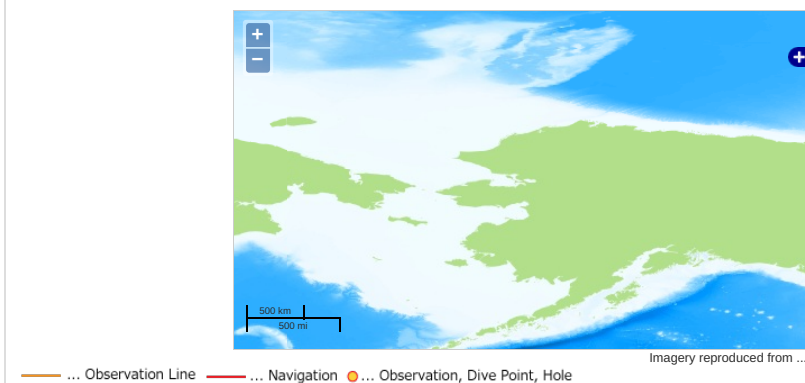
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OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

Observation Map



Data List

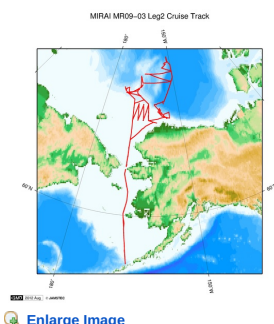
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☐ **File names**

☐ MR090302_ex_bot.csv

☐ MR090302_odv_bot.txt

Related Information



MR09-03 Leg2

Ship Name: MIRAI

Period: 2009-09-07 - 2009-10-15

Chief Scientist: Takashi Kikuchi (JAMSTEC)

Project Name: [Arctic Ocean Climate System Research]

Proposal ▶ Multi-disciplinary observation cruise for the Arctic Ocean

Title:

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