

MIRAI MR07-04 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

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Cruise ID: [MR07-04](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Silicate, Nitrate, Nitrite, Phosphate, CFC11, CFC12, CFC113, CCL4, Total inorganic carbon, Alkalinity, pH, Carbon14, Carbon13, 137C s, Pu, Potential temperature, Density

Science Keywords:

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	> RADIOCARBON
OCEANS > OCEAN CHEMISTRY	> SILICATE
OCEANS > OCEAN CHEMISTRY	> SALINITY
OCEANS > OCEAN TEMPERATURE	> WATER TEMPERATURE
OCEANS > SALINITY/DENSITY	> SALINITY
OCEANS > OCEAN CHEMISTRY	> ALKALINITY
OCEANS > OCEAN CHEMISTRY	> CARBON
OCEANS > OCEAN CHEMISTRY	> RADIONUCLIDES
OCEANS > OCEAN CHEMISTRY	> OCEAN TRACERS
OCEANS > OCEAN CHEMISTRY	> STABLE ISOTOPES
OCEANS > OCEAN TEMPERATURE	> POTENTIAL TEMPERATURE

Cruise Report

http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR07-04_all.pdf

[For Using Data](#)

Principal Investigator

CTDTMP : Hiroshi Uchida (JAMSTEC)
 SBE35 : Hiroshi Uchida (JAMSTEC)
 CTDSAL : Hiroshi Uchida (JAMSTEC)
 SALNTY : Takeshi Kawano (JAMSTEC)
 CTDOXY : Hiroshi Uchida (JAMSTEC)
 OXYGEN : Yuichiro Kumamoto (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)
 CFC-11 : Kenichi Sasaki (JAMSTEC)
 CFC-12 : Kenichi Sasaki (JAMSTEC)
 CFC113 : Kenichi Sasaki (JAMSTEC)
 CCL4 : Kenichi Sasaki (JAMSTEC)
 TCARBN : Akihiko Murata (JAMSTEC)
 ALKALI : Akihiko Murata (JAMSTEC)
 PH : Akihiko Murata (JAMSTEC)
 DELC14 : Yuichiro Kumamoto (JAMSTEC)
 DELC13 : Yuichiro Kumamoto (JAMSTEC)
 CS-137 : Michio Aoyama (Meteorological Research Institute)
 PLUTO : Michio Aoyama (Meteorological Research Institute)

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:

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



Instrument:

Gas chromatograph



Instrument:

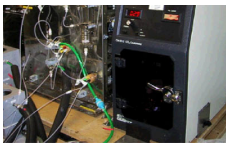
Titration for DO (- MR11-05 Leg2)



Instrument:

Nutrient analyzer(4ch) (- MR09-01)





Overview

Please see the [Data book](#) for details of data.

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

RINKO-III(JFE Advantech, Co. Ltd.)

(5) 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 : 0.10 umol kg⁻¹
- (4) Reference Material/Calibration : 0.001667M KIO₃ solution/Comparison with CSK standard solution (Wako pure chemical industries, Ltd.)

2. Salinity

- (1) Instruments : Autosol salinometer model 8400B(Guildline Instruments Ltd.)
- (2) Methods : -
- (3) Precision : 0.00019 PSU
- (4) Reference Material/Calibration : IAPSO Standard Sea Water batch P148(Ocean Scientific International Ltd.)

3. Silicate

- (1) Instruments : TRAACS800 (Bran+Luebbe)
- (2) Methods : Molybdenum blue method
- (3) Precision : C.V. 0.07% (170uM) Median
- (4) Reference Material/Calibration : RMNS [Aoyama et al., 2007] and Silicate standard solution, Silicate standard solution was provided by Merck. The silicate concentration is certified by NIST-SRM3150 with the uncertainty of 0.5 %.

4. Nitrate

- (1) Instruments : TRAACS800 (Bran+Luebbe)
- (2) Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)
- (3) Precision : C.V. 0.06% (55uM) Median
- (4) Reference Material/Calibration : KNO₃ solution and RMNS [Aoyama et al., 2007]

5. Nitrite

- (1) Instruments : TRAACS800 (Bran+Luebbe)
- (2) Methods : Diazotization method
- (3) Precision : -
- (4) Reference Material/Calibration : NaNO₂ solution and RMNS [Aoyama et al., 2007]

6. Phosphate

- (1) Instruments : TRAACS800 (Bran+Luebbe)
- (2) Methods : Molybdenum blue method
- (3) Precision : C.V. 0.10% (3.6uM) Median
- (4) Reference Material/Calibration : KH₂PO₄ solution and RMNS [Aoyama et al., 2007]

7. Total inorganic carbon

- (1) Instruments : the automated TCO₂ analyzer (Nippon ANS, Inc.) equipped with carbon coulometer 5012 (UIC Inc.)
- (2) Methods : coulometry
- (3) Precision : 1.2umol kg⁻¹
- (4) Reference Material/Calibration : Na₂CO₃ solution and the CRM provided by Dr. Dickson in Scripps Institute of Oceanography

8. Total Alkalinity

- (1) Instruments : Measurement of AT was made based on spectrophotometry using a custom-made system(Nippon ANS, Inc.).
The system comprises of a water dispensing unit, an auto-burette (765 Dosimat, Metrohm), and a spectrophotometer (Cary 50 Bio, Varian), which are automatically controlled by a PC.
- (2) Methods : Single step acid additional procedure/spectrophotometry
- (3) Precision : 0.5 umol kg⁻¹
- (4) Reference Material/Calibration : the CRM provided by Dr. Dickson in Scripps Institute of Oceanography

9. pH

(1) Instruments : Measurement of pH was made by a pH measuring system (Nippon ANS, Inc.), which adopts a method of the spectrophotometric determination.

The measuring system comprises of a water dispensing unit with an auto-sampler and a spectrophotometer (Carry 50 Scan, Varian).

(2) Methods : spectrophotometric method at 25deg-C

(3) Precision : 0.0005 pH unit

(4) Reference Material/Calibration : total hydrogen ion scale

10. CFCs

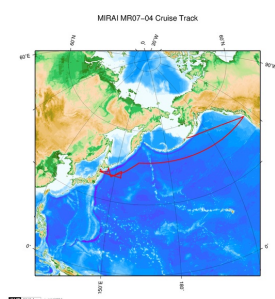
(1) Instruments : A custom made purging and trapping system was attached to gas chromatograph (GC-14B: Shimadzu Ltd) having an electron capture detector (ECD-14: Shimadzu Ltd).

(2) Methods : see "DATA BOOK"

(3) Precision : CFC-11 0.009pmol kg-1; CFC-12 0.007pmol kg-1; CFC-113 0.008pmol kg-1

(4) Reference Material/Calibration : see "DATA BOOK"

Related Information



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MR07-04

Ship Name: MIRAI

Period: 2007-07-24 - 2007-09-03

Chief Scientist: Takeshi Kawano (JAMSTEC)

Project Name: [POST-WOCE Hydrography]

Update History

2017-07-28	An observation data was registerd.
2017-04-11	An observation data was registerd.
2015-05-29	An observation data was registerd.
2013-08-29	An observation data was registerd.
2012-10-30	An observation data was registerd.
2012-10-26	An observation data was registerd.

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Bottle Sampling Water Chemical Analysis: Processed (PI)

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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	F8.4	LATITUDE
11	LONGITUDE	DEG	F9.4	LONGITUDE
12	DEPTH	M	I5	Reported depth to bottom.
13	CTDPRS	DBAR	F9.1	Pressure
14	CTDPRS_FLAG_W		I1	Quality flag for CTD data
15	CTDTMP	ITS-90	F9.4	Temperature
16	CTDTMP_FLAG_W		I1	Quality flag for CTD data
17	SBE35	ITS-90	F10.5	Temperature from Deep Ocean Standards Thermometer
18	SBE35_FLAG_W		I1	Quality flag for CTD data
19	CTDSAL	PSS-78	F9.4	CTD Salinity sensor
20	CTDSAL_FLAG_W		I1	Quality flag for CTD data
21	SALNTY	PSS-78	F9.4	Salinity
22	SALNTY_FLAG_W		I1	Quality flags for water samples
23	CTDOXY	UMOL/KG	F9.2	CTD Oxygen sensor
24	CTDOXY_FLAG_W		I1	Quality flag for CTD data
25	OXYGEN	UMOL/KG	F9.2	Oxygen
26	OXYGEN_FLAG_W		I1	Quality flags for water samples
27	SILCAT	UMOL/KG	F9.2	Silicate
28	SILCAT_FLAG_W		I1	Quality flags for water samples
29	SILUNC	UMOL/KG	F9.2	Uncertainty of Silicate data
30	NITRAT	UMOL/KG	F9.2	Nitrate
31	NITRAT_FLAG_W		I1	Quality flags for water samples
32	NRAUNC	UMOL/KG	F9.2	Uncertainty of Nitrate data
33	NITRIT	UMOL/KG	F9.2	Nitrite
34	NITRIT_FLAG_W		I1	Quality flags for water samples
35	NRIUNC	UMOL/KG	F9.2	Uncertainty of Nitrite data
36	PHSPHT	UMOL/KG	F9.3	Phosphate
37	PHSPHT_FLAG_W		I1	Quality flags for water samples
38	PHPUNC	UMOL/KG	F9.3	Uncertainty of Phosphate data
39	CFC-11	PMOL/KG	F9.3	Freon-11
40	CFC-11_FLAG_W		I1	Quality flags for water samples
41	CFC-12	PMOL/KG	F9.3	Freon-12
42	CFC-12_FLAG_W		I1	Quality flags for water samples
43	CFC113	PMOL/KG	F9.3	Freon-113
44	CFC113_FLAG_W		I1	Quality flags for water samples
45	CCL4	PMOL/KG	F9.3	Carbon tetrachloride
46	CCL4_FLAG_W		I1	Quality flags for water samples
47	TCARBN	UMOL/KG	F9.1	Total carbon
48	TCARBN_FLAG_W		I1	Quality flags for water samples
49	ALKALI	UMOL/KG	F9.1	Total alkalinity
50	ALKALI_FLAG_W		I1	Quality flags for water samples
51	PH	-	F9.4	pH
52	PH_FLAG_W		I1	Quality flags for water samples
53	DELC14	/MILLE	F9.1	14Carbon
54	DELC14_FLAG_W		I1	Quality flags for water samples
55	C14ERR	/MILLE	F9.1	Expected error
56	DELC13	/MILLE	F9.3	13Carbon
57	DELC13_FLAG_W		I1	Quality flags for water samples
58	C13ERR	/MILLE	F9.3	Expected error
59	CS-137	BQ/CUM	F9.3	137Cesium
60	CS-137_FLAG_W		I1	Quality flags for water samples
61	CS137ER	BQ/CUM	F9.3	Expected error
62	PLUTO	MBQ/CUM	F9.3	Plutonium
63	PLUTO_FLAG_W		I1	Quality flags for water samples

Column No.	Column Heading Mnemonic	Units/CUM Mnemonic	Reporting Precision FORTRAN Format	Expected error Comments Potential temperature
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66	SIG0	KG/CUM	F9.4	Density
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ODV Format

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

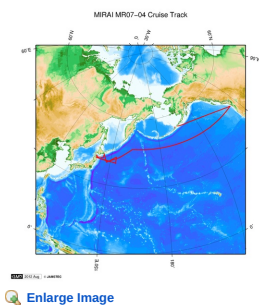
[Ocean Data View \(ODV\)](#)

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	OXYGEN[UMOL/KG]	Oxygen
24	QF	Quality flags for water samples
25	SILCAT[UMOL/KG]	Silicate
26	QF	Quality flags for water samples
27	SILUNC	Uncertainty of Silicate data
28	QF	Quality flags for water samples
29	NITRAT[UMOL/KG]	Nitrate
30	QF	Quality flags for water samples
31	NRAUNC	Uncertainty of Nitrate data
32	QF	Quality flags for water samples
33	NITRIT[UMOL/KG]	Nitrite
34	QF	Quality flags for water samples
35	NRIUNC	Uncertainty of Nitrite data
36	QF	Quality flags for water samples
37	PHSPHT[UMOL/KG]	Phosphate
38	QF	Quality flags for water samples
39	PHPUNC	Uncertainty of Phosphate data
40	QF	Quality flags for water samples
41	CFC-11[PMOL/KG]	Freon-11
42	QF	Quality flags for water samples
43	CFC-12[PMOL/KG]	Freon-12
44	QF	Quality flags for water samples
45	CFC113[PMOL/KG]	Freon-113
46	QF	Quality flags for water samples
47	CCL4[PMOL/KG]	Carbon tetrachloride
48	QF	Quality flags for water samples
49	TCARBN[UMOL/KG]	Total carbon
50	QF	Quality flags for water samples
51	ALKAL[UMOL/KG]	Total alkalinity
52	QF	Quality flags for water samples
53	PH	pH
54	QF	Quality flags for water samples
55	DELC14[/MILLE]	14Carbon
56	QF	Quality flags for water samples
57	C14ERR	Expected error
58	QF	Quality flags for water samples
59	DELC13[/MILLE]	13Carbon
60	QF	Quality flags for water samples
61	C13ERR	Expected error
62	QF	Quality flags for water samples
63	CS-137[BQ/CUM]	137Cesium
64	QF	Quality flags for water samples
65	CS137ER[BQ/CUM]	Expected error
66	QF	Quality flags for water samples
67	PLUTO[MBQ/CUM]	Plutonium
68	QF	Quality flags for water samples
69	PLUTOER	Expected error
70	QF	Quality flags for water samples
71	THETA[DEG C]	Potential temperature
72	QF	Quality flag for CTD data
73	SIG0[KG/CUM]	Density

Column No.	Column Heading	Comments
75	SAMPNO	Sample number
76	QF	Bottle quality flag

Related Information



MR07-04

Ship Name: MIRAI
 Period: 2007-07-24 - 2007-09-03
 Chief Scientist: Takeshi Kawano (JAMSTEC)
 Project Name: [POST-WOCE Hydrography]

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Update History

2017-07-28	An observation data was registerd.
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 SHINKAI 6500
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 6K Camera DEEP TOW
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Bottle Sampling Water Chemical Analysis: Processed (PI)

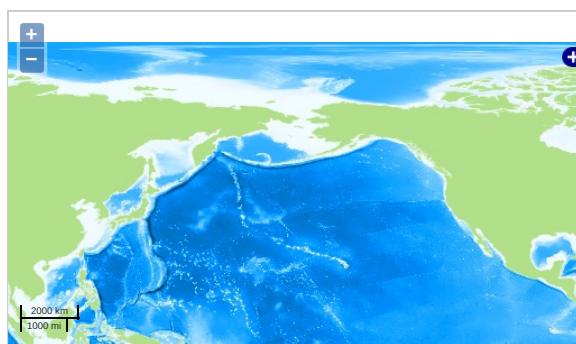
Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Silicate, Nitrate, Nitrite, Phosphate, CFC11, CFC12, CFC113, CCL4, Total inorganic carbon, Alkalinity, pH, Carbon14, Carbon13, 137C s, Pu, Potential temperature, Density

Science Keywords:

OCEANS > OCEAN CHEMISTRY > DISSOLVED GASES
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OCEANS > OCEAN CHEMISTRY > STABLE ISOTOPES
OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

Observation Map



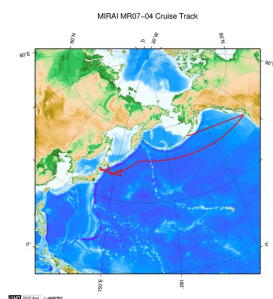
— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

Imagery reproduced from ...

Data List

☐ File names
☐ MR070400_ex_bot.csv
☐ MR070400_odv_bot.txt

Related Information



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MR07-04

Ship Name: MIRAI
Period: 2007-07-24 - 2007-09-03
Chief Scientist: Takeshi Kawano (JAMSTEC)
Project Name: [POST-WOCE Hydrography]

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