

## MIRAI MR05-05 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

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

Cruise ID: [MR05-05 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Silicate, Nitrate, Nitrite, Phosphate, CFC11, CFC12, CFC113, Total inorganic carbon, Alkalinity, pH, Carbon14, Carbon13, 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 > 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/MR05-05\\_leg1-3\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR05-05_leg1-3_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)  
OPTOXY : Hiroshi Uchida (JAMSTEC)  
OXYGEN : Yuichiro Kumamoto (JAMSTEC)  
DWNPRS : Hiroshi Uchida (JAMSTEC)  
DWNNOXY : Hiroshi Uchida (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)  
TCARBN : Akihiko Murata (JAMSTEC)  
ALKALI : Akihiko Murata (JAMSTEC)  
PH : Akihiko Murata (JAMSTEC)  
DELC14 : Yuichiro Kumamoto (JAMSTEC)  
DELC13 : Yuichiro Kumamoto (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:  
Total dissolved inorganic carbon measurement system ( - MR11-E02)



Instrument:  
Gas chromatograph

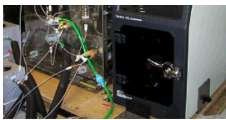


Instrument:  
Titrator for DO ( - MR11-05 Leg2)



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





## Overview

Please see Data books (" [WHP P03 REVISIT DATA BOOK](#) " / " [Wake Island Passage Flux Experiment 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  
Model : SBE43, Sea-Bird Electronics, Inc.  
Measurement range : 0-15ml/(120% of surface saturation)  
Accuracy : 0.1ml/(2% of saturation)  
Resolution : 0.01ml/l
- (5) Deep Ocean Standards Thermometer  
Model : SBE 35, Sea-Bird Electronics, Inc.
- (6) Oxygen Optode  
Model : Aanderaa Oxygen Optode 3830, Aanderaa Instruments AS, NORWAY

## Information on Chemical and Biological data

1. Dissolved Oxygen
  - (1) Instruments :Burette:APB-510 manufactured by Kyoto Electronic Co. Ltd. / 10 cm<sup>3</sup> of titration vessel  
Detector and Software: Automatic photometric titrator manufactured by Kimoto Electronic Co. Ltd
  - (2) Methods :Winkler method/photometric methods
  - (3) Precision : 0.083 umol kg<sup>-1</sup>
  - (4) Reference Material/Calibration:0.001667M KIO<sub>3</sub> solution/compared standard to CSK standard solution (Wako pure chemical industries, Ltd.)
2. Salinity
  - (1) Instruments:Autosal salinometer model 8400B(Guildline Instruments Ltd.)
  - (2) Methods : -
  - (3) Precision : 0.00017 PSU
  - (4) Reference Material/Calibration:IAPSO Standard Sea Water batch P145(Ocean Scientific International Ltd.)
3. Silicate
  - (1) Instruments:TRAACS800 (Bran+Luebbe)
  - (2) Methods :Molybdenum blue method
  - (3) Precision :C.V. 0.090% (median)
  - (4) Reference Material/Calibration:RMNS [Aoyama et al., 2007] and commercial available silicon standard solution for atomic absorption spectrometry
4. Nitrate
  - (1) Instruments:TRAACS800 (Bran+Luebbe)
  - (2) Methods :Diazotization method
  - (3) Precision : C.V. 0.070% (median),
  - (4) Reference Material/Calibration:KNO<sub>3</sub> solution and RMNS [Aoyama et al., 2007]
5. Nitrite
  - (1) Instruments:TRAACS800 (Bran+Luebbe)
  - (2) Methods :Diazotization method (reduced to nitrite by Cd - Cu tube)
  - (3) Precision :-
  - (4) Reference Material/Calibration:NaNO<sub>2</sub> solution and RMNS [Aoyama et al., 2007]
6. Phosphate
  - (1) Instruments:TRAACS800 (Bran+Luebbe)
  - (2) Methods :Molybdenum blue method
  - (3) Precision :C.V. 0.070% (median),
  - (4) Reference Material/Calibration:KH<sub>2</sub>PO<sub>4</sub> solution and RMNS [Aoyama et al., 2007]
7. Total inorganic carbon
  - (1) Instruments:the automated TCO<sub>2</sub> analyzer (Nippon ANS , Inc.) equipped with carbon coulometer 5012 (UIC , Inc.)
  - (2) Methods :coulometry
  - (3) Precision :0.7 umol kg<sup>-1</sup>
  - (4) Reference Material/Calibration:Na<sub>2</sub>CO<sub>3</sub> solution and the CRM provided by Dr. Dickson in Scripps Institute of Oceanography
8. Total Alkalinity
  - (1) Instruments:TALK measuring systems (TA-1000), which were made by Nippon ANS, Inc.
  - (2) Methods :Modified Gran titration/Closed-cell/potentiometry
  - (3) Precision :1.5 umol kg<sup>-1</sup>
  - (4) Reference Material/Calibration:Na<sub>2</sub>CO<sub>3</sub> solution and 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

(3) Precision : 0.0006 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 0.006pmol kg<sup>-1</sup>; CFC-12 0.004pmol kg<sup>-1</sup>; CFC-113 0.004pmol kg<sup>-1</sup>

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

## 11. $\delta^{13}C$ and $\delta^{14}C$ of Dissolved Inorganic Carbon

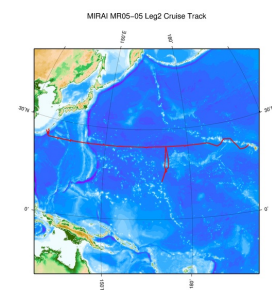
(1) Instruments: see "DATA BOOK"

(2) Methods : see "DATA BOOK"

(3) Precision : see "DATA BOOK"

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

### Related Information



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#### MR05-05 Leg2

Ship Name: MIRAI

Period: 2005-11-27 - 2006-01-17

Chief Scientist: Ikuo Kaneko (JAMSTEC)/Akihiko Murata (JAMSTEC)

Project Name: [POST-WOCE Hydrography]

### Update History

2017-07-28	An observation data was registered.
2017-04-11	An observation data was registered.
2015-05-29	An observation data was registered.
2013-08-24	An observation data was registered.
2012-11-25	An observation data was registered.

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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:

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Dive ID:

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## MIRAI MR05-05 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

ReadMe Observation Data **Data Format** Quality Information

Cruise ID: **MR05-05 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	F8.4	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	OPTOXY	UMOL/KG	F9.2	Optode oxygen
26	OPTOXY_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	DWNPRS	DBAR	F9.1	Down-cast pressure at the same density of the up-cast CTD data
30	DWNPRS_FLAG_W		I1	Quality flag for CTD data
31	DWNOXY	UMOL/KG	F9.2	Down-cast CTD oxygen at pressure of DWNPRS
32	DWNOXY_FLAG_W		I1	Quality flag for CTD data
33	SILCAT	UMOL/KG	F9.2	Silicate
34	SILCAT_FLAG_W		I1	Quality flags for water samples
35	SILUNC	UMOL/KG	F9.2	Uncertainty of Silicate data
36	NITRAT	UMOL/KG	F9.2	Nitrate
37	NITRAT_FLAG_W		I1	Quality flags for water samples
38	NRAUNC	UMOL/KG	F9.2	Uncertainty of Nitrate data
39	NITRIT	UMOL/KG	F9.2	Nitrite
40	NITRIT_FLAG_W		I1	Quality flags for water samples
41	NRIUNC	UMOL/KG	F9.2	Uncertainty of Nitrite data
42	PHSPHT	UMOL/KG	F9.3	Phosphate
43	PHSPHT_FLAG_W		I1	Quality flags for water samples
44	PHPUNC	UMOL/KG	F9.3	Uncertainty of Phosphate data
45	CFC-11	PMOL/KG	F9.3	Freon-11
46	CFC-11_FLAG_W		I1	Quality flags for water samples
47	CFC-12	PMOL/KG	F9.3	Freon-12
48	CFC-12_FLAG_W		I1	Quality flags for water samples
49	CFC113	PMOL/KG	F9.3	Freon-113
50	CFC113_FLAG_W		I1	Quality flags for water samples
51	TCARBN	UMOL/KG	F9.1	Total carbon
52	TCARBN_FLAG_W		I1	Quality flags for water samples
53	ALKALI	UMOL/KG	F9.1	Total alkalinity
54	ALKALI_FLAG_W		I1	Quality flags for water samples
55	PH	-	F9.4	pH
56	PH_FLAG_W		I1	Quality flags for water samples
57	DELC14	/MILLE	F9.1	14Carbon
58	DELC14_FLAG_W		I1	Quality flags for water samples
59	C14ERR	/MILLE	F9.1	Expected error
60	DELC13	/MILLE	F9.3	13Carbon
61	DELC13_FLAG_W		I1	Quality flags for water samples
62	C13ERR	/MILLE	F9.3	Expected error
63	THETA	DEG C	F9.4	Potential temperature

Column No.	Column Heading Mnemonic	Units Mnemonic	Reporting Precision Format	Density Comments
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ODV Format

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

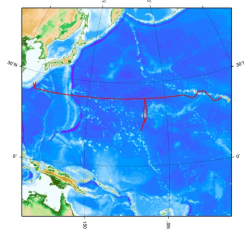
[Ocean Data View \(ODV\)](#)

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	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	DWNPRS[DBAR]	Down-cast pressure at the same density of the up-cast CTD data
28	QF	Quality flag for CTD data
29	DWNOXY[UMOL/KG]	Down-cast CTD oxygen at pressure of DWNPRS
30	QF	Quality flag for CTD data
31	SILCAT[UMOL/KG]	Silicate
32	QF	Quality flags for water samples
33	SILUNC	Uncertainty of Silicate data
34	QF	Quality flags for water samples
35	NITRAT[UMOL/KG]	Nitrate
36	QF	Quality flags for water samples
37	NRAUNC	Uncertainty of Nitrate data
38	QF	Quality flags for water samples
39	NITRIT[UMOL/KG]	Nitrite
40	QF	Quality flags for water samples
41	NRIUNC	Uncertainty of Nitrite data
42	QF	Quality flags for water samples
43	PHSPHT[UMOL/KG]	Phosphate
44	QF	Quality flags for water samples
45	PHPUNC	Uncertainty of Phosphate data
46	QF	Quality flags for water samples
47	CFC-11[PMOL/KG]	Freon-11
48	QF	Quality flags for water samples
49	CFC-12[PMOL/KG]	Freon-12
50	QF	Quality flags for water samples
51	CFC113[PMOL/KG]	Freon-113
52	QF	Quality flags for water samples
53	TCARBN[UMOL/KG]	Total carbon
54	QF	Quality flags for water samples
55	ALKALI[UMOL/KG]	Total alkalinity
56	QF	Quality flags for water samples
57	PH	pH
58	QF	Quality flags for water samples
59	DELC14[MILLE]	14Carbon
60	QF	Quality flags for water samples
61	C14ERR	Expected error
62	QF	Quality flags for water samples
63	DELC13[MILLE]	13Carbon
64	QF	Quality flags for water samples
65	C13ERR	Expected error
66	QF	Quality flags for water samples
67	THETA[DEG C]	Potential temperature
68	QF	Quality flag for CTD data
69	SIG0[KG/CUM]	Density
70	QF	Quality flag for CTD data
71	SAMPNO	Sample number
72	QF	Bottle quality flag

Related Information

MIRAI MR05-05 Leg2 Cruise Track



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#### MR05-05 Leg2

Ship Name: MIRAI

Period: 2005-11-27 - 2006-01-17

Chief Scientist: Ikuo Kaneko (JAMSTEC)/Akihiko Murata (JAMSTEC)

Project Name: [POST-WOCE Hydrography]

#### Update History

2017-07-28	An observation data was registered.
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[URASHIMA](#)

[YOKOSUKA DEEP TOW](#)

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国立研究開発法人  
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Cruise ID: [MR05-05 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

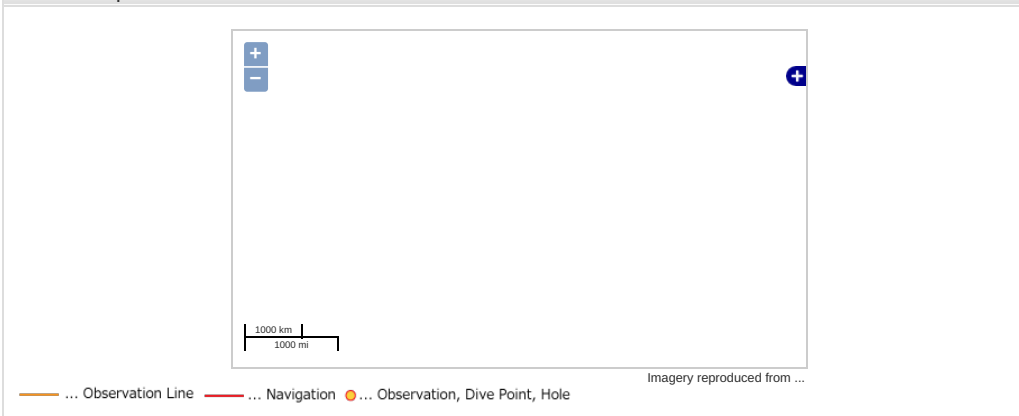
Data Policy: [JAMSTEC](#)

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

Science Keywords:

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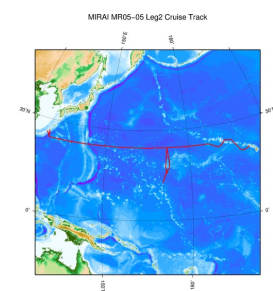
### Observation Map



### Data List

☐ File names  
☐ MR050502\_ex\_bot.csv  
☐ MR050502\_odv\_bot.txt

### Related Information



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#### MR05-05 Leg2

Ship Name: MIRAI  
Period: 2005-11-27 - 2006-01-17  
Chief Scientist: Ikuo Kaneko (JAMSTEC)/Akihiko Murata (JAMSTEC)  
Project Name: [POST-WOCE Hydrography]

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#### Information of the Ships

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[6K Camera DEEP TOW](#)  
[6K Sonar DEEP TOW](#)  
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