

## MIRAI MR03-K04 Leg1 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

ReadMe Observation Data Data Format Quality Information

Cruise ID: [MR03-K04 Leg1](#)

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, Total organic carbon, Tritium, 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/MR03-K04\\_leg1\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR03-K04_leg1_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 : Shuichi Watanabe (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 : Yutaka Watanabe (Hokkaido University)  
CFC-12 : Yutaka Watanabe (Hokkaido University)  
CFC113 : Yutaka Watanabe (Hokkaido University)  
TCARBN : Akihiko Murata (JAMSTEC)  
ALKALI : Akihiko Murata (JAMSTEC)  
PH : Akihiko Murata (JAMSTEC)  
DELC14 : Yuichiro Kumamoto (JAMSTEC)  
DELC13 : Yuichiro Kumamoto (JAMSTEC)  
TOC : Akihiko Murata (JAMSTEC)  
TRITUM : Michio Aoyama (Meteorological Research Institute)  
CS-137 : Michio Aoyama (Meteorological Research Institute)  
PLUTO : Michio Aoyama (Meteorological Research Institute)

#### Use Constraints

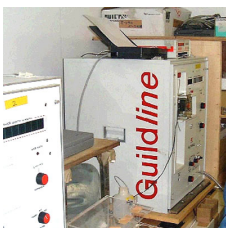
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#### Data Citation

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

### Instrument

Instrument:  
Salinity measurement system



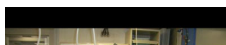
Instrument:  
Total dissolved inorganic carbon measurement system ( - MR11-E02)



Instrument:  
Gas chromatograph

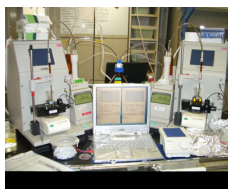


Instrument:  
Titrator for DO ( - MR11-05 Leg2)



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





## Overview

Please see the Data book for details of data. ("WHP P6, A10, I3/I4 REVISIT DATA BOOK" [Vol.1](#), [Vol.2](#), [Vol.3](#))

## 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.

## 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 : 0.09umol/kg
- (4) Reference Material/Calibration: 0.001667M KIO<sub>3</sub> solution/compared standard to CSK standard solution

### 2. Salinity

- (1) Instruments: Autosal salinometer model 8400B (Guildline Instruments Ltd.)
- (2) Methods : -
- (3) Precision : 0.0002 PSU
- (4) Reference Material/Calibration: IAPSO Standard Sea Water batch P142 (Ocean Scientific International Ltd.)

### 3. Silicate

- (1) Instruments: TRAACS800 (Bran+Luebbe)
- (2) Methods : Molybdenum blue method
- (3) Precision : C.V. 0.16% (200 uM), Summary of precision in MR03-K04
- (4) Reference Material/Calibration: RMNS [Aoyama et al., 2007] and commercial available silicon standard solution for atomic absorption spectrometry of 1000 mg L<sup>-1</sup>

### 4. Nitrate

- (1) Instruments: TRAACS800 (Bran+Luebbe)
- (2) Methods : Diazotization method
- (3) Precision : C.V. 0.16% (54.0 uM), Summary of precision in MR03-K04
- (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. 0.19% (3.6uM), Summary of precision in MR03-K04
- (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 Co., Ltd.) equipped with carbon coulometer 5012 (UIC Co., Ltd.)
- (2) Methods : coulometry
- (3) Precision : 1.3 umol kg<sup>-1</sup> (n = 203)
- (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:TA1k measuring systems (TA-1000), which were made by Nihon ANS Ltd  
(2) Methods :Modified Gran titration/Closed-cell/potentiometry  
(3) Precision :1.8  $\mu\text{mol kg}^{-1}$   
(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 :0.0017 (n = 140)  
(4) Reference Material/Calibration: -

#### 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 :-

(4) Reference Material/Calibration: Taiyo Nissan Co. Ltd. CFC mixing ratios of the standard gases

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

- (1) Instruments: $\delta^{13}\text{C}$  of the sample CO<sub>2</sub> gas was measured using Finnigan MAT252 mass spectrometer.

$\Delta^{14}\text{C}$  in the graphite sample was measured in AMS facilities of Institute of Accelerator

Analysis Ltd in Shirakawa (Pelletron 9SDH-2, NEC) and Paleo Labo Co. Ltd in Kiryu (Compact-AMS, NEC),Japan

(2) Methods : see "DATA BOOK"

(3) Precision : "precisions" of our  $\delta^{13}\text{C}$  and  $\Delta^{14}\text{C}$  analyses including error due to the sample preparation and storage were about 0.03‰ and 6‰ respectively.

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

#### 12. $^{137}\text{Sc}$

- (1) Instruments: $\gamma$ -spectrometry using well-type Ge detectors coupled with multichannel pulse height analyzers.

(2) Methods : see "DATA BOOK"

(3) Precision :-

(4) Reference Material/Calibration: -

#### 13. Pu

- (1) Instruments:The  $\alpha$ -spectrometers consist of several vacuum chambers with solid-state detectors, a pulse height analyzer and a computer system

(2) Methods : see "DATA BOOK"

(3) Precision :-

(4) Reference Material/Calibration: -

#### 14. tritium

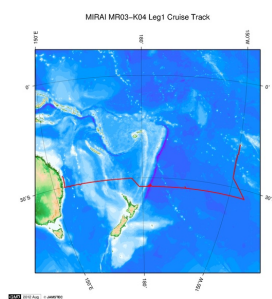
- (1) Instruments: see "DATA BOOK"

(2) Methods :the He-3 ingrowth method (see "DATA BOOK")

(3) Precision :-

(4) Reference Material/Calibration: -

### Related Information



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#### MR03-K04 Leg1

Ship Name: MIRAI

Period: 2003-08-03 - 2003-09-05

Chief Scientist: Masao Fukasawa (JAMSTEC)

Project Name: [Blue Earth Global Expedition 2003,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.
2013-08-23	An observation data was registerd.
2012-12-25	An observation data was registerd.

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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

#### Go to a Cruise Information

Cruise ID:

#### Go to a Dive Information

Dive ID:

POWER GRAB SAMPLER  
(SHELL)  
POWER GRAB SAMPLER  
(CLOW)  
BMS

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**JAMSTEC** 国立研究開発法人  
海洋研究開発機構  
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

## MIRAI MR03-K04 Leg1 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

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

Cruise ID: [MR03-K04 Leg1](#)

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	OXYGEN	UMOL/KG	F9.2	Oxygen
26	OXYGEN_FLAG_W		I1	Quality flags for water samples
27	DWNPRS	DBAR	F9.1	Down-cast pressure at the same density of the up-cast CTD data
28	DWNPRS_FLAG_W		I1	Quality flag for CTD data
29	DWNOXY	UMOL/KG	F9.2	Down-cast CTD oxygen at pressure of DWNPRS
30	DWNOXY_FLAG_W		I1	Quality flag for CTD data
31	SILCAT	UMOL/KG	F9.2	Silicate
32	SILCAT_FLAG_W		I1	Quality flags for water samples
33	SILUNC	UMOL/KG	F9.2	Uncertainty of Silicate data
34	NITRAT	UMOL/KG	F9.2	Nitrate
35	NITRAT_FLAG_W		I1	Quality flags for water samples
36	NRAUNC	UMOL/KG	F9.2	Uncertainty of Nitrate data
37	NITRIT	UMOL/KG	F9.2	Nitrite
38	NITRIT_FLAG_W		I1	Quality flags for water samples
39	NRIUNC	UMOL/KG	F9.2	Uncertainty of Nitrite data
40	PHSPHT	UMOL/KG	F9.2	Phosphate
41	PHSPHT_FLAG_W		I1	Quality flags for water samples
42	PHPUNC	UMOL/KG	F9.2	Uncertainty of Phosphate data
43	CFC-11	PMOL/KG	F9.3	Freon-11
44	CFC-11_FLAG_W		I1	Quality flags for water samples
45	CFC-12	PMOL/KG	F9.3	Freon-12
46	CFC-12_FLAG_W		I1	Quality flags for water samples
47	CFC113	PMOL/KG	F9.3	Freon-113
48	CFC113_FLAG_W		I1	Quality flags for water samples
49	TCARBN	UMOL/KG	F9.1	Total carbon
50	TCARBN_FLAG_W		I1	Quality flags for water samples
51	ALKALI	UMOL/KG	F9.1	Total alkalinity
52	ALKALI_FLAG_W		I1	Quality flags for water samples
53	PH	-	F9.4	pH
54	PH_FLAG_W		I1	Quality flags for water samples
55	DEL14	/MILLE	F9.1	14Carbon
56	DEL14_FLAG_W		I1	Quality flags for water samples
57	C14ERR	/MILLE	F9.1	Expected error
58	DEL13	/MILLE	F9.3	13Carbon
59	DEL13_FLAG_W		I1	Quality flags for water samples
60	C13ERR	/MILLE	F9.3	Expected error
61	TOC	UMOL/KG	F9.1	Total organic carbon
62	TOC_FLAG_W		I1	Quality flags for water samples
63	TRITUM	KBQ/CUM	F9.3	Tritium

Column No.	Column Heading	Units	Reporting Precision	FORTRAN Format	Comments
	CS-137	BQ/CUM	F9.2		Expected error
66	CS-137_FLAG_W		I1		Quality flags for water samples
67	CS137ER	BQ/CUM	F9.2		Expected error
68	PLUTO	MBQ/CUM	F9.2		Plutonium
69	PLUTO_FLAG_W		I1		Quality flags for water samples
70	PLUTOER	MBQ/CUM	F9.2		Expected error
71	THETA	DEG C	F9.4		Potential temperature
72	SIG0	KG/CUM	F9.4		Density
73					

#### ODV Format

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

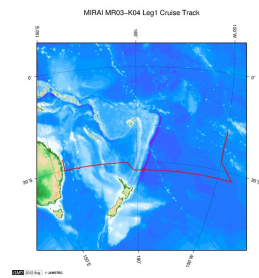
[Ocean Data View \(ODV\)](#)

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(Calculate from CTDPRS and LATITUDE)
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	DWNPRS[DBAR]	Down-cast pressure at the same density of the up-cast CTD data
26	QF	Quality flag for CTD data
27	DWNOXY[UMOL/KG]	Down-cast CTD oxygen at pressure of DWNPRS
28	QF	Quality flag for CTD data
29	SILCAT[UMOL/KG]	Silicate
30	QF	Quality flags for water samples
31	SILUNC	Uncertainty of Silicate data
32	QF	Quality flags for water samples
33	NITRAT[UMOL/KG]	Nitrate
34	QF	Quality flags for water samples
35	NRAUNC	Uncertainty of Nitrate data
36	QF	Quality flags for water samples
37	NITRIT[UMOL/KG]	Nitrite
38	QF	Quality flags for water samples
39	NRIUNC	Uncertainty of Nitrite data
40	QF	Quality flags for water samples
41	PHSPHT[UMOL/KG]	Phosphate
42	QF	Quality flags for water samples
43	PHPUNC	Uncertainty of Phosphate data
44	QF	Quality flags for water samples
45	CFC-11[PMOL/KG]	Freon-11
46	QF	Quality flags for water samples
47	CFC-12[PMOL/KG]	Freon-12
48	QF	Quality flags for water samples
49	CFC113[PMOL/KG]	Freon-113
50	QF	Quality flags for water samples
51	TCARBN[UMOL/KG]	Total carbon
52	QF	Quality flags for water samples
53	ALKALI[UMOL/KG]	Total alkalinity
54	QF	Quality flags for water samples
55	PH	pH
56	QF	Quality flags for water samples
57	DELC14[MILLE]	14Carbon
58	QF	Quality flags for water samples
59	C14ERR	Expected error
60	QF	Quality flags for water samples
61	DELC13[MILLE]	13Carbon
62	QF	Quality flags for water samples
63	C13ERR	Expected error
64	QF	Quality flags for water samples
65	TOC[UMOL/KG]	Total organic carbon
66	QF	Quality flags for water samples

Column No.	Column Heading	Comments
68	QF	Quality flags for water samples
69	TRITERER[KBQ/CUM]	Expected error
70	QF	Quality flags for water samples
71	CS-137[BQ/CUM]	137Cesium
72	QF	Quality flags for water samples
73	CS137ER[BQ/CUM]	Expected error
74	QF	Quality flags for water samples
75	PLUTO[MBQ/CUM]	Plutonium
76	QF	Quality flags for water samples
77	PLUTOER	Expected error
78	QF	Quality flags for water samples
79	THETA[DEG C]	Potential temperature
80	QF	Quality flag for CTD data
81	SIG0[KG/CUM]	Density
82	QF	Quality flag for CTD data
83	SAMPNO	Sample number
84	QF	Bottle quality flag

#### Related Information



[Enlarge Image](#)

#### MR03-K04 Leg1

Ship Name: MIRAI  
Period: 2003-08-03 - 2003-09-05  
Chief Scientist: Masao Fukasawa (JAMSTEC)  
Project Name: [Blue Earth Global Expedition 2003, POST-WOCE Hydrography]

#### Update History

2017-07-28	An observation data was registerd.
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#### Data

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#### Information of the Ships

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[KAIMEI](#)  
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#### Information of the Submersibles

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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 \(CLOW\)](#)  
[BMS](#)

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Cruise ID:

#### Go to a Dive Information

Dive ID:

## MIRAI MR03-K04 Leg1 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

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

Cruise ID: [MR03-K04 Leg1](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

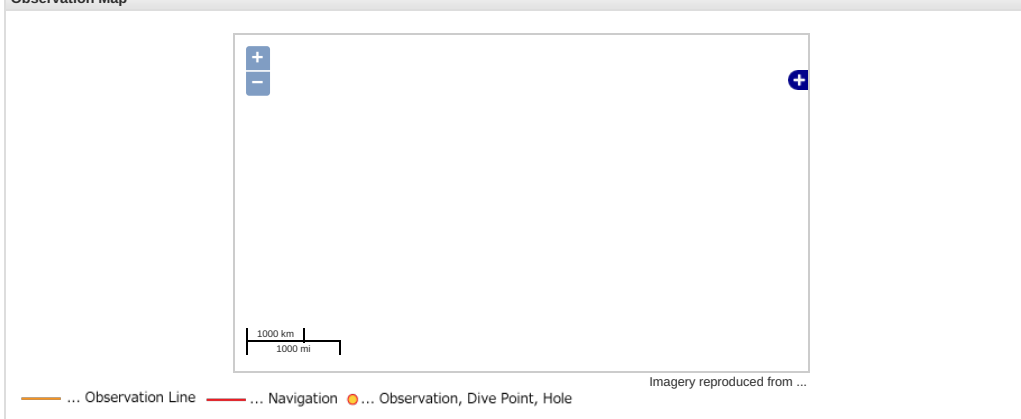
Data Policy: [JAMSTEC](#)

**Observation Items:** Temperature, Salinity, Dissolved oxygen, Silicate, Nitrate, Nitrite, Phosphate, CFC11, CFC12, CFC113, Total inorganic carbon, Alkalinity, pH, Carbon14, Carbon13, Total organic carbon, Tritium, 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

### Observation Map



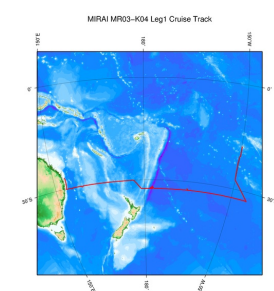
### Data List

☐ File names

☐ MR03K0401\_ex\_bot.csv

☐ MR03K0401\_odv\_bot.txt

### Related Information



[Enlarge Image](#)

#### MR03-K04 Leg1

Ship Name: MIRAI

Period: 2003-08-03 - 2003-09-05

Chief Scientist: Masao Fukasawa (JAMSTEC)

Project Name: [Blue Earth Global Expedition 2003, 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.
2013-08-23	An observation data was registered.



2012-12-25

An observation data was registerd.

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#### Data

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#### Information of the Ships

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[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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国立研究開発法人  
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