

MIRAI MR03-K04 Leg4 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

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Cruise ID: [MR03-K04 Leg4](#)

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_leg4_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

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 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 cm³ of titration vessel
 Detector and Software: Automatic photometric titrator manufactured by Kimoto Electronic Co. Ltd
- (2) Methods : Winkler method/photometric methods
- (3) Precision : 0.08umol/kg
- (4) Reference Material/Calibration: 0.001667M KIO₃ 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 ; C.V. 0.12% (200 uM) in Leg5
- (4) Reference Material/Calibration: RMNS [Aoyama et al., 2007] and commercial available silicon standard solution for atomic absorption spectrometry of 1000 mg L⁻¹

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 ; C.V. 0.13% (200 uM) in Leg5
- (4) Reference Material/Calibration: KNO₃ 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: NaNO₂ solution and RMNS [Aoyama et al., 2007]

6. Phosphate

- (1) Instruments: TRAACS800 (Bran+Luebbe)
- (2) Methods : Molybdenum blue method
- (3) Precision : C.V. 0.19% (3.6uM), Summary of precision in MR03-K04 ; C.V. 0.17% (200 uM) in Leg5
- (4) Reference Material/Calibration: KH₂PO₄ solution and RMNS [Aoyama et al., 2007]

7. Total inorganic carbon

- (1) Instruments: the automated TCO₂ analyzer (Nippon ANS Co., Ltd.) equipped with carbon coulometer 5012 (UIC Co., Ltd.)
- (2) Methods : coulometry
- (3) Precision : 0.7 umol 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: TALK measuring systems (TA-1000), which were made by Nihon ANS Ltd
 (2) Methods : Modified Gran titration/Closed-cell/potentiometry
 (3) Precision : $1.8 \text{ } \mu\text{mol kg}^{-1}$
 (4) Reference Material/Calibration: Na_2CO_3 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 : 0.0007
 (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 : The precisions were estimated from average of absolute difference to be $0.009 \pm 0.010 \text{ pmol/kg}$ ($n = 131$) and $0.006 \pm 0.006 \text{ pmol/kg}$ ($n = 122$) for CFC-11 and -12, respectively.
 (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_2 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 Kiriyu (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}Sc

- (1) Instruments: γ -spectrometry using well-type Ge detectors coupled with multichannel pulse height analyzers.
 (2) Methods : see "DATA BOOK"
 (3) Precision : -
 (4) Reference Material/Calibration: -

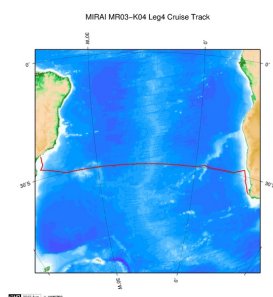
13. Pu

- (1) Instruments: The α -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 Leg4

Ship Name: MIRAI

Period: 2003-11-06 - 2003-12-05

Chief Scientist: Yasushi Yoshikawa (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 registered.

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 6K Camera DEEP TOW
 6K Sonar DEEP TOW
 KM-ROV

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Cruise ID:

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Dive ID:

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

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Last Modified: 2017-07-28

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Cruise ID: **MR03-K04 Leg4**

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	Comments
66	CS-137	BQ/CUM	F9.2	Expected error
66	CS-137	BQ/CUM	F9.2	137Cesium
67	CS-137_FLAG_W		I1	Quality flags for water samples
68	CS137ER	BQ/CUM	F9.2	Expected error
69	PLUTO	MBQ/CUM	F9.2	Plutonium
70	PLUTO_FLAG_W		I1	Quality flags for water samples
71	PLUTOER	MBQ/CUM	F9.2	Expected error
72	THETA	DEG C	F9.4	Potential temperature
73	SIG0	KG/CUM	F9.4	Density

ODV Format

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

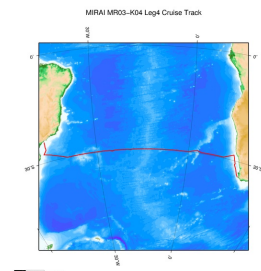
[Ocean Data View \(ODV\)](#)

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
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 Leg4

Ship Name: MIRAI
Period: 2003-11-06 - 2003-12-05
Chief Scientist: Yasushi Yoshikawa (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 registered.

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Dive ID:

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Bottle Sampling Water Chemical Analysis: Processed (PI)

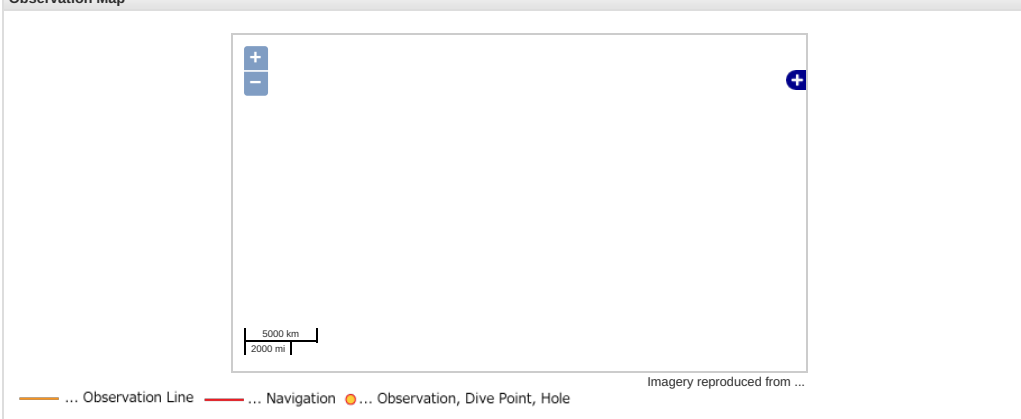
Data Policy: [JAMSTEC](#)

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

Science Keywords:

OCEANS > OCEAN CHEMISTRY > DISSOLVED GASES
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OCEANS > OCEAN CHEMISTRY > pH
OCEANS > OCEAN CHEMISTRY > PHOSPHATE
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OCEANS > OCEAN CHEMISTRY > OCEAN TRACERS
OCEANS > OCEAN CHEMISTRY > STABLE ISOTOPES
OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

Observation Map



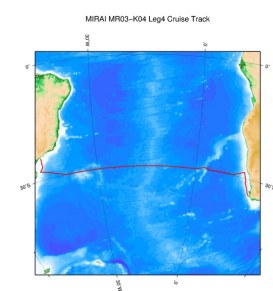
Data List

☐ File names

☐ MR03K0404_ex_bot.csv

☐ MR03K0404_odv_bot.txt

Related Information



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MR03-K04 Leg4

Ship Name: MIRAI

Period: 2003-11-06 - 2003-12-05

Chief Scientist: Yasushi Yoshikawa (JAMSTEC)

Project Name: [Blue Earth Global Expedition 2003, POST-WOCE Hydrography]

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2012-12-25

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Go to a Cruise Information

Cruise ID:

Go to a Dive Information

Dive ID:

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