

## MIRAI MR04-05 Bottle Sampling Water Chemical Analysis

Last Modified: 2015-05-29

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

Cruise ID: [MR04-05](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Chlorophyll, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, CFC11, CFC12, CFC113, Alkalinity, 18O, CH4

Science Keywords:

OCEANS > OCEAN CHEMISTRY > AMMONIA  
OCEANS > OCEAN CHEMISTRY > DISSOLVED GASES  
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 CHEMISTRY > CHLOROPHYLL  
OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE  
OCEANS > SALINITY/DENSITY > SALINITY  
OCEANS > OCEAN CHEMISTRY > ALKALINITY  
OCEANS > OCEAN CHEMISTRY > OCEAN TRACERS  
OCEANS > OCEAN CHEMISTRY > STABLE ISOTOPES

Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR04-05\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR04-05_all.pdf)

### For Using Data

#### Principal Investigator

CTDTMP : Koji Shimada (JAMSTEC)  
CTDSAL : Koji Shimada (JAMSTEC)  
SALNTY : Koji Shimada (JAMSTEC)  
CTDOXY : Koji Shimada (JAMSTEC)  
OXYGEN : Motoyo Itoh (JAMSTEC)  
CHLORA : Sanae Chiba (JAMSTEC)  
SILCAT : Shigeto Nishino (JAMSTEC)  
NITRAT : Shigeto Nishino (JAMSTEC)  
NITRIT : Shigeto Nishino (JAMSTEC)  
PHSPHT : Shigeto Nishino (JAMSTEC)  
NH4 : Shigeto Nishino (JAMSTEC)  
CFC-11 : Shigeto Nishino (JAMSTEC)  
CFC-12 : Shigeto Nishino (JAMSTEC)  
CFC113 : Shigeto Nishino (JAMSTEC)  
ALKALI : Shigeto Nishino (JAMSTEC)  
O18O16 : Fiona McLaughlin (Institute of Ocean Sciences, Canada)  
CH4 : Fiona McLaughlin (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:

Gas chromatograph



Instrument:

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



Instrument:

Titration for DO ( - MR11-05 Leg2)



Overview

Citation

Shimada, K. 2004, R/V Mirai Cruise Report MR04-05, edited by K. Shimada, S. Nishino, and M. Itoh, 110pp., JAMSTEC, Yokosuka, Japan.

Upon consultation in advance with the chief of investigation and the person(s) in charge of research issues who gathered that data, we request that the text of the results material contain a statement to the effect that it was obtained during the R/V Mirai cruise of MR04-05 under the project of JWACS 2004, the Chief Scientist, Koji Shimada (JAMSTEC), and the following Principal Investigators (PI) for gathering the data.

Chief Scientist

Koji Shimada (JAMSTEC)

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PI for CTD

Koji Shimada (JAMSTEC)

Collaborators:

Motoyo Itoh (JAMSTEC)

Eddy Carmack (Institute of Ocean Sciences)

PI for bottle salinity

Koji Shimada (JAMSTEC)

Collaborators:

Motoyo Itoh (JAMSTEC)

Eddy Carmack (Institute of Ocean Sciences)

PI for bottle oxygen

Motoyo Itoh (JAMSTEC)

PI for nutrients, CFCs and total alkalinity

Shigeto Nishino (JAMSTEC)

Collaborators:

Fiona McLaughlin (Institute of Ocean Sciences)

PI for chlorophyll

Sanae Chiba (JAMSTEC)

PI for O-18

Fiona McLaughlin (Institute of Ocean Sciences)

Collaborators:

Michiyo Yamamoto-Kawai (Institute of Ocean Sciences)

PI for Methane

Fiona McLaughlin (Institute of Ocean Sciences)

Collaborators:

Johanna Jenkins (Institute of Ocean Sciences)

**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 (120% of surface saturation)

Accuracy : 0.1ml/l (2% of saturation)

Resolution : 0.01ml/l

**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 : 0.11 umol kg<sup>-1</sup>

(4) Reference Material/Calibration : KIO<sub>3</sub> solution (0.001667M)/compared standard to CSK standard solution (Wako pure chemical industries, Ltd.)

2. Salinity

(1) Instruments: Autosol salinometer model 8400B (Guildline Instruments Ltd.)

(2) Methods : -

(3) Precision : 0.001 PSU

(4) Reference Material/Calibration: IAPSO Standard Sea Water batch P144 (Ocean Scientific International Ltd.)

3. Silicate

(1) Instruments: TRAACS800 (Bran+Luebbe)

- (2) Methods :Molybdenum blue method  
 (3) Precision :C.V. 0.18% (115.2uM)  
 (4) Reference Material/Calibration:RMNS [Aoyama et al., 2007] and Silicate standard solution, the silicate primary standard, is obtained from Kanto Chemical CO.,Inc.

This standard solution is 1000 mg per liter with 0.5 M KOH and prepared for ICP analysis.

#### 4. Nitrate

- (1) Instruments:TRAACS800 (Bran+Luebbe)  
 (2) Methods :Diazotization method  
 (3) Precision : C.V. 0.19% (36uM)  
 (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 :C.V. 0.31% (0.8uM)  
 (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. 0.28% (2.4uM)  
 (4) Reference Material/Calibration:KH<sub>2</sub>PO<sub>4</sub> solution and RMNS [Aoyama et al., 2007]

#### 7. Ammonia

- (1) Instruments:TRAACS800 (Bran+Luebbe)  
 (2) Methods :Indophenol method/gas diffusion method(GDM)  
 (3) Precision :C.V. 0.98% (6.4uM)  
 (4) Reference Material/Calibration:(NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> solution

#### 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 :1.68umol 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. 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 "Cruise Report"  
 (3) Precision :CFC-11;0.03pmol/kg CFC-12;0.04pmol/kg CFC-113;0.01pmol/kg  
 (4) Reference Material/Calibration:-

#### 10. 18O16O

- (1) Instruments: -  
 (2) Methods :-  
 (3) Precision :-  
 (4) Reference Material/Calibration: -

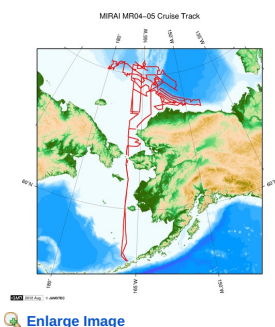
#### 11. Methane

- (1) Instruments: -  
 (2) Methods :-  
 (3) Precision :-  
 (4) Reference Material/Calibration: -

#### 12. Chlorophyll

- (1) Instruments: -  
 (2) Methods :-  
 (3) Precision :-  
 (4) Reference Material/Calibration: -

### Related Information



#### MR04-05

Ship Name: MIRAI  
 Period: 2004-09-01 - 2004-10-13  
 Chief Scientist: Koji Shimada (JAMSTEC)  
 Project Name: [Arctic Ocean Climate System Reaserch]

### Update History

2015-05-29 An observation data was registered.

2013-08-23  
2012-11-25

An observation data was registerd.  
An observation data was registerd.

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#### Data

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[SHINKAI 6500](#)  
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[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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**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 MR04-05 Bottle Sampling Water Chemical Analysis

Last Modified: 2015-05-29

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Cruise ID: [MR04-05](#)

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	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	CTDSAL	PSS-78	F9.4	CTD Salinity sensor
18	CTDSAL_FLAG_W		I1	Quality flag for CTD data
19	SALNTY	PSS-78	F9.4	Salinity
20	SALNTY_FLAG_W		I1	Quality flags for water samples
21	CTDOXY	UMOL/KG	F9.2	CTD Oxygen sensor
22	CTDOXY_FLAG_W		I1	Quality flag for CTD data
23	OXYGEN	UMOL/KG	F9.2	Oxygen
24	OXYGEN_FLAG_W		I1	Quality flags for water samples
25	CHLORA	MG/CUM	F9.2	Chlorophyll a
26	CHLORA_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	NITRAT	UMOL/KG	F9.2	Nitrate
30	NITRAT_FLAG_W		I1	Quality flags for water samples
31	NITRIT	UMOL/KG	F9.2	Nitrite
32	NITRIT_FLAG_W		I1	Quality flags for water samples
33	PHSPHT	UMOL/KG	F9.2	Phosphate
34	PHSPHT_FLAG_W		I1	Quality flags for water samples
35	NH4	UMOL/KG	F9.2	Ammonium
36	NH4_FLAG_W		I1	Quality flags for water samples
37	CFC-11	PMOL/KG	F9.2	Freon-11
38	CFC-11_FLAG_W		I1	Quality flags for water samples
39	CFC-12	PMOL/KG	F9.2	Freon-12
40	CFC-12_FLAG_W		I1	Quality flags for water samples
41	CFC113	PMOL/KG	F9.2	Freon-113
42	CFC113_FLAG_W		I1	Quality flags for water samples
43	ALKALI	UMOL/KG	F9.1	Total alkalinity
44	ALKALI_FLAG_W		I1	Quality flags for water samples
45	O18O16	/MILLE	F9.2	18O/16O ratio
46	O18O16_FLAG_W		I1	Quality flags for water samples
47	CH4	NMOL/KG	F9.2	Methane
48	CH4_FLAG_W		I1	Quality flags for water samples

### ODV Format

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

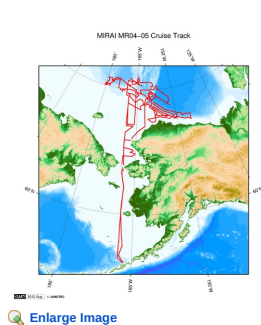
[Ocean Data View \(ODV\)](#)

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

Column No.	Column Heading	Comments
12	QF	Quality flag for CTD data
13	CTDTMP[ITS-90]	Temperature
14	QF	Quality flag for CTD data
15	CTDSAL[PSS-78]	CTD Salinity sensor
16	QF	Quality flag for CTD data
17	SALNTY[PSS-78]	Salinity
18	QF	Quality flags for water samples
19	CTDOXY[UMOL/KG]	CTD Oxygen sensor
20	QF	Quality flag for CTD data
21	OXYGEN[UMOL/KG]	Oxygen
22	QF	Quality flags for water samples
23	CHLORA[MG/CUM]	Chlorophyll a
24	QF	Quality flags for water samples
25	SILCAT[UMOL/KG]	Silicate
26	QF	Quality flags for water samples
27	NITRAT[UMOL/KG]	Nitrate
28	QF	Quality flags for water samples
29	NITRIT[UMOL/KG]	Nitrite
30	QF	Quality flags for water samples
31	PHSPHT[UMOL/KG]	Phosphate
32	QF	Quality flags for water samples
33	NH4[UMOL/KG]	Ammonium
34	QF	Quality flags for water samples
35	CFC-11[PMOL/KG]	Freon-11
36	QF	Quality flags for water samples
37	CFC-12[PMOL/KG]	Freon-12
38	QF	Quality flags for water samples
39	CFC113[PMOL/KG]	Freon-113
40	QF	Quality flags for water samples
41	ALKALI[UMOL/KG]	Total alkalinity
42	QF	Quality flags for water samples
43	O18O16[MILLE]	18O/16O ratio
44	QF	Quality flags for water samples
45	CH4[NMOL/KG]	Methane
46	QF	Quality flags for water samples
47	SAMPNO	Sample number
48	QF	Bottle quality flag

#### Related Information



[Enlarge Image](#)

#### MR04-05

Ship Name: MIRAI  
Period: 2004-09-01 - 2004-10-13  
Chief Scientist: Koji Shimada (JAMSTEC)  
Project Name: [Arctic Ocean Climate System Reaserch]

#### Update History

2015-05-29	An observation data was registerd.
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6K Sonar DEEP TOW  
KM-ROV  
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SAMPLER (SHELL)  
POWER GRAB  
SAMPLER (CLOW)  
BMS

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Cruise ID:

#### Go to a Dive Information

Dive ID:

## MIRAI MR04-05 Bottle Sampling Water Chemical Analysis

Last Modified: 2015-05-29

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Cruise ID: [MR04-05](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

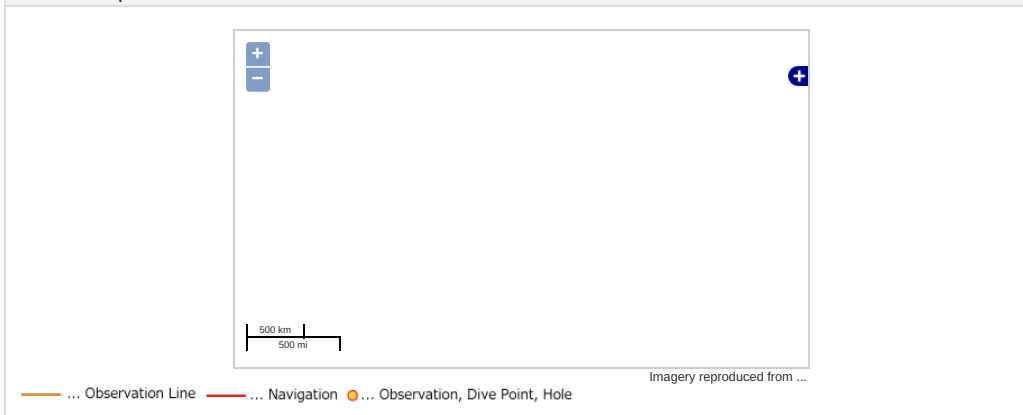
Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Chlorophyll, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, CFC11, CFC12, CFC113, Alkalinity, 18O, CH4

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OCEANS > OCEAN CHEMISTRY > STABLE ISOTOPES

### Observation Map



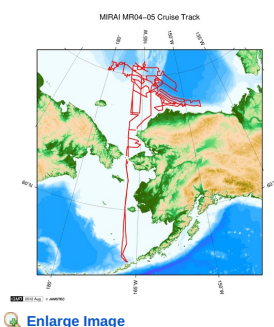
### Data List

☐ File names

☐ MR040500\_ex\_bot.csv

☐ MR040500\_odv\_bot.txt

### Related Information



#### MR04-05

Ship Name: MIRAI

Period: 2004-09-01 - 2004-10-13

Chief Scientist: Koji Shimada (JAMSTEC)

Project Name: [Arctic Ocean Climate System Reaserch]

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