

MIRAI MR11-08 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

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

Cruise ID: [MR11-08 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Fluorescence, Chlorophyll, Transmittance, PAR, Density salinity, Silicate, Nitrate, Nitrite, Phosphate, CFC11, CFC12, CFC113, SF6, Total inorganic carbon, Alkalinity, pH, Carbon13, Carbon14, Tritium, 134Cs, 137Cs

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 CHEMISTRY	> CHLOROPHYLL
OCEANS > OCEAN TEMPERATURE	> WATER TEMPERATURE
OCEANS > SALINITY/DENSITY	> SALINITY
OCEANS > OCEAN OPTICS	> PHOTOSYNTHETICALLY ACTIVE RADIATION
OCEANS > OCEAN CHEMISTRY	> ALKALINITY
OCEANS > OCEAN CHEMISTRY	> CARBON
OCEANS > OCEAN CHEMISTRY	> RADIONUCLIDES
OCEANS > OCEAN CHEMISTRY	> OCEAN TRACERS
OCEANS > OCEAN OPTICS	> FLUORESCENCE

Cruise Report

http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR11-08_leg1-3_all.pdf

For Using Data

Principal Investigator

CTDTMP : Hiroshi Uchida (JAMSTEC)
 SBE35 : Hiroshi Uchida (JAMSTEC)
 CTDSAL : Hiroshi Uchida (JAMSTEC)
 SALNTY : Hiroshi Uchida (JAMSTEC)
 CTDOXY : Hiroshi Uchida (JAMSTEC)
 OXYGEN : Yuichiro Kumamoto (JAMSTEC)
 FLUOR : Hiroshi Uchida (JAMSTEC)
 XMISS : Hiroshi Uchida (JAMSTEC)
 PAR : Hiroshi Uchida (JAMSTEC)
 DNSSAL : Hiroshi Uchida (JAMSTEC)
 CHLORA : Osamu Yoshida(Rakuno Gakuen University) /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)
 CFCs : Kenichi Sasaki (JAMSTEC)
 SF6 : Kenichi Sasaki (JAMSTEC)
 TCARBN : Akihiko Murata (JAMSTEC)
 ALKALI : Akihiko Murata (JAMSTEC)
 PH : Akihiko Murata (JAMSTEC)
 DELC14 : Yuichiro Kumamoto (JAMSTEC)
 DELC13 : Yuichiro Kumamoto (JAMSTEC)
 TRITUM : Yuichiro Kumamoto (JAMSTEC)/Tatsuo Aono(NIRS)
 CS134 : Yuichiro Kumamoto (JAMSTEC)/Tatsuo Aono(NIRS)
 CS137 : Yuichiro Kumamoto (JAMSTEC)/Tatsuo Aono(NIRS)

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

Instrument:

Gas chromatograph



Instrument:

Titration for DO Dissolved oxygen

Instrument:

Nutrient analyzer(5ch) (MR09-02 -)



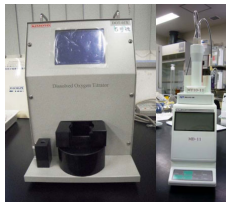
Instrument:

Fluorometer (TURNER DESIGNS)

measurement system (MR11-05 Leg1
-)



titration equipment (MR11-06 -)



Data Citation

Parameters : CS-134, CS-137

Please cite the following paper.

Yuichiro Kumamoto, Michio Aoyama, Yasunori Hamajima, Akihiko Murata, Takeshi Kawano, Impact of Fukushima-derived radiocesium in the western North Pacific Ocean about ten months after the Fukushima Dai-ichi nuclear power plant accident, Journal of Environmental Radioactivity, Volume 140, 114–122 (2015), doi:10.1016/j.jenvrad.2014.11.010

Overview

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

Information on CTD data

(1) Temperature sensor

Model: SBE03, Sea-Bird Electronics, Inc.
Measurement range: -5.0 to +35degC
Accuracy: 0.001degC
Resolution: 0.0002degC

(2) Salinity sensor

Model: SBE04, 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: RINKO-III (JFE Advantech Co. Ltd.)
Measurement range: 0 to 200%
Accuracy: $\pm 2\%$ F.S.
Resolution: 0.01 to 0.04%

(5) Fluorometer

Model: The Seapoint Chlorophyll Fluorometer (Seapoint Sensors, Inc.)
Measurement range : 0-5ug/l
Resolution: 0.02ug/l

(6) Transmissometer

Model : C-Star WET Labs, Inc.

(7) Deep Ocean Standards Thermometer

Model: SBE 35, (Sea-Bird Electronics, Inc.)

(8) PAR sensor

Model: (Satlantic Inc.)

Information on Chemical and Biological data

1. Dissolved Oxygen

(1)Instruments:

Burette : APB-620 and APB-510 (Kyoto Electronic Co. Ltd.) / 10 cm³ of titration vessel
Detector : Automatic photometric titrator DOT-01X (Kimoto Electronic Co. Ltd)

(2)Methods: Winkler method

(3)Precision: Standard deviation of the replicate measurement 0.13 $\mu\text{mol kg}^{-1}$
Standard deviation of the duplicate measurement 0.14 $\mu\text{mol kg}^{-1}$

(4)Reference Material/Calibration: CSK standard of potassium iodate Lot EPJ3885 (Wako Pure Chemical Industries Ltd.)0.0100N

2. Salinity

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

(2)Methods: -

(3)Precision: The standard deviation of absolute difference were 0.00083

(4)Reference Material/Calibration: IAPSO Standard Sea Water batch P153

3. Silicate

(1)Instruments: BL TEC K.K QuAAtro 2-HR

(2)Methods: Molybdenum blue method

(3)Precision: C.V. 0.14%

(4)Reference Material/Calibration: RMNS, Silicon standard solution SiO₂ in NaOH 0.5 mol/L CertiPUR® (Merck KGaA)

4. Nitrate

(1)Instruments: BL TEC K.K QuAAtro 2-HR

(2)Methods: Diazotization method (reduced to nitrite by Cd - Cu tube)

(3)Precision: C.V. 0.12%

(4)Reference Material/Calibration: RMNS, potassium nitrate 99.995 Suprapur® (Merck KGaA)

5. Nitrite

(1)Instruments: BL TEC K.K QuAAtro 2-HR

(2)Methods: Diazotization method

(3)Precision: -

(4)Reference Material/Calibration: RMNS, sodium nitrite (Wako Pure Chemical Industries, Ltd.)

6. Phosphate

(1)Instruments: BL TEC K.K QuAAtro 2-HR

(2)Methods: Molybdenum blue method

(3)Precision: C.V. 0.20%

(4)Reference Material/Calibration: RMNS, potassium dihydrogen phosphate anhydrous 99.995 Suprapur® (Merck KGaA)

7. Total inorganic carbon

(1)Instruments: two TC_{CO₂} measuring system (Nippon ANS, Inc.)called as Systems C and D. The systems equipped with coulometer Model Seacat2000 and Model3000(Nippon ANS, Inc.)

(2)Methods: coulometry

(3)Precision: Systems C 0.72±0.64μmol kg⁻¹, Systems D 0.72±0.64μmol kg⁻¹

(4)Reference Material/Calibration: -

8. Total alkalinity

(1)Instruments: Spectrophotometric systems(Nippon ANS, Inc.) .

The system comprises of a spectrophotometer (Carry 50 Bio, Varian)

(2)Methods: Single step acid additional procedure/spectrophotometry

(3)Precision: 0.48 ± 0.43 μmol kg⁻¹

(4)Reference Material/Calibration: -

9. pH

(1)Instruments: pH measureing system (Nippon ANS, Inc.)

The system comprises of a spectrophotometer (Carry 50 Scan, Varian)

(2)Methods: potentiometric methods

(3)Precision: The average of absolute differences 0.0005 ± 0.0005 pH unit

(4)Reference Material/Calibration: -

10. CFCs

(1)Instruments : Gas chromatograph (GC-14B: Shimadzu Ltd.)

(2)Methods : see "Cruise report"

(3)Precision : CFC-11 ±0.005 pmol/kg,CFC-12 ±0.004 pmol/kg, CFC-113 ±0.003 pmol/kg

(4)Reference Material/Calibration : -

11. SF6

(1)Instruments : Gas chromatograph (GC-14B: Shimadzu Ltd.)

(2)Methods : see "Cruise report"

(3)Precision : ±0.03 fmol/kg

(4)Reference Material/Calibration : -

12. Chlorophyll a

(1)Instruments : Fluorophotometer model 10-AU-005 (Turner design)

(2)Methods : Extract in N,N-dimethylformamide / fluorometric determination (Non-acidification method)

(3)Precision : -

(4)Reference Material/Calibration : Pure chlorophyll a (Sigma-Aldrich Co.)

13. DNSSAL

(1)Instruments : oscillation-type density meter DMA 5000M (Anton-Paar GmbH)

(2)Methods : see "Cruise report"

(3)Precision : -

(4)Reference Material/Calibration : -

14.δ13C and Δ14 C of Dissolved Inorganic Carbon

(1) Instruments:δ13C of the sample CO2 gas was measured using Finnigan MAT252 mass spectrometer.

Δ14C 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 :

(3) Precision : "precisions" of our δ13C and Δ14C analyses including error due to the sample preparation and storage were about 0.03‰ and 6‰ respectively.

(4) Reference Material/Calibration:

15. Tritium

(1) Instruments:mass spectrometer

(2) Methods :the He-3 ingrowth method

(3) Precision : -

(4) Reference Material/Calibration: -

16. Cs-134 and Cs-137

(1) Instruments: low-background Ge-detectors, Well-type GCW2022-7915-30-ULB, Canberra Industries, Inc.

(2) Methods : AMP treatment, gamma-ray analysis

(3) Precision : -

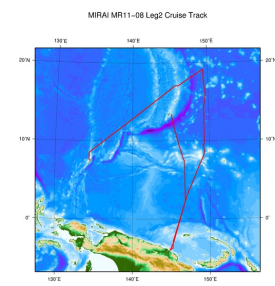
(4) Reference Material/Calibration: -

About this data

There are some description error for nutrient data of this cruise.

Please refer to the errata of the cruise report.

Related Information



 [Enlarge Image](#)

MR11-08 Leg2

Ship Name: MIRAI
Period: 2011-12-20 - 2012-01-12
Chief Scientist: Akihiko Murata (JAMSTEC)
Project Name: [POST-WOCE Hydrography]

Update History

2018-01-25	An observation data was registerd.
2017-04-11	An observation data was registerd.
2015-05-29	An observation data was registerd.
2015-02-05	An observation data was registerd.
2014-04-30	An observation data was registerd.

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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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Dive ID:

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MIRAI MR11-08 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

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Cruise ID: [MR11-08 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.

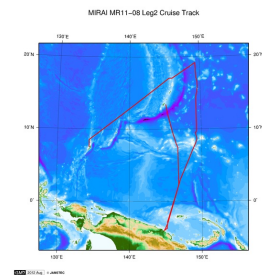
[CCHDO | CLIVAR & Carbon Hydrographic Data Office](#)

Format Information

Column No.	Column Heading Mnemonic	Units Mnemonic	Reporting Precision FORTRAN Format	Comments
1	EXPCODE		A14	Expedition code
2	SECT_ID		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	METERS	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	DNSSAL	G/KG	F9.4	Quality-controlled density salinity data
24	DNSSAL_FLAG_W		I1	Quality flags for water samples
25	CTDOXY	UMOL/KG	F9.2	CTD Oxygen sensor
26	CTDOXY_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	XMISS	%TRANS	F9.3	Transmissometer
30	XMISSCP	/METER	F9.4	Beam attenuation coefficient
31	XMISS_FLAG_W		I1	Quality flag for CTD data
32	FLUOR	MG/CUM	F9.3	Fluorometer
33	FLUOR_FLAG_W		I1	Quality flag for CTD data
34	CHLORA	MG/CUM	F9.2	Chlorophyll a
35	CHLORA_FLAG_W		I1	Quality flags for water samples
36	PAR	UE/SQM/S	F9.3	Ed PAR
37	PAR_FLAG_W		I1	Quality flag for CTD data
38	SILCAT	UMOL/KG	F9.2	Silicate
39	SILCAT_FLAG_W		I1	Quality flags for water samples
40	SILUNC	UMOL/KG	F9.2	Uncertainty of Silicate data
41	NITRAT	UMOL/KG	F9.2	Nitrate
42	NITRAT_FLAG_W		I1	Quality flags for water samples
43	NRAUNC	UMOL/KG	F9.2	Uncertainty of Nitrate data
44	NITRIT	UMOL/KG	F9.2	Nitrite
45	NITRIT_FLAG_W		I1	Quality flags for water samples
46	NRIUNC	UMOL/KG	F9.2	Uncertainty of Nitrite data
47	PHSPHT	UMOL/KG	F9.3	Phosphate
48	PHSPHT_FLAG_W		I1	Quality flags for water samples
49	PHPUNC	UMOL/KG	F9.3	Uncertainty of Phosphate data
50	CFC-11	PMOL/KG	F9.3	Freon-11
51	CFC-11_FLAG_W		I1	Quality flags for water samples
52	CFC-12	PMOL/KG	F9.3	Freon-12
53	CFC-12_FLAG_W		I1	Quality flags for water samples
54	CFC113	PMOL/KG	F9.3	Freon-113
55	CFC113_FLAG_W		I1	Quality flags for water samples
56	SF6	FMOL/KG	F9.3	SF6
57	SF6_FLAG_W		I1	Quality flags for water samples
58	TCARBN	UMOL/KG	F9.1	Total carbon
59	TCARBN_FLAG_W		I1	Quality flags for water samples
60	ALKALI	UMOL/KG	F9.1	Total alkalinity
61	ALKALI_FLAG_W		I1	Quality flags for water samples
62	PH_TOT		F9.4	pH (Total scale)
63	PH_TMP	DEG C	I9	Temperature of Analysis

Column No.	Column Heading Mnemonic	Units Mnemonic	Reporting Precision FORTRAN Format	Quality flags for water samples Comments
66	DELC13_FLAG_W		I1	Quality flags for water samples
67	C13ERR	/MILLE	F9.3	Expected error
68	DELC14	/MILLE	F9.1	14Carbon
69	DELC14_FLAG_W		I1	Quality flags for water samples
70	C14ERR	/MILLE	F9.1	Expected error
71	TRITUM	KBQ/CUM	F9.3	Tritium
72	TRITUM_FLAG_W		I1	Quality flags for water samples
73	TRITER	KBQ/CUM	F9.3	Expected error
74	CS-134	BQ/CUM	F9.2	134Cesium
75	CS-134_FLAG_W		I1	Quality flags for water samples
76	CS134ER	BQ/CUM	F9.2	Expected error
77	CS-137	BQ/CUM	F9.2	137Cesium
78	CS-137_FLAG_W		I1	Quality flags for water samples
79	CS137ER	BQ/CUM	F9.2	Expected error

Related Information



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MR11-08 Leg2

Ship Name: MIRAI
Period: 2011.12.20 - 2012-01-12
Chief Scientist: Akihiko Murata (JAMSTEC)
Project Name: [POST-WOCE Hydrography]

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2018-01-25	An observation data was registered.
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POWER GRAB
SAMPLER (CLOW)
BMS

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国立研究開発法人
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Cruise ID: [MR11-08 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

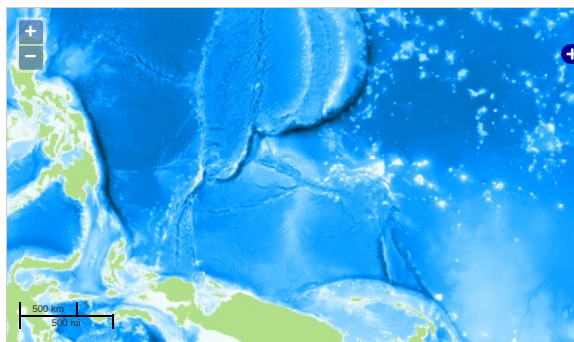
Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Fluorescence, Chlorophyll, Transmittance, PAR, Density salinity, Silicate, Nitrate, Nitrite, Phosphate, CFC11, CFC12, CFC113, SF6, Total inorganic carbon, Alkalinity, pH, Carbon13, Carbon14, Tritium, 134Cs, 137Cs

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OCEANS > OCEAN CHEMISTRY	> OCEAN TRACERS
OCEANS > OCEAN OPTICS	> FLUORESCENCE

Observation Map



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

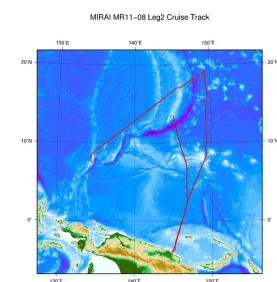
Data List

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File names

☐ 49NZ20111220_hy1.csv

Related Information



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MR11-08 Leg2

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Period: 2011-12-20 - 2012-01-12
Chief Scientist: Akihiko Murata (JAMSTEC)
Project Name: [POST-WOCE Hydrography]

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

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