

MIRAI MR13-06 Leg1 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

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

Cruise ID: [MR13-06 Leg1](#)

Bottle Sampling Water Chemical Analysis : Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Transmittance, Fluorescence, PAR, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, Total inorganic carbon, Alkalinity, Chlorophyll, POC, Potential temperature, Density

Science Keywords:

OCEANS	> OCEAN CHEMISTRY	> AMMONIA
OCEANS	> OCEAN CHEMISTRY	> INORGANIC CARBON
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
BIOSPHERE	> AQUATIC ECOSYSTEMS	> PLANKTON
OCEANS	> OCEAN OPTICS	> PHOTOSYNTHETICALLY ACTIVE RADIATION
BIOSPHERE	> ECOLOGICAL DYNAMICS	> ECOSYSTEM FUNCTIONS
OCEANS	> OCEAN CHEMISTRY	> ALKALINITY
BIOSPHERE	> ECOLOGICAL DYNAMICS	> ECOSYSTEM FUNCTIONS
OCEANS	> OCEAN CHEMISTRY	> CARBON
OCEANS	> OCEAN OPTICS	> FLUORESCENCE
OCEANS	> OCEAN TEMPERATURE	> POTENTIAL TEMPERATURE
		> PHYTOPLANKTON
		> PRIMARY PRODUCTION
		> PHOTOSYNTHESIS

Cruise Report

http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR13-06_leg1-2_all.pdf

For Using Data

Principal Investigator

CTDTMP : Shigeto Nishino(JAMSTEC)
 SBE35 : Shigeto Nishino(JAMSTEC)
 CTDSAL : Shigeto Nishino(JAMSTEC)
 SALNTY : Shigeto Nishino(JAMSTEC)
 CTDOXY : Shigeto Nishino(JAMSTEC)
 OXYGEN : Shigeto Nishino(JAMSTEC)
 XMISS : Shigeto Nishino(JAMSTEC)
 FLUOR : Shigeto Nishino(JAMSTEC)
 PAR : Shigeto Nishino(JAMSTEC)
 SILCAT : Shigeto Nishino(JAMSTEC)/Michio Aoyama (JAMSTEC/Fukushima University)
 NITRAT : Shigeto Nishino(JAMSTEC)/Michio Aoyama (JAMSTEC/Fukushima University)
 NITRIT : Shigeto Nishino(JAMSTEC)/Michio Aoyama (JAMSTEC/Fukushima University)
 PHSPHT : Shigeto Nishino(JAMSTEC)/Michio Aoyama (JAMSTEC/Fukushima University)
 AMMONIA : Shigeto Nishino(JAMSTEC)/Michio Aoyama (JAMSTEC/Fukushima University)
 TCARBN : Shigeto Nishino(JAMSTEC)
 ALKALI : Shigeto Nishino(JAMSTEC)
 CHLWEL : Shigeto Nishino(JAMSTEC)
 SIZECHL : Shigeto Nishino(JAMSTEC)
 d-POC : Shigeto Nishino(JAMSTEC)/Toru Hirawake(Hokkaido University)

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:

CN mass spectrometer



Instrument:

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



Instrument:

Titration for DO Dissolved oxygen titration equipment (MR11-06 -)



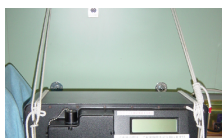
Instrument:

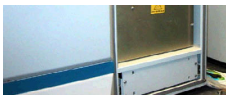
Total dissolved inorganic carbon measurement system (MR11-05 Leg1 -)



Instrument:

Fluorometer (TURNER DESIGNS)





Data Citation

Nishino, S., 2013, R/V Mirai Cruise Report MR13-06, edited by S. Nishino, 226pp., 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 MR13-06, the Chief Scientist, Shigeto Nishino (JAMSTEC), and the following Principal Investigators (PIs) for gathering the data.

Chief Scientist

Shigeto Nishino

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PI for CTD

Shigeto Nishino (JAMSTEC)

PI for bottle salinity

Shigeto Nishino (JAMSTEC)

PI for bottle oxygen

Shigeto Nishino (JAMSTEC)

PI for nutrients

Shigeto Nishino (JAMSTEC)

Michio Aoyama (JAMSTEC/Fukushima University)

PI for total inorganic carbon and total alkalinity

Shigeto Nishino (JAMSTEC)

PI for chlorophyll a

Shigeto Nishino (JAMSTEC)

PI for carbon uptake rate

Shigeto Nishino (JAMSTEC)

Toru Hirawake (Hokkaido University)

And also the data were obtained under the GRENE (Green Network of Excellence) Arctic Climate Change Research Project of the Ministry of Education, Culture, Sports, Science and Technology in Japan (MEXT).

Information on CTD data

Pressure sensor

Model : SBE9plus, Sea-Bird Electronics, Inc.

Measurement range : 0 to 10500 m

Accuracy : $\pm 0.015\%$ of full scale range

Resolution : 0.001% of full scale

Temperature sensor

Model : SBE3, Sea-Bird Electronics, Inc.

Measurement range : -5 to +35 °C

Accuracy : ± 0.001 °C

Resolution : 0.0002 °C

Deep Ocean Standards Thermometer

Model : SBE35, Sea-Bird Electronics, Inc.

Measurement range : -5 to +35 °C

Accuracy : 0.001 °C

Resolution : 0.000025 °C

Salinity sensor

Model : SBE4, Sea-Bird Electronics, Inc.

Measurement range : 0 to 7 S/m

Accuracy : ± 0.0003 S/m

Resolution : 0.00004 S/m

DO sensor

Model : SBE43, Sea-Bird Electronics, Inc.

Measurement range : 120% of surface saturation

Accuracy : $\pm 2\%$ of saturation

DO sensor

Model : RINKOIII, JFE Advantech Co., Ltd.

Measurement range : 0 to 200% of surface saturation

Accuracy : $\pm 2\%$ F.S.

Resolution : 0.001 to 0.04%

Transmissometer

Model : C-Star, WET Labs, Inc.

Measurement range : 0 - 100%

Linearity : 99% R^2

Fluorometer

Model : Seapoint Sensors, Inc.

Measurement range : 0 - 5 $\mu\text{g/l}$

Resolution : 0.02 $\mu\text{g/l}$

PAR sensor

Model : Satlantic, Inc.

Measurement range : 0 - 5000 $\mu\text{mol photons m}^{-2} \text{s}^{-1}$

Accuracy : 5%

Information on Chemical and Biological data

Salinity

Instruments : Autosal salinometer model 8400B (Guildline Instruments Ltd.)
Methods : -
Precision : The average and the standard deviation of absolute difference among 314 pairs of replicate samples were 0.0022 and 0.0066 in salinity
Reference Material/Calibration : IAPSO Standard Sea Water batch P155 (Ocean Scientific International Ltd.)

Dissolved Oxygen

Instruments : Burette: APB-510/APB-620 manufactured by Kyoto Electronic Co. Ltd. /10 cm³ of titration vessel
Detector: Automatic photometric titrator DOT-01X manufactured by Kimoto Electronic Co. Ltd
Software: DOT_Terminal Ver. 1.2.0
Methods : Winkler method/photometric methods
Precision : 0.74 µmol kg⁻¹
Reference Material/Calibration : CSK standard of potassium iodate Lot EPR3227

Silicate

Instruments : BL TEC K.K. QuAAtro 2-HR
Methods : Molybdenum blue method
Precision : C.V. 0.16% (includes Leg2)
Reference Material/Calibration : RMNS (Kanso Technos), Silicon standard solution SiO₂ in NaOH 0.5 mol/L CertiPUR® (Merck KGaA) Batch HC122701

Nitrate

Instruments : BL TEC K.K. QuAAtro 2-HR
Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)
Precision : C.V. 0.11% (includes Leg2)
Reference Material/Calibration : RMNS [Aoyama and Hydes, 2010; Sato et al., 2010], potassium nitrate 99.995% suprapur® (Merck KGaA) Batch B0771365

Nitrite

Instruments : BL TEC K.K. QuAAtro 2-HR
Methods : Diazotization method
Precision : C.V. 0.19% (includes Leg2)
Reference Material/Calibration : RMNS [Aoyama and Hydes, 2010; Sato et al., 2010], sodium nitrite (Wako Pure Chemical Industries, Ltd.) Lot HLK7454

Phosphate

Instruments : BL TEC K.K. QuAAtro 2-HR
Methods : Modified molybdenum blue method
Precision : C.V. 0.12% (includes Leg2)
Reference Material/Calibration : RMNS [Aoyama and Hydes, 2010; Sato et al., 2010], potassium dihydrogen phosphate anhydrous 99.995% suprapur® (Merck KGaA) Batch B0691108

Ammonia

Instruments : BL TEC K.K. QuAAtro 2-HR
Methods : Indophenol method
Precision : C.V. 0.31%
Reference Material/Calibration : ammonium sulfate (Wako Pure Chemical Industries, Ltd.) Lot CDP6807

Total inorganic carbon

Instruments : TCO₂ measuring system (Nippon ANS, Inc.) equipped with coulometer Model 3000(Nippon ANS, Inc.)
Methods : coulometry
Precision : average of the differences 1.01 µmol kg⁻¹, standard deviation of the differences 1.07 µmol kg⁻¹
Reference Material/Calibration : The CRM provided by Dr. Dickson in Scripps Institute of Oceanography

Total alkalinity

Instruments : Spectrophotometric system(Nippon ANS, Inc.). The system comprises of a spectrophotometer (Carry 50 Scan, Varian)
Methods : Single step acid additional procedure/spectrophotometry
Precision : average of the differences 0.88 µmol kg⁻¹, standard deviation of the differences 0.80 µmol kg⁻¹
Reference Material/Calibration : Na₂CO₃ solution and the CRM provided by Dr. Dickson in Scripps Institute of Oceanography

Chlorophyll a (Welschmeyer method)

Instruments : Fluorophotometer model 10-AU-005 (Turner design).
Methods : Extract in N,N-dimethylformamide /fluorometric determination (Welschmeyer non-acidification method)
Precision : -
Reference Material/Calibration : Pure chlorophyll a (Sigma chemical Co.)

Carbon uptake rate (Simulated in-situ incubation method)

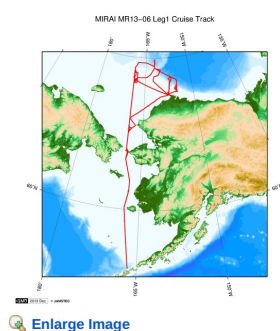
Instruments : ANCA-SL SYSTEM (SerCon Ltd. (IEPDZ Europa Ltd.))
Methods : Stable 13C isotope method [Hama et al., 1983]
Precision : -
Reference Material/Calibration : -

About this data

This data includes the data of MR13-06 Leg1 and MR13-06 Leg2.

There are some description error for nutrient data of this cruise.
Please refer to the errata of the cruise report.

Related Information



MR13-06 Leg1

Ship Name: MIRAI
Period: 2013-08-28 - 2013-10-07
Chief Scientist: Shigeto Nishino (JAMSTEC)
Project Name: [Arctic Ocean Climate System Reaserch]
Proposal ▶ Study on environmental changes in the sea-ice reduction regions of the Arctic Ocean
Title:

Update History	
2018-01-25	An observation data was registerd.
2017-07-29	An observation data was registerd.
2016-09-15	An observation data was registerd.
2016-04-30	An observation data was registerd.
2016-01-04	An observation data was registerd.

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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

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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 MR13-06 Leg1 Bottle Sampling Water Chemical Analysis

Last Modified: 2018-01-25

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 Cruise ID: [MR13-06 Leg1](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

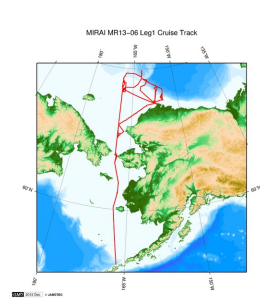
 Data Policy: [JAMSTEC](#)

Data Format

Column No.	Column Heading Mnemonic	Units Mnemonic	Comments
1	EXPCODE	-	Exploration code
2	STNNBR	-	Station number
3	CASTNO	-	Cast number
4	SAMPNO	-	Sample number
5	BTLNBR	-	Bottle number
6	BTLNBR_FLAG_W	-	Bottle quality flags
7	DATE	UTC	Date [MM/DD/YYYY]
8	TIME	UTC	Time [HH:MM]
9	LATITUDE	DEG	Latitude [N]
10	LONGITUDE	DEG	Longitude [E]
11	DEPTH	M	Bottom depth
12	CTDPRS	DBAR	CTD-pressure
13	CTDPRS_FLAG_W	-	Quality flags for CTD data
14	CTDDPT	M	CTD-depth
15	CTDDPT_FLAG_W	-	Quality flags for CTD data
16	CTDTMP	ITS-90	CTD-temperature (primary sensor)
17	CTDTMP_FLAG_W	-	Quality flags for CTD data
18	CTDTMP_1	ITS-90	CTD-temperature (secondary sensor)
19	CTDTMP_1_FLAG_W	-	Quality flags for CTD data
20	CTDSAL	PSS-78	CTD-salinity (primary sensor)
21	CTDSAL_FLAG_W	-	Quality flags for CTD data
22	CTDSAL_1	PSS-78	CTD-salinity (secondary sensor)
23	CTDSAL_1_FLAG_W	-	Quality flags for CTD data
24	CTDCND	S/m	CTD-conductivity (primary sensor)
25	CTDCND_FLAG_W	-	Quality flags for CTD data
26	CTDCND_1	S/m	CTD-conductivity (secondary sensor)
27	CTDCND_1_FLAG_W	-	Quality flags for CTD data
28	CTDOXY	UMOL/KG	CTD-oxygen (primary sensor of RINKO)
29	CTDOXY_FLAG_W	-	Quality flags for CTD data
30	CTDOXY_s	UMOL/KG	CTD-oxygen (primary sensor of RINKO using secondary T and S)
31	CTDOXY_s_FLAG_W	-	Quality flags for CTD data
32	CTDOXY_1	UMOL/KG	CTD-oxygen (secondary sensor of RINKO)
33	CTDOXY_1_FLAG_W	-	Quality flags for CTD data
34	CTDOXY_1_s	UMOL/KG	CTD-oxygen (secondary sensor of RINKO using secondary T and S)
35	CTDOXY_1_s_FLAG_W	-	Quality flags for CTD data
36	CTDOXY_2	UMOL/KG	CTD-oxygen (primary sensor of SBE43)
37	CTDOXY_2_FLAG_W	-	Quality flags for CTD data
38	CTDOXY_3	UMOL/KG	CTD-oxygen (secondary sensor of SBE43)
39	CTDOXY_3_FLAG_W	-	Quality flags for CTD data
40	CTDOXV	V	CTD-oxygen voltage (primary sensor of RINKO)
41	CTDOXV_FLAG_W	-	Quality flags for CTD data
42	CTDOXV_1	V	CTD-oxygen voltage (secondary sensor of RINKO)
43	CTDOXV_1_FLAG_W	-	Quality flags for CTD data
44	CTDOXV_2	V	CTD-oxygen voltage (primary sensor of SBE43)
45	CTDOXV_2_FLAG_W	-	Quality flags for CTD data
46	CTDOXV_3	V	CTD-oxygen voltage (secondary sensor of SBE43)
47	CTDOXV_3_FLAG_W	-	Quality flags for CTD data
48	THETA	DEG C	CTD-theta (primary sensor)
49	THETA_FLAG_W	-	Quality flags for CTD data
50	THETA_1	DEG C	CTD-theta (secondary sensor)
51	THETA_1_FLAG_W	-	Quality flags for CTD data
52	SIG0	KG/CUM	CTD-sigma 0 (primary sensor)
53	SIG0_FLAG_W	-	Quality flags for CTD data
54	SIG0_1	KG/CUM	CTD-sigma 0 (secondary sensor)
55	SIG0_1_FLAG_W	-	Quality flags for CTD data
56	XMISS	%TRANSE	CTD-transmission
57	XMISS_FLAG_W	-	Quality flags for CTD data
58	XMISSCP	1/M	Beam attenuation coefficient
59	XMISSCP_FLAG_W	-	Quality flags for CTD data
60	XMISSV	V	CTD-transmission voltage
61	XMISSV_FLAG_W	-	Quality flags for CTD data
62	FLUOR	UG/L	CTD-fluorescence
63	FLUOR_FLAG_W	-	Quality flags for CTD data
64	PAR	UMOL PHOTONS/M^2/S	CTD-PAR
65	PAR_FLAG_W	-	Quality flags for CTD data
66	SBE35	ITS-90	CTD-SBE35
67	SBE35_FLAG_W	-	Quality flags for CTD data
68	SALNTY	PSS-78	Bottle salinity

Column No.	Column Heading/Mnemonic	Units Mnemonic	Comments
70	SALNTY_1	PSS-78	Bottle salinity (replicate)
71	SALNTY_1_FLAG_W	-	Quality flags for water samples
72	OXYGEN	UMOL/KG	Bottle oxygen
73	OXYGEN_FLAG_W	-	Quality flags for water samples
74	OXYGEN_1	UMOL/KG	Bottle oxygen (replicate)
75	OXYGEN_1_FLAG_W	-	Quality flags for water samples
76	TCARBN	UMOL/KG	Total inorganic carbon
77	TCARBN_FLAG_W	-	Quality flags for water samples
78	TCARBN_1	UMOL/KG	Total inorganic carbon (replicate)
79	TCARBN_1_FLAG_W	-	Quality flags for water samples
80	ALKALI	UMOL/KG	Total alkalinity
81	ALKALI_FLAG_W	-	Quality flags for water samples
82	ALKALI_1	UMOL/KG	Total alkalinity (replicate)
83	ALKALI_1_FLAG_W	-	Quality flags for water samples
84	NITRAT1	UMOL/KG	Nitrate
85	NITRAT1_FLAG_W	-	Quality flags for water samples
86	NITRIT1	UMOL/KG	Nitrite
87	NITRIT1_FLAG_W	-	Quality flags for water samples
88	SILCAT1	UMOL/KG	Silicate
89	SILCAT1_FLAG_W	-	Quality flags for water samples
90	PHSPHT1	UMOL/KG	Phosphate
91	PHSPHT1_FLAG_W	-	Quality flags for water samples
92	AMMONIA1	UMOL/KG	Ammonium
93	AMMONIA1_FLAG_W	-	Quality flags for water samples
94	NITRAT2	UMOL/KG	Nitrate (replicate)
95	NITRAT2_FLAG_W	-	Quality flags for water samples
96	NITRIT2	UMOL/KG	Nitrite (replicate)
97	NITRIT2_FLAG_W	-	Quality flags for water samples
98	SILCAT2	UMOL/KG	Silicate (replicate)
99	SILCAT2_FLAG_W	-	Quality flags for water samples
100	PHSPHT2	UMOL/KG	Phosphate (replicate)
101	PHSPHT2_FLAG_W	-	Quality flags for water samples
102	AMMONIA2	UMOL/KG	Ammonium (replicate)
103	AMMONIA2_FLAG_W	-	Quality flags for water samples
104	NITRAT_AVE	UMOL/KG	Nitrate (average)
105	NITRAT_AVE_FLAG_W	-	Quality flags for water samples
106	NITRIT_AVE	UMOL/KG	Nitrite (average)
107	NITRIT_AVE_FLAG_W	-	Quality flags for water samples
108	SILCAT_AVE	UMOL/KG	Silicate (average)
109	SILCAT_AVE_FLAG_W	-	Quality flags for water samples
110	PHSPHT_AVE	UMOL/KG	Phosphate (average)
111	PHSPHT_AVE_FLAG_W	-	Quality flags for water samples
112	AMMONIA_AVE	UMOL/KG	Ammonium (average)
113	AMMONIA_AVE_FLAG_W	-	Quality flags for water samples
114	NRAUNC	UMOL/KG	Nitrate (uncertainty)
115	NRIUNC	UMOL/KG	Nitrite (uncertainty)
116	SILUNC	UMOL/KG	Silicate (uncertainty)
117	PHPUNC	UMOL/KG	Phosphate (uncertainty)
118	AMOUNC	UMOL/KG	Ammonium (uncertainty)
119	CHLWEL	UG/L	Total Chlorophyll quantity
120	CHLWEL_FLAG_W	-	Quality flags for water samples
121	CHLWEL_1	UG/L	Total Chlorophyll quantity (replicate)
122	CHLWEL_1_FLAG_W	-	Quality flags for water samples
123	SIZECHL>20µm	UG/L	20µm< Chlorophyllquantity
124	SIZECHL>20µm_FLAG_W	-	Quality flags for water samples
125	SIZECHL10-20µm	UG/L	10 to 20µm Chlorophyllquantity
126	SIZECHL10-20µm_FLAG_W	-	Quality flags for water samples
127	SIZECHL2-10µm	UG/L	2 to 10µm Chlorophyllquantity
128	SIZECHL2-10µm_FLAG_W	-	Quality flags for water samples
129	SIZECHL<2µm	UG/L	2µm> Chlorophyllquantity
130	SIZECHL<2µm_FLAG_W	-	Quality flags for water samples
131	d-POC_C1	mgC/m3/day	Carbon uptake rate
132	d-POC_C1_FLAG_W	-	Quality flags for water samples
133	d-POC_C2	mgC/m3/day	Carbon uptake rate (average)
134	d-POC_C2_FLAG_W	-	Quality flags for water samples

Related Information



[Enlarge Image](#)

MR13-06 Leg1

Ship Name: MIRAI
 Period: 2013-08-28 - 2013-10-07
 Chief Scientist: Shigeto Nishino (JAMSTEC)
 Project Name: [Arctic Ocean Climate System Reaserch]
 Proposal ▶ Study on environmental changes in the sea-ice reduction regions of the Arctic Ocean
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[YOKOSUKA DEEP TOW](#)
[6K Camera DEEP TOW](#)
[6K Sonar DEEP TOW](#)
[KM-ROV](#)
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国立研究開発法人
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JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

MIRAI MR13-06 Leg1 Bottle Sampling Water Chemical Analysis

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Cruise ID: [MR13-06 Leg1](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

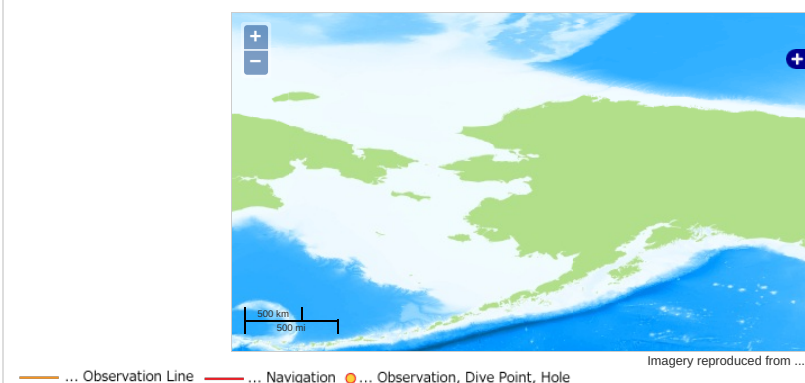
Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Transmittance, Fluorescence, PAR, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, Total inorganic carbon, Alkalinity, Chlorophyll, POC, Potential temperature, Density

Science Keywords:

OCEANS	> OCEAN CHEMISTRY	> AMMONIA
OCEANS	> OCEAN CHEMISTRY	> INORGANIC CARBON
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
BIOSPHERE	> AQUATIC ECOSYSTEMS	> PLANKTON
OCEANS	> OCEAN OPTICS	> PHOTOSYNTHETICALLY ACTIVE RADIATION
BIOSPHERE	> ECOLOGICAL DYNAMICS	> ECOSYSTEM FUNCTIONS
OCEANS	> OCEAN CHEMISTRY	> ALKALINITY
BIOSPHERE	> ECOLOGICAL DYNAMICS	> ECOSYSTEM FUNCTIONS
OCEANS	> OCEAN CHEMISTRY	> CARBON
OCEANS	> OCEAN OPTICS	> FLUORESCENCE
OCEANS	> OCEAN TEMPERATURE	> POTENTIAL TEMPERATURE

Observation Map



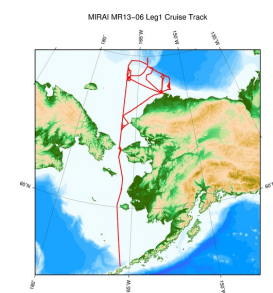
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Period: 2013-08-28 - 2013-10-07

Chief Scientist: Shigeto Nishino (JAMSTEC)

Project Name: [Arctic Ocean Climate System Research]

Proposal ▶ Study on environmental changes in the sea-ice reduction regions of the Arctic Ocean

Title:

Update History

2018-01-25	An observation data was registered.
2017-07-29	An observation data was registered.
2016-09-15	An observation data was registered.
2016-04-30	An observation data was registered.
2016-01-04	An observation data was registered.

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SHINKAI 6500
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HYPER-DOLPHIN
URASHIMA
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POWER GRAB SAMPLER (SHELL)
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