

## MIRAI MR99-K05 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

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

Cruise ID: [MR99-K05 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (DMO/PI)

Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, Total inorganic carbon, Alkalinity, Carbon14,

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 > 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 TEMPERATURE > POTENTIAL TEMPERATURE

### For Using Data

#### Principal Investigator

[ Arctic Ocean ]

CTDTMP : Takashi Kikuchi (JAMSTEC)

CTDSAL : Takashi Kikuchi (JAMSTEC)

SILCAT : Hirofumi Okano (JAMSTEC)

NITRAT : Hirofumi Okano (JAMSTEC)

NITRIT : Hirofumi Okano (JAMSTEC)

PHSPHT : Hirofumi Okano (JAMSTEC)

NH4 : Hirofumi Okano (JAMSTEC)

TCARBN : Akihiko Murata (JAMSTEC)

ALKALI : Akihiko Murata (JAMSTEC)

[ WOCE P01H ]

CTDTMP : Masao Fukasawa (JAMSTEC)

CTDSAL : Masao Fukasawa (JAMSTEC)

SALNTY : Hiroyuki Yoritaka (Hydrographic Department Japan Maritime Safety Agency)

CTDOXY : Masao Fukasawa (JAMSTEC)

OXYGEN : Masao Fukasawa (JAMSTEC)

SILCAT : Chizuru Saitoh (JAMSTEC)

NITRAT : Chizuru Saitoh (JAMSTEC)

NITRIT : Chizuru Saitoh (JAMSTEC)

PHSPHT : Chizuru Saitoh (JAMSTEC)

TCARBN : Tsuneo Ono (NRIFS)

ALKALI : Tsuneo Ono (NRIFS)

DELC14 : Robert Key (Princeton University) / Masao Fukasawa (JAMSTEC)

#### 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:

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



Instrument:

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



Instrument:

Titration for total alkalinity ( - MR14-02)





## Overview

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

## 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.

## Information on Chemical and Biological data

[ Arctic Ocean ]

### 1. Silicate

- (1) Instruments: TRAACS800 (Bran+Luebbe)
- (2) Methods : Molybdenum blue method
- (3) Precision : see "Cruise Report"
- (4) Reference Material/Calibration: SiO<sub>2</sub> standard solution (J.T. Baker Chemical Co. LTD)/compared standard to CSK standard solution

### 2. Nitrate

- (1) Instruments: TRAACS800 (Bran+Luebbe)
- (2) Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)
- (3) Precision : see "Cruise Report"
- (4) Reference Material/Calibration: KNO<sub>3</sub> solution/compared standard to CSK standard solution

### 3. Nitrite

- (1) Instruments: TRAACS800 (Bran+Luebbe)
- (2) Methods : Diazotization method
- (3) Precision : see "Cruise Report"
- (4) Reference Material/Calibration: NaNO<sub>2</sub> solution/compared standard to CSK standard solution

### 4. Phosphate

- (1) Instruments: TRAACS800 (Bran+Luebbe)
- (2) Methods : Molybdenum blue method
- (3) Precision : see "Cruise Report"
- (4) Reference Material/Calibration: KH<sub>2</sub>PO<sub>4</sub> solution/compared standard to CSK standard solution

### 5. Ammonia

- (1) Instruments: TRAACS800 (Bran+Luebbe)
- (2) Methods : Indophenol method
- (3) Precision : see "Cruise Report"
- (4) Reference Material/Calibration: (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> solution/compared standard to CSK standard solution

### 6. Total inorganic carbon

- (1) Instruments: the automated TCO<sub>2</sub> analyzer (Nippon ANS Inc.) equipped with carbon coulometer 5012 (UIC Inc.)
- (2) Methods : coulometry
- (3) Precision :-
- (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

### 7. Total Alkalinity

- (1) Instruments: auto-burette (Radiometer, ABU901), a pH glass electrode (Radiometer, pHG201), a reference electrode (Radiometer, REF201),
- (2) Methods : Modified Gran titration/Open-cell/potentiometry
- (3) Precision : 0.15% on average (repeatability)
- (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

[ WOCE P01H ]

### 1. Dissolved Oxygen

- (1) Instruments : Titrator: Model 716 DMS Titrino (Metrohm)  
Detector: Pt electrode
- (2) Methods : Winkler method/potentiometric method
- (3) Precision : 0.009mL/L
- (4) Reference Material/Calibration : 0.0100N KIO<sub>3</sub> solution

### 2. Salinity

- (1) Instruments : Autosal salinometer model 8400B (Guildline Instruments Ltd.)
- (2) Methods : -
- (3) Precision : 0.0013 PSU
- (4) Reference Material/Calibration: IAPSO Standard Sea Water batch P135 (Ocean Scientific International Ltd.)

### 3. Silicate

- (1) Instruments : TRAACS800 (Bran+Luebbe)

(2) Methods : TRAACS800 (Bran+Luebbe)

(2) Methods : Molybdenum blue method

(3) Precision : -

(4) Reference Material/Calibration: SiO<sub>2</sub> standard solution (J.T.Baker Chemical Co. LTD)

#### 4. Nitrate

(1) Instruments : TRAACS800 (Bran+Luebbe)

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

(3) Precision : -

(4) Reference Material/Calibration: KNO<sub>3</sub> solution

#### 5. Nitrite

(1) Instruments : TRAACS800 (Bran+Luebbe)

(2) Methods : Diazotization method

(3) Precision : -

(4) Reference Material/Calibration: NaNO<sub>2</sub> solution

#### 6. Phosphate

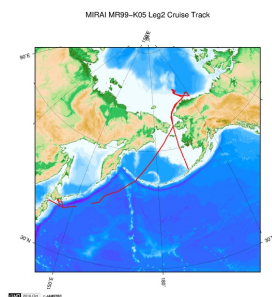
(1) Instruments : TRAACS800 (Bran+Luebbe)

(2) Methods : Molybdenum blue method

(3) Precision : -

(4) Reference Material/Calibration: KH<sub>2</sub>PO<sub>4</sub> solution

### Related Information



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#### MR99-K05 Leg2

Ship Name: MIRAI

Period: 1999-09-11 - 1999-10-05

Chief Scientist: Takatoshi Takizawa (JAMSTEC)

Project Name: [Arctic Ocean Climate System Reaserch]

### Update History

2017-07-28	An observation data was registerd.
2017-04-11	An observation data was registerd.
2016-10-17	An observation data was registerd.

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[KM-ROV](#)

[POWER GRAB SAMPLER \(SHELL\)](#)

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海洋研究開発機構  
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## MIRAI MR99-K05 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

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[Quality Information](#)

Cruise ID: [MR99-K05 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (DMO/PI)

Data Policy: [JAMSTEC](#)

### Exchange Format : Arctic Ocean

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	FORTTRAN 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	CTDDPT	M	F9.1		Depth
14	CTDDPT_FLAG_W		I1		Quality flag for CTD data
15	CTDPRS	DBAR	F9.1		Pressure
16	CTDPRS_FLAG_W		I1		Quality flag for CTD data
17	CTDTMP	ITS-90	F9.3		Temperature
18	CTDTMP_FLAG_W		I1		Quality flag for CTD data
19	CTDSAL	PSS-78	F9.3		CTD Salinity sensor
20	CTDSAL_FLAG_W		I1		Quality flag for CTD data
21	SILCAT	UMOL/KG	F9.2		Silicate
22	SILCAT_FLAG_W		I1		Quality flags for water samples
23	NITRAT	UMOL/KG	F9.2		Nitrate
24	NITRAT_FLAG_W		I1		Quality flags for water samples
25	NITRIT	UMOL/KG	F9.2		Nitrite
26	NITRIT_FLAG_W		I1		Quality flags for water samples
27	PHSPHT	UMOL/KG	F9.2		Phosphate
28	PHSPHT_FLAG_W		I1		Quality flags for water samples
29	NH4	UMOL/KG	F9.2		Ammonium
30	NH4_FLAG_W		I1		Quality flags for water samples
31	TCARBON	UMOL/KG	F9.1		Total carbon
32	TCARBON_FLAG_W		I1		Quality flags for water samples
33	ALKALI	UMOL/KG	F9.1		Total alkalinity
34	ALKALI_FLAG_W		I1		Quality flags for water samples
35	THETA	DEG C	F9.3		Potential temperature
36	SIG0	KG/CUM	F9.3		Density

### ODV Format : Arctic Ocean

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
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	CTDSAL[PSS-78]	CTD Salinity sensor
16	QF	Quality flag for CTD data
17	SILCAT[UMOL/KG]	Silicate
18	QF	Quality flags for water samples
19	NITRAT[UMOL/KG]	Nitrate
20	QF	Quality flags for water samples
21	NITRIT[UMOL/KG]	Nitrite
22	QF	Quality flags for water samples
23	PHSPHT[UMOL/KG]	Phosphate

Column No.	Column Heading	Comments
24	QF	Quality flags for water samples
25	NH4[UMOL/KG]	Ammonium
26	QF	Quality flags for water samples
27	TCARBN[UMOL/KG]	Total carbon
28	QF	Quality flags for water samples
29	ALKALI[UMOL/KG]	Total alkalinity
30	QF	Quality flags for water samples
31	THETA[DEG C]	Potential temperature
32	QF	Quality flag for CTD data
33	SIG0[KG/CUM]	Density
34	QF	Quality flag for CTD data
35	SAMPNO	Sample number
36	QF	Bottle quality flag

#### Exchange Format : WOCE P01H

Provided in the Exchange Format of CCHDO (CLIVAR and Carbon Hydrographic Data Office).

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

Format Information

Column No.	Column Heading	Mnemonic	Units	Mnemonic	Reporting Precision	FORTTRAN Format	Comments
1	EXPOCODE				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	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	SILCAT		UMOL/KG		F9.2		Silicate
26	SILCAT_FLAG_W				I1		Quality flags for water samples
27	NITRAT		UMOL/KG		F9.2		Nitrate
28	NITRAT_FLAG_W				I1		Quality flags for water samples
29	NITRIT		UMOL/KG		F9.2		Nitrite
30	NITRIT_FLAG_W				I1		Quality flags for water samples
31	PHSPHT		UMOL/KG		F9.2		Phosphate
32	PHSPHT_FLAG_W				I1		Quality flags for water samples
33	TCARBN		UMOL/KG		F9.1		Total carbon
34	TCARBN_FLAG_W				I1		Quality flags for water samples
35	ALKALI		UMOL/KG		F9.1		Total alkalinity
36	ALKALI_FLAG_W				I1		Quality flags for water samples
37	DELC14		/MILLE		F9.1		14Carbon
38	DELC14_FLAG_W				I1		Quality flags for water samples
39	C14ERR		/MILLE		F9.1		Expected error
40	THETA		DEG C		F9.4		Potential temperature
41	SIG0		KG/CUM		F9.4		Density

#### ODV Format : WOCE P01H

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

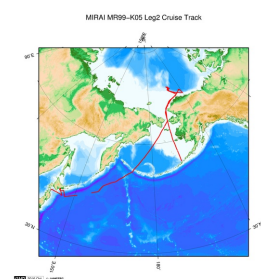
[Ocean Data View \(ODV\)](#)

Format Information

Column No.	Column Heading	Comments
1	Cruise	Cruise Label
2	Station	Station number_Cast number
3	Type	Station type
4	mon/day/lyr	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[IITS-90]	Temperature
14	QF	Quality flag for CTD data
15	CTDSAL[PSS-78]	CTD Salinity sensor
16	QF	Quality flag for CTD data

Column No.	Column Heading	Comments
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	SILCAT[UMOL/KG]	Silicate
24	QF	Quality flags for water samples
25	NITRAT[UMOL/KG]	Nitrate
26	QF	Quality flags for water samples
27	NITRIT[UMOL/KG]	Nitrite
28	QF	Quality flags for water samples
29	PHSPHT[UMOL/KG]	Phosphate
30	QF	Quality flags for water samples
31	TCARBN[UMOL/KG]	Total carbon
32	QF	Quality flags for water samples
33	ALKALI[UMOL/KG]	Total alkalinity
34	QF	Quality flags for water samples
35	DELC14[MILLE]	14Carbon
36	QF	Quality flags for water samples
37	C14ERR	Expected error
38	QF	Quality flags for water samples
39	THETA[DEG C]	Potential temperature
40	QF	Quality flag for CTD data
41	SIG0[KG/CUM]	Density
42	QF	Quality flag for CTD data
43	SAMPNO	Sample number
44	QF	Bottle quality flag

#### Related Information



[Enlarge Image](#)

#### MR99-K05 Leg2

Ship Name: MIRAI

Period: 1999-09-11 - 1999-10-05

Chief Scientist: Takatoshi Takizawa (JAMSTEC)

Project Name: [Arctic Ocean Climate System Reaserch]

#### Update History

2017-07-28	An observation data was registerd.
2017-04-11	An observation data was registerd.
2016-10-17	An observation data was registerd.

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KAIMEI  
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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  
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BMS

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Dive ID:

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JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

国立研究開発法人  
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## MIRAI MR99-K05 Leg2 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

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Cruise ID: [MR99-K05 Leg2](#)

Bottle Sampling Water Chemical Analysis: Processed (DMO/PI)

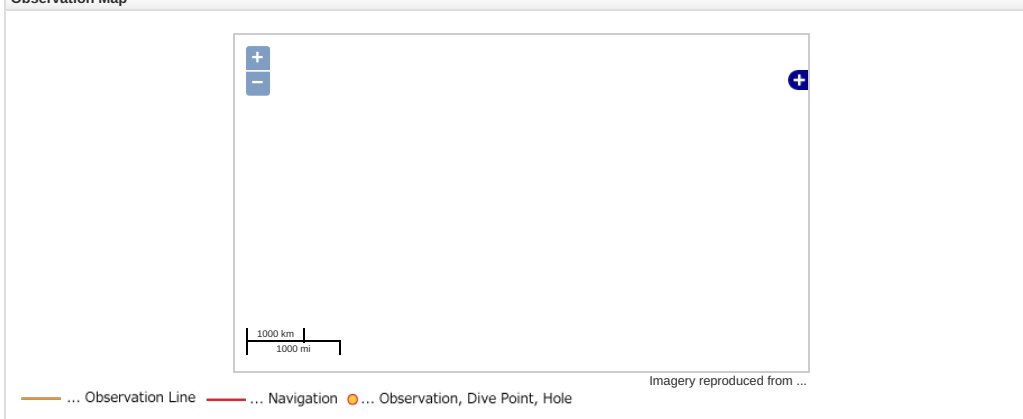
Data Policy: [JAMSTEC](#)

**Observation Items:** Temperature, Salinity, Dissolved oxygen, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, Total inorganic carbon, Alkalinity, Carbon14, 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 > 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 TEMPERATURE > POTENTIAL TEMPERATURE

### Observation Map



### Data List

☐ File names

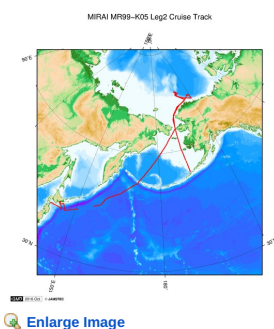
☐ MR99K0502\_ex\_bot.csv

☐ MR99K0502\_odv\_bot.txt

☐ MR99K0502arctic\_ex\_bot.csv

☐ MR99K0502arctic\_odv\_bot.txt

### Related Information



#### MR99-K05 Leg2

Ship Name: MIRAI

Period: 1999-09-11 - 1999-10-05

Chief Scientist: Takatoshi Takizawa (JAMSTEC)

Project Name: [Arctic Ocean Climate System Research]

### Update History

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