

## MIRAI MR09-03 Leg2 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

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

Cruise ID: [MR09-03 Leg2](#)

Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed

Data Policy: [JAMSTEC](#)

Observation Items: Depth, Temperature, Salinity

Science Keywords:

OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE

OCEANS > SALINITY/DENSITY > SALINITY

Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR09-03\\_leg1-3\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR09-03_leg1-3_all.pdf)

### For Using Data

#### Principal Investigator

Data Management Office

#### Use Constraints

See [Terms and Conditions](#) about constrain of use.

#### Data Citation

See [Terms and Conditions](#) about data citation.

### Instrument

Instrument:

Expendable conductivity temperature

depth measurements (XCTD) ( -

MR11-E02)



### Overview

Using XCTD (eXpendable Conductivity Temperature Depth profiler) system, the vertical distribution of water temperature and salinity are observed during free fall of its probe part in the seawater. Observed temperature and conductivity are transmitted to the data processor on board by the digital signal. The digital signal is converted to the temperature, conductivity and depth by data processor as binary data. Binary data is transmitted from data processor to PC. The PC calculates salinity from temperature, conductivity and depth, and those properties are recorded in PC as the ASCII files.

### System

#### (1) Launcher

Hand launcher

Manufacturer : Sippican, Inc.

Operation area : Rear upper deck

Automatic launcher

Manufacturer : Tsurumi Seiki Co., LTD.

Location : Port side of rear upper deck (4m from the sea level). The control panel is installed in the investigation room.

#### (2) Converter

Manufacturer : Tsurumi Seiki Co., LTD.

Location : Investigation room

Sampling rate : 40 msec

#### (3) XCTD probe specifications

Probe Type	TSK XCTD-1	TSK XCTD-2	TSK XCTD-3	TSK XCTD-4
Temperature range [deg-C]	-2 to 35			
Temperature accuracy [deg-C]	+/- 0.02			
Temperature resolution [deg-C]	0.01			
Conductivity range [mS/cm]	0 to 60			
Conductivity accuracy [mS/cm]	+/- 0.03			
Conductivity resolution [mS/cm]	0.015			
Measurement depth [m]	1000	1850	1000	1850
Depth accuracy [m]	5 or +/- 2% of depth; whichever is larger			
Maximum elapsed time [sec]	300	600	200	502
Rated ship speed [knot]	12	3.5	20	6

Since XCTD carries no pressure sensor, we need to estimate depth from the elapsed time. The fall-rate equation is as follows.

$$Z = at + 10E^{-3} * bt^2$$

Where Z(m) is the depth and t(sec) is the elapsed time.

In addition, coefficients of the fall-rate equation are different by probe types.

Probe Type	TSK XCTD-1	TSK XCTD-2	TSK XCTD-3	TSK XCTD-4
Coefficient-a	3.42543	3.43898	5.07598	3.68081
Coefficient-b	-0.47	-0.31	-0.72	-0.47

\* Coefficients listed above are supplied by Sippican, Inc., in USA.

The list of an XCTD type used in each cast is as follows.

Cast name	Probe Serial No.	Probe Type	Launcher	Converter
200909121631	08069536	XCTD-1	Auto	MK-130
200909150309	08069546	XCTD-1	Auto	MK-130
200909150357	08069544	XCTD-1	Auto	MK-130
200909150449	08069535	XCTD-1	Auto	MK-130
200909150547	08069620	XCTD-1	Auto	MK-130
200909150636	08069545	XCTD-1	Auto	MK-130
200909150726	08069622	XCTD-1	Auto	MK-130
200909160407	08069541	XCTD-1	Auto	MK-130
200909161441	08069621	XCTD-1	Auto	MK-130
200909170040	08069542	XCTD-1	Auto	MK-130
200909180738	09022814	XCTD-2	Auto	MK-130
200909181227	09012812	XCTD-2	Auto	MK-130
200909181348	09012813	XCTD-2	Auto	MK-130
200909182258	09022822	XCTD-2	Auto	MK-130
200909190012	09022819	XCTD-2	Auto	MK-130
200909190113	09022820	XCTD-2	Auto	MK-130
200909190556	09022818	XCTD-2	Auto	MK-130
200909190653	09022815	XCTD-2	Auto	MK-130
200909190749	09022823	XCTD-2	Auto	MK-130
200909191208	09022821	XCTD-2	Auto	MK-130
200909191258	09022817	XCTD-2	Auto	MK-130
200909191348	09022816	XCTD-2	Auto	MK-130
200909192159	09022845	XCTD-2	Auto	MK-130
200909192250	09022847	XCTD-2	Auto	MK-130
200909192343	09022846	XCTD-2	Auto	MK-130
200909200449	09022843	XCTD-2	Auto	MK-130
200909200554	09022842	XCTD-2	Auto	MK-130
200909200653	09022844	XCTD-2	Auto	MK-130
200909200751	09022840	XCTD-2	Auto	MK-130
200909201437	09022841	XCTD-2	Auto	MK-130
200909201610	09022839	XCTD-2	Hand	MK-130
200909201732	09022836	XCTD-2	Hand	MK-130
200909211059	08069543	XCTD-1	Auto	MK-130
200909211159	08069539	XCTD-1	Auto	MK-130
200909220059	08069537	XCTD-1	Auto	MK-130
200909220403	08069540	XCTD-1	Auto	MK-130
200909221227	09064410	XCTD-1	Auto	MK-130
200909221525	09064413	XCTD-1	Auto	MK-130
200909222149	09064411	XCTD-1	Auto	MK-130
200909222224	09064414	XCTD-1	Auto	MK-130
200909222301	09064404	XCTD-1	Auto	MK-130
200909222338	09064407	XCTD-1	Auto	MK-130
200909231100	09064415	XCTD-1	Auto	MK-130
200909231235	09064412	XCTD-1	Auto	MK-130
200909231319	09064408	XCTD-1	Auto	MK-130
200909231427	09064406	XCTD-1	Auto	MK-130
200909231536	09064405	XCTD-1	Auto	MK-130
200909232104	09064438	XCTD-1	Auto	MK-130
200909232213	09064409	XCTD-1	Auto	MK-130
200909240217	09064437	XCTD-1	Auto	MK-130
200909241114	09064439	XCTD-1	Auto	MK-130
200909241950	09064436	XCTD-1	Auto	MK-130
200909242024	09064428	XCTD-1	Auto	MK-130
200909242107	09064429	XCTD-1	Auto	MK-130
200909242222	09064435	XCTD-1	Auto	MK-130
200909242337	09064433	XCTD-1	Auto	MK-130
200909250051	09064431	XCTD-1	Auto	MK-130
200909250215	09064434	XCTD-1	Auto	MK-130
200909250322	09064432	XCTD-1	Auto	MK-130
200909251234	09064440	XCTD-1	Auto	MK-130
200909251607	09064441	XCTD-1	Auto	MK-130
200909251646	09064442	XCTD-1	Auto	MK-130
200909251739	09064430	XCTD-1	Auto	MK-130
200909251804	09022826	XCTD-2	Auto	MK-130
200909251857	09022837	XCTD-2	Auto	MK-130
200909251959	09022832	XCTD-2	Auto	MK-130
200909252055	09022820	XCTD-2	Auto	MK-130

Cast name	Probe Serial No.	Probe Type	Auto Launcher	MR-130 Converter
200909252152	09022838	XCTD-2	Auto	MK-130
200909260317	09022825	XCTD-2	Auto	MK-130
200909260412	09022831	XCTD-2	Auto	MK-130
200909260510	09022827	XCTD-2	Auto	MK-130
200909261001	09022824	XCTD-2	Auto	MK-130
200909261055	09022828	XCTD-2	Auto	MK-130
200909261152	09022835	XCTD-2	Auto	MK-130
200909262121	09022830	XCTD-2	Auto	MK-130
200909262215	09022834	XCTD-2	Auto	MK-130
200909262311	09022833	XCTD-2	Auto	MK-130
200909270349	09064446	XCTD-1	Auto	MK-130
200909270431	09064445	XCTD-1	Auto	MK-130
200909271652	09064448	XCTD-1	Auto	MK-130
200909272050	09064450	XCTD-1	Auto	MK-130
200909280055	09064451	XCTD-1	Auto	MK-130
200909280204	09064444	XCTD-1	Auto	MK-130
200909280312	09064443	XCTD-1	Auto	MK-130
200909280419	09064447	XCTD-1	Auto	MK-130
200909280529	09064550	XCTD-1	Auto	MK-130
200909280641	09064553	XCTD-1	Auto	MK-130
200909280751	09064449	XCTD-1	Auto	MK-130
200909280936	09064552	XCTD-1	Auto	MK-130
200909281129	09064549	XCTD-1	Auto	MK-130
200910070828	09064551	XCTD-1	Auto	MK-130
200910080222	09064548	XCTD-1	Auto	MK-130
200910082340	09064557	XCTD-1	Auto	MK-130
200910082344	09064559	XCTD-1	Auto	MK-130
200910090235	09064556	XCTD-1	Auto	MK-130
200910090533	09064558	XCTD-1	Auto	MK-130
200910090829	09064555	XCTD-1	Auto	MK-130
200910091121	09064554	XCTD-1	Auto	MK-130
200910091724	09064545	XCTD-1	Auto	MK-130
200910100234	09064542	XCTD-1	Auto	MK-130
200910100520	09064547	XCTD-1	Auto	MK-130
200910100824	09064546	XCTD-1	Auto	MK-130

### Data processing

(1) For sensor's stability, values of less than 1 m for temperature and less than 3 m for salinity are replaced by missing values, respectively, based on manufacturer's recommendation.

(2) Quality control

QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure.

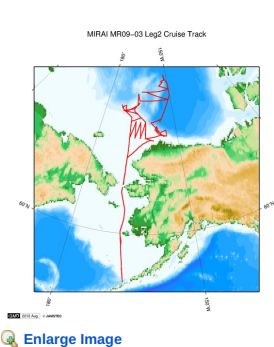
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

Please see the site of NODC of the following link for quality control procedure in detail.

[QUALITY CONTROL AND PROCESSING OF HISTORICAL OCEANOGRAPHIC TEMPERATURE, SALINITY, AND OXYGEN DATA](#)

In addition, an abnormal value is identified by a visual check, and the data after visual QC is released.

### Related Information



**MR09-03 Leg2**  
 Ship Name: MIRAI  
 Period: 2009-09-07 - 2009-10-15  
 Chief Scientist: Takashi Kikuchi (JAMSTEC)  
 Project Name: [Arctic Ocean Climate System Reaserch]  
 Proposal ▶ Multi-disciplinary observation cruise for the Arctic Ocean  
 Title:

[Enlarge Image](#)

### Update History

2019-08-31	An observation data was registerd.
2017-06-14	An observation data was registerd.
2014-08-06	An observation data was registerd.
2014-02-18	An observation data was registerd.
2012-09-28	An observation data was registerd.

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 Update History

Lists  
 Publication List  
 Amount of Public Info.  
 Data  
 Map Search  
 Data Tree  
 Detailed Search

Information of the Ships  
 NATSUSHIMA  
 KAIYO  
 YOKOSUKA  
 MIRAI  
 KAIREI  
 CHIKYU  
 KAIMEI

Information of the Submersibles  
 KAIKO  
 SHINKAI 2000  
 SHINKAI 6500  
 DEEP TOW  
 HYPER-DOLPHIN  
 URASHIMA

Go to a Cruise Information

Cruise ID:

Go to a Dive Information

Dive ID:

Feeds

SHINSEI MARU  
HAKUHO MARU

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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**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 MR09-03 Leg2 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

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

Cruise ID: [MR09-03 Leg2](#)

Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed

Data Policy: [JAMSTEC](#)

### XCTD DMO

#### Format Description for the Corrected Data

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](#)

Data in following cruise is not expressed with Exchange Format. Please see the site of each cruise for format.

MR02-K05 Leg1

MR04-05

#### Format Description for the QCed Data

Each data file contains one line header (meta data) followed by data lines for each cast.

The number of data lines are recorded in the header.

Header part

No.	Column	Content	Format	Remarks
1	1	Header ID	a1	fixed as '#'
2	3 - 6	Data ID	a4	XCTD
3	8 - 22	Cruise ID	a15	
4	33 - 40	Date	i8	YYYYMMDD (UTC)
5	42 - 45	Time	i4	hhmm (UTC)
6	47 - 55	Latitude	i2,a1,f5.2,a1	dd-mm.mmN(S)
7	57 - 66	Longitude	i3,a1,f5.2,a1	ddd-mm.mmE(W)
8	68 - 71	Number of data lines	i4	
9	72 - 73	Terminator	-	CR+LF

Data part

No.	Column	Content	Unit	Format	Remarks
1	1 - 11	Depth	m	f11.1	
2	12 - 22	Temperature	deg-C	f11.2	ITS-90
3	23 - 33	Salinity	PSU	f11.3	PSS-78
4	45 - 55	Flag	-	i11	1 - 7 : space 8 : flag of depth 9 : flag of temperature 10 : flag of salinity 11 : space * reference : <a href="#">Definition of Quality Control Flags</a>
5	56 - 57	Terminator	-	-	CR+LF

Each contents of the data part is stored in 11 bytes.

Missing value is presented by '-5', and error value is presented by '-9'.

#### Definition of Quality Control Flags

##### 1. Depth Flags

- 0 - accepted value
- 1 - error in recorded depth ( same or less than previous depth )
- 2 - density inversion

##### 2. Observed Level Flags

- N - missing value
- 0 - accepted value
- 1 - range outlier ( outside of broad range check )
- 2 - failed inversion check
- 3 - failed gradient check
- 4 - zero anomaly
- 5 - failed combined gradient and inversion checks
- 6 - failed range and inversion checks
- 7 - failed range and gradient checks
- 8 - failed range and zero anomaly checks
- 9 - failed range and combined gradient and inversion checks
- A - failed visual check

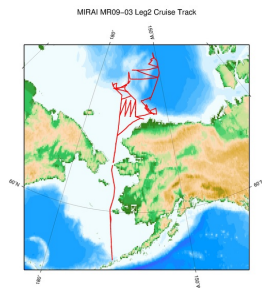
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

[QUALITY CONTROL AND PROCESSING OF HISTORICAL OCEANOGRAPHIC TEMPERATURE, SALINITY, AND OXYGEN DATA](#)

#### Sample Program

[ex\\_read2.f](#)

#### Related Information



[Enlarge Image](#)

#### MR09-03 Leg2

Ship Name: MIRAI

Period: 2009-09-07 - 2009-10-15

Chief Scientist: Takashi Kikuchi (JAMSTEC)

Project Name: [Arctic Ocean Climate System Reaserch]

Proposal ▶ Multi-disciplinary observation cruise for the Arctic Ocean

Title:

#### Update History

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#### Data

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[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

Cruise ID:

#### Go to a Dive Information

Dive ID:

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海洋研究開発機構  
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

## MIRAI MR09-03 Leg2 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

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

Cruise ID: [MR09-03 Leg2](#)

Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed

Data Policy: [JAMSTEC](#)

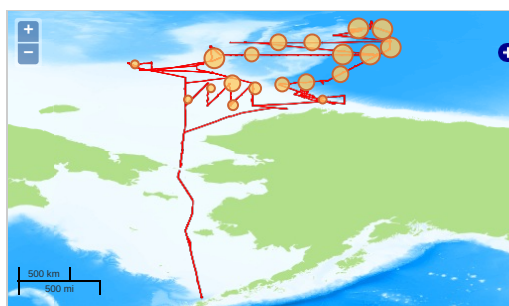
Observation Items: Depth, Temperature, Salinity

Science Keywords:

OCEANS > OCEAN > WATER  
TEMPERATURE  
OCEANS > SALINITY/DENSITY > SALINITY

### Observation Map

- Clicking the icon displays a balloon with observation information.
- Then click the observation name, figures will be displayed.



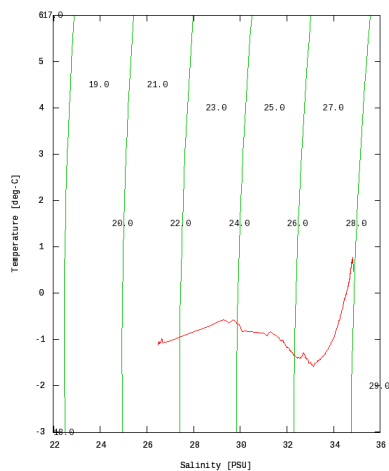
— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

### Figures

200909121631



MR09-03 Leg2: 200909121631  
Expendable Conductivity-Temperature-Depth Profiler (XCTD): Salinity




















































































Only values evaluated as "good" : all flags are 0" are plotted in profiles.  
Please see Format Page for the definition of quality flags.

### Data List

[Add to Basket](#)

#### File names

<input type="checkbox"/>	200909121631.dat
<input type="checkbox"/>	200909150309.dat
<input type="checkbox"/>	200909150357.dat
<input type="checkbox"/>	200909150449.dat
<input type="checkbox"/>	200909150547.dat
<input type="checkbox"/>	200909150636.dat
<input type="checkbox"/>	200909150726.dat
<input type="checkbox"/>	200909160407.dat
<input type="checkbox"/>	200909161441.dat
<input type="checkbox"/>	200909170040.dat
<input type="checkbox"/>	200909180738.dat
<input type="checkbox"/>	200909181227.dat
<input type="checkbox"/>	200909181348.dat
<input type="checkbox"/>	200909182258.dat

	200909190112.dat
	200909190113.dat
	200909190556.dat
	200909190653.dat
	200909190749.dat
	200909191208.dat
	200909191258.dat
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	200909242024.dat
	200909242107.dat
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	200909280529.dat
	200909280641.dat
	200909280751.dat
	200909280936.dat
	200909281129.dat
	200910070828.dat
	200910080222.dat
	200910082340.dat
	200910082344.dat
	200910090235.dat
	200910090533.dat



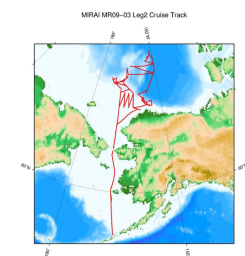
File names
200910090829.dat
200910091121.dat
200910091724.dat
200910100234.dat
200910100520.dat
200910100824.dat
ex_read2.f (Sample Program)

- Observation List  
The list of observation is shown as follows.

Observation	Time and Date	Lat. [°]	Lon. [°]
200909121631	2009-09-12 16:32	75.1245	-172.7251
200909150309	2009-09-15 03:10	75.6648	-165.6675
200909150357	2009-09-15 03:59	75.8268	-165.6313
200909150449	2009-09-15 04:50	75.9976	-165.6795
200909150547	2009-09-15 05:48	76.1663	-165.7203
200909150636	2009-09-15 06:37	76.3306	-165.7206
200909150726	2009-09-15 07:27	76.4970	-165.7185
200909160407	2009-09-16 04:08	75.9993	-164.7558
200909161441	2009-09-16 14:43	76.0006	-162.3533
200909170040	2009-09-17 00:42	76.0005	-161.0183
200909180738	2009-09-18 07:40	76.0003	-154.2588
200909181227	2009-09-18 12:28	75.9990	-152.6713
200909181348	2009-09-18 13:49	75.9996	-151.8381
200909182258	2009-09-18 22:59	76.1240	-150.7556
200909190012	2009-09-19 00:14	76.2481	-150.5000
200909190113	2009-09-19 01:14	76.3736	-150.2546
200909190556	2009-09-19 05:57	76.6233	-150.0048
200909190653	2009-09-19 06:54	76.7496	-149.9961
200909190749	2009-09-19 07:50	76.8746	-149.9998
200909191208	2009-09-19 12:09	77.1250	-150.0018
200909191258	2009-09-19 12:59	77.2500	-149.9968
200909191348	2009-09-19 13:49	77.3735	-150.0008
200909192159	2009-09-19 22:00	77.6248	-150.0130
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200909200751	2009-09-20 07:52	78.4995	-151.4981
200909201437	2009-09-20 14:38	78.6246	-151.5021
200909201610	2009-09-20 16:11	78.7491	-151.5393
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200909211059	2009-09-21 11:00	78.3333	-152.3611
200909211159	2009-09-21 12:00	78.3180	-152.8791
200909220059	2009-09-22 01:00	78.0446	-153.0728
200909220403	2009-09-22 04:04	77.9599	-153.5698
200909221227	2009-09-22 12:28	77.6841	-154.3343
200909221525	2009-09-22 15:26	77.6023	-153.5125
200909222149	2009-09-22 21:50	77.4980	-152.5198
200909222224	2009-09-22 22:25	77.4530	-152.0186
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200909222338	2009-09-22 23:39	77.3636	-151.0166
200909231100	2009-09-23 11:01	77.1568	-151.9871
200909231235	2009-09-23 12:36	77.1493	-152.9890
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200909240217	2009-09-24 02:18	77.0833	-159.9796
200909241114	2009-09-24 11:15	77.0856	-163.0815
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200909251739	2009-09-25 17:40	76.0520	-151.4758
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200909251857	2009-09-25 18:58	76.0003	-151.0058
200909251959	2009-09-25 20:00	75.8761	-151.2468
200909252055	2009-09-25 20:57	75.7513	-151.4968
200909252152	2009-09-25 21:53	75.6261	-151.7470
200909260317	2009-09-26 03:19	75.3764	-152.2495
200909260412	2009-09-26 04:13	75.2505	-152.4995
200909260510	2009-09-26 05:11	75.1251	-152.7913
200909261001	2009-09-26 10:02	74.8755	-153.2565

Observation	Time and Date	Lat. [°]	Lon. [°]
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200909261152	2009-09-26 11:53	74.6246	-153.7536
200909262121	2009-09-26 21:22	74.3773	-154.2381
200909262215	2009-09-26 22:16	74.2516	-154.4731
200909262311	2009-09-26 23:13	74.1268	-154.7324
200909270349	2009-09-27 03:50	73.8788	-155.2020
200909270431	2009-09-27 04:32	73.7520	-155.4178
200909271652	2009-09-27 16:53	73.5120	-155.9503
200909272050	2009-09-27 20:51	73.5410	-157.5001
200909280055	2009-09-28 00:57	73.3360	-159.6430
200909280204	2009-09-28 02:06	73.1695	-159.1480
200909280312	2009-09-28 03:14	73.0020	-158.6496
200909280419	2009-09-28 04:20	72.8351	-158.1825
200909280529	2009-09-28 05:30	72.6665	-157.7041
200909280641	2009-09-28 06:42	72.5018	-157.2290
200909280751	2009-09-28 07:53	72.3336	-156.7788
200909280936	2009-09-28 09:37	72.1670	-156.6125
200909281129	2009-09-28 11:30	72.0000	-156.0551
200910070828	2009-10-07 08:29	72.0013	-168.0103
200910080222	2009-10-08 02:23	73.0036	-165.9715
200910082340	2009-10-08 23:41	73.4416	-164.0710
200910082344	2009-10-08 23:45	73.4389	-164.1140
200910090235	2009-10-09 02:37	73.0033	-164.0825
200910090533	2009-10-09 05:34	72.5056	-164.0120
200910090829	2009-10-09 08:30	71.9938	-163.9730
200910091121	2009-10-09 11:22	71.5010	-164.0091
200910091724	2009-10-09 17:25	72.5025	-162.9856
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200910100520	2009-10-10 05:21	72.5018	-162.0183
200910100824	2009-10-10 08:25	71.9943	-162.0693

#### Related Information



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#### MR09-03 Leg2

Ship Name: MIRAI  
Period: 2009-09-07 - 2009-10-15  
Chief Scientist: Takashi Kikuchi (JAMSTEC)  
Project Name: [Arctic Ocean Climate System Research]  
Proposal: ▶ Multi-disciplinary observation cruise for the Arctic Ocean  
Title:

#### Update History

2019-08-31	An observation data was registered.
2017-06-14	An observation data was registered.
2014-08-06	An observation data was registered.
2014-02-18	An observation data was registered.
2012-09-28	An observation data was registered.

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#### Information of the Ships

NATSUSHIMA  
KAIYO  
YOKOSUKA  
MIRAI  
KAIREI  
CHIKYU  
KAIIMEI  
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

Cruise ID:

#### Go to a Dive Information

Dive ID:

