

MIRAI MR01-K03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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Cruise ID: [MR01-K03](#)

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/MR01-K03_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
200106112051	00092697	XCTD-1	Auto	MK-100
200106112251	00092699	XCTD-1	Auto	MK-100
200106120051	00092698	XCTD-1	Auto	MK-100
200106120254	00092704	XCTD-1	Auto	MK-100
200106130502	00092700	XCTD-1	Auto	MK-100
200106130714	00092701	XCTD-1	Auto	MK-100
200106130922	00092705	XCTD-1	Auto	MK-100
200106131130	00092702	XCTD-1	Auto	MK-100
200106140503	00113314	XCTD-1	Auto	MK-100
200106140518	00113318	XCTD-1	Auto	MK-100
200106140748	00113320	XCTD-1	Auto	MK-100
200106141029	00113321	XCTD-1	Auto	MK-100
200106141311	00113316	XCTD-1	Auto	MK-100
200106141554	00113322	XCTD-1	Auto	MK-100
200106141823	00113317	XCTD-1	Auto	MK-100
200106170422	01013784	XCTD-1	Auto	MK-100
200106170620	01013783	XCTD-1	Auto	MK-100
200106170819	01013787	XCTD-1	Auto	MK-100
200106171017	01013786	XCTD-1	Auto	MK-100
200106171221	01013782	XCTD-1	Auto	MK-100
200106171422	00123766	XCTD-1	Auto	MK-100
200106171624	01013781	XCTD-1	Auto	MK-100
200106171827	00113315	XCTD-1	Auto	MK-100
200106172029	01013790	XCTD-1	Auto	MK-100
200106172238	01013788	XCTD-1	Auto	MK-100
200106190332	00113293	XCTD-1	Auto	MK-100
200106190441	00113287	XCTD-1	Auto	MK-100
200106190547	00113284	XCTD-1	Auto	MK-100
200106190653	00113286	XCTD-1	Auto	MK-100
200106190759	00113289	XCTD-1	Auto	MK-100
200106190907	00113288	XCTD-1	Auto	MK-100
200106191040	00113290	XCTD-1	Auto	MK-100
200106250502	00113292	XCTD-1	Auto	MK-100
200106251539	00113291	XCTD-1	Auto	MK-100
200106251654	00113296	XCTD-1	Auto	MK-100
200106260114	00113295	XCTD-1	Auto	MK-100
200106261323	01034556	XCTD-1	Auto	MK-100
200106261701	01034557	XCTD-1	Auto	MK-100
200106280533	01034560	XCTD-1	Auto	MK-100
200106281313	01034558	XCTD-1	Auto	MK-100
200106281413	00113294	XCTD-1	Auto	MK-100
200106290331	01034561	XCTD-1	Auto	MK-100
200106290459	01034559	XCTD-1	Auto	MK-100
200106290646	01034564	XCTD-1	Auto	MK-100
200106291620	01034563	XCTD-1	Auto	MK-100
200106300418	01034562	XCTD-1	Auto	MK-100
200106300540	01034565	XCTD-1	Auto	MK-100
200106300653	01034566	XCTD-1	Auto	MK-100
200106300825	01034567	XCTD-1	Auto	MK-100
200106301443	00123774	XCTD-1	Auto	MK-100
200106301643	00123773	XCTD-1	-	MK-100
200107071433	00123778	XCTD-1	Auto	MK-100
200107071618	00123776	XCTD-1	Auto	MK-100
200107071720	00123775	XCTD-1	Auto	MK-100
200107100349	00123777	XCTD-1	Auto	MK-100
200107110852	00123779	XCTD-1	Auto	MK-100
200107120655	00123780	XCTD-1	Auto	MK-100
200107121339	01013791	XCTD-1	Auto	MK-100
200107130152	01013789	XCTD-1	Auto	MK-100
200107130752	01013802	XCTD-1	Auto	MK-100
200107131746	01013803	XCTD-1	Auto	MK-100
200107132203	01013796	XCTD-1	Auto	MK-100
200107140151	01013793	XCTD-1	Auto	MK-100
200107140734	01013794	XCTD-1	Auto	MK-100
200107141037	01013797	XCTD-1	Auto	MK-100
200107141550	01013804	XCTD-1	Auto	MK-100
200107150206	01013801	XCTD-1	Auto	MK-100

Cast name	Probe Serial No.	ACU-1 Probe Type	Auto Launcher	MIN-100 Converter
200107150507	01013795	XCTD-1	Auto	MK-100
200107160001	01013800	XCTD-1	Auto	MK-100
200107160049	01013798	XCTD-1	Auto	MK-100
200107160958	01013792	XCTD-1	Auto	MK-100

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.

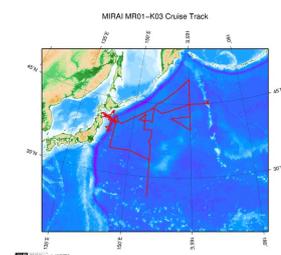
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



[Enlarge Image](#)

MR01-K03

Ship Name: MIRAI
 Period: 2001-06-04 - 2001-07-18
 Chief Scientist: Shuichi Watanabe (JAMSTEC)
 Project Name: [Station K2, Station KNOT]

Update History

2019-08-29	An observation data was registerd.
2017-06-14	An observation data was registerd.
2014-07-16	An observation data was registerd.
2014-02-18	An observation data was registerd.
2012-12-25	An observation data was registerd.

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 MIRAI
 KAIREI
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 SHINSEI MARU
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 SHINKAI 2000
 SHINKAI 6500
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 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:

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Dive ID:



MIRAI MR01-K03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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Cruise ID: [MR01-K03](#)

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 : 'Definition of Quality Control Flags'
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

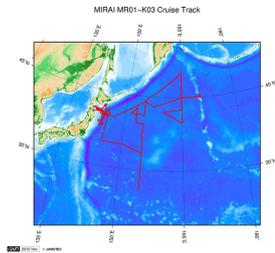
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



[Enlarge Image](#)

MR01-K03

Ship Name: MIRAI
 Period: 2001-06-04 - 2001-07-18
 Chief Scientist: Shuichi Watanabe (JAMSTEC)
 Project Name: [Station K2, Station KNOT]

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- YOKOSUKA
- MIRAI
- KAIREI
- CHIKYU
- KAIMEI
- SHINSEI MARU
- HAKUHO MARU

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- 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:



MIRAI MR01-K03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

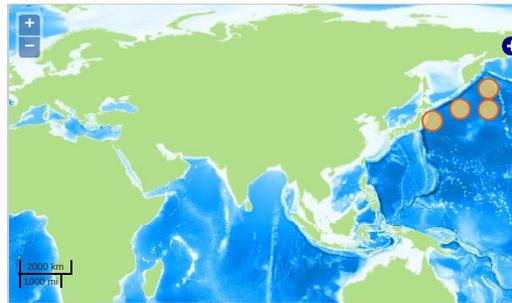
Last Modified: 2019-08-29

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Cruise ID: **MR01-K03**
 Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed
 Data Policy: **JAMSTEC**
 Observation Items: Depth, Temperature, Salinity
 Science Keywords:
 OCEANS > OCEAN > WATER
 TEMPERATURE TEMPERATURE
 OCEANS > SALINITY/DENSITY > SALINITY

Observation Map

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



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

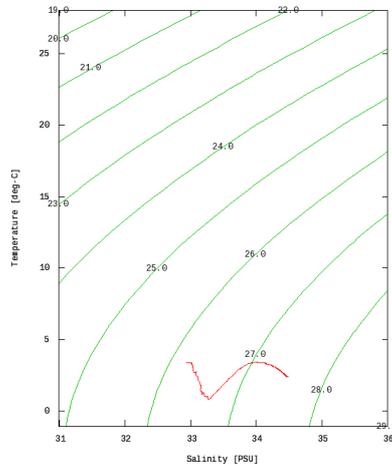
Imagery reproduced from ...

Figures

200106112051



MR01-K03: 200106112051
 Expendable Conductivity-Temperature-Depth Profiler (XCTD): Salinity



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

Data List

[Add to Basket](#)

File names
<input type="checkbox"/> 200106112051.dat
<input type="checkbox"/> 200106112251.dat
<input type="checkbox"/> 200106120051.dat
<input type="checkbox"/> 200106120254.dat
<input type="checkbox"/> 200106130502.dat
<input type="checkbox"/> 200106130714.dat
<input type="checkbox"/> 200106130922.dat
<input type="checkbox"/> 200106131130.dat
<input type="checkbox"/> 200106140503.dat
<input type="checkbox"/> 200106140518.dat
<input type="checkbox"/> 200106140748.dat
<input type="checkbox"/> 200106141029.dat
<input type="checkbox"/> 200106141311.dat
<input type="checkbox"/> 200106141554.dat

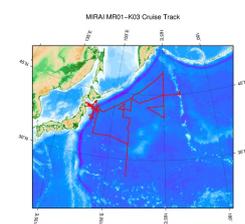
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<input type="checkbox"/>	200106112051.dat
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<input type="checkbox"/>	200106170620.dat
<input type="checkbox"/>	200106170819.dat
<input type="checkbox"/>	200106171017.dat
<input type="checkbox"/>	200106171221.dat
<input type="checkbox"/>	200106171422.dat
<input type="checkbox"/>	200106171624.dat
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<input type="checkbox"/>	200106260114.dat
<input type="checkbox"/>	200106261323.dat
<input type="checkbox"/>	200106261701.dat
<input type="checkbox"/>	200106280533.dat
<input type="checkbox"/>	200106281313.dat
<input type="checkbox"/>	200106281413.dat
<input type="checkbox"/>	200106290331.dat
<input type="checkbox"/>	200106290459.dat
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<input type="checkbox"/>	200106291620.dat
<input type="checkbox"/>	200106300418.dat
<input type="checkbox"/>	200106300540.dat
<input type="checkbox"/>	200106300653.dat
<input type="checkbox"/>	200106300825.dat
<input type="checkbox"/>	200106301443.dat
<input type="checkbox"/>	200106301643.dat
<input type="checkbox"/>	200107071433.dat
<input type="checkbox"/>	200107071618.dat
<input type="checkbox"/>	200107071720.dat
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<input type="checkbox"/>	200107110852.dat
<input type="checkbox"/>	200107120655.dat
<input type="checkbox"/>	200107121339.dat
<input type="checkbox"/>	200107130152.dat
<input type="checkbox"/>	200107130752.dat
<input type="checkbox"/>	200107131746.dat
<input type="checkbox"/>	200107132203.dat
<input type="checkbox"/>	200107140151.dat
<input type="checkbox"/>	200107140734.dat
<input type="checkbox"/>	200107141037.dat
<input type="checkbox"/>	200107141550.dat
<input type="checkbox"/>	200107150206.dat
<input type="checkbox"/>	200107150507.dat
<input type="checkbox"/>	200107160001.dat
<input type="checkbox"/>	200107160049.dat
<input type="checkbox"/>	200107160958.dat
<input type="checkbox"/>	ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200106112051	2001-06-11 20:46	48.9991	165.0006
200106112251	2001-06-11 22:46	48.5006	165.0010
200106120051	2001-06-12 00:46	48.0006	165.0010
200106120254	2001-06-12 02:49	47.4993	165.0003
200106130502	2001-06-13 04:57	46.9961	165.0306
200106130714	2001-06-13 07:09	46.4993	165.0000
200106130922	2001-06-13 09:17	46.0003	165.0021
200106131130	2001-06-13 11:25	45.4991	164.9986
200106140503	2001-06-14 04:58	44.9930	165.0105
200106140518	2001-06-14 05:12	44.9938	165.0738
200106140748	2001-06-14 07:43	44.9993	166.0056
200106141029	2001-06-14 10:24	45.0010	167.0003
200106141311	2001-06-14 13:06	44.9986	167.9998
200106141554	2001-06-14 15:49	45.0005	168.9996
200106141823	2001-06-14 18:18	44.9991	169.9208
200106170422	2001-06-17 04:16	44.4991	164.9796
200106170620	2001-06-17 06:15	44.0015	164.9948
200106170819	2001-06-17 08:14	43.5011	164.9808
200106171017	2001-06-17 10:12	43.0005	164.9910
200106171221	2001-06-17 12:15	42.4965	165.0003
200106171422	2001-06-17 14:17	42.0003	164.9995

Observation ID	Time and Date	Lat. (°N)	Long. (°E)
200106171827	2001-06-17 18:22	41.0001	165.0126
200106172029	2001-06-17 20:23	40.5000	165.0158
200106172238	2001-06-17 22:33	40.0000	165.0136
200106190332	2001-06-19 03:27	39.8038	164.7943
200106190441	2001-06-19 04:36	39.9620	164.4940
200106190547	2001-06-19 05:42	40.1121	164.2083
200106190653	2001-06-19 06:48	40.2630	163.9235
200106190759	2001-06-19 07:54	40.4111	163.6330
200106190907	2001-06-19 09:02	40.5598	163.3398
200106191040	2001-06-19 10:35	40.7620	162.9491
200106250502	2001-06-25 04:57	41.7515	154.9981
200106251539	2001-06-25 15:34	41.1663	154.6648
200106251654	2001-06-25 16:49	41.3341	154.3318
200106260114	2001-06-26 01:09	41.3330	153.6631
200106261323	2001-06-26 13:18	41.3345	151.4968
200106261701	2001-06-26 16:56	42.0035	152.3366
200106280533	2001-06-28 05:28	40.8061	152.9995
200106281313	2001-06-28 13:08	39.9973	153.0003
200106281413	2001-06-28 14:08	39.7496	152.9993
200106290331	2001-06-29 03:26	39.4983	153.5004
200106290459	2001-06-29 04:54	39.5016	153.9485
200106290646	2001-06-29 06:41	39.5021	154.5008
200106291620	2001-06-29 16:14	38.5005	155.0003
200106300418	2001-06-30 04:12	37.7146	154.8326
200106300540	2001-06-30 05:34	37.4146	154.6585
200106300653	2001-06-30 06:48	37.1505	154.4993
200106300825	2001-06-30 08:20	36.8188	154.7513
200106301443	2001-06-30 14:38	36.1655	154.9998
200106301643	2001-06-30 16:38	35.6638	155.0000
200107071433	2001-07-07 14:28	37.5013	145.2215
200107071618	2001-07-07 16:12	37.9101	145.2503
200107071720	2001-07-07 17:14	38.1438	145.2693
200107100349	2001-07-10 03:44	41.4006	143.4248
200107110852	2001-07-11 08:47	41.4166	144.6246
200107120655	2001-07-12 06:50	39.8330	145.5833
200107121339	2001-07-12 13:34	40.8918	143.9206
200107130152	2001-07-13 01:46	38.8168	143.9176
200107130752	2001-07-13 07:47	38.4515	143.7160
200107131746	2001-07-13 17:40	38.5013	144.2191
200107132203	2001-07-13 21:58	38.9053	143.0053
200107140151	2001-07-14 01:46	39.2171	144.1368
200107140734	2001-07-14 07:28	39.7661	144.4181
200107141037	2001-07-14 10:32	40.1833	144.6341
200107141550	2001-07-14 15:44	40.5541	144.8271
200107150206	2001-07-15 02:01	40.9096	145.0191
200107150507	2001-07-15 05:02	41.3008	145.2375
200107160001	2001-07-15 23:56	40.3665	145.4178
200107160049	2001-07-16 00:43	40.3666	145.1670
200107160958	2001-07-16 09:52	40.3666	143.4153

Related Information



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MR01-K03

Ship Name: MIRAI
 Period: 2001-06-04 - 2001-07-18
 Chief Scientist: Shuichi Watanabe (JAMSTEC)
 Project Name: [Station K2, Station KNOT]

Update History

2019-08-29 An observation data was registered.
 2017-06-14 An observation data was registered.
 2014-07-16 An observation data was registered.
 2014-02-18 An observation data was registered.
 2012-12-25 An observation data was registered.

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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)

Go to a Cruise Information

Cruise ID:

Go to a Dive Information

Dive ID:

POWER GRAB SAMPLER
(GLOW)
BMS

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