

## MIRAI MR02-K06 Leg3 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR02-K06 Leg3](#)

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/MR02-K06\\_leg3-4\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR02-K06_leg3-4_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.

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

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
200301160727	02090716	XCTD-1	Auto	MK-100
200301161033	02090719	XCTD-1	Auto	MK-100
200301161418	02090720	XCTD-1	Auto	MK-100
200301161803	02090723	XCTD-1	Auto	MK-100
200301162150	02090722	XCTD-1	Auto	MK-100
200301170242	02100900	XCTD-1	Auto	MK-100
200301170426	02100901	XCTD-1	Auto	MK-100
200301170815	02100903	XCTD-1	Auto	MK-100
200301171205	02100904	XCTD-1	Auto	MK-100
200301171600	02100902	XCTD-1	Auto	MK-100
200301171957	02100905	XCTD-1	Auto	MK-100
200301180241	02100906	XCTD-1	Auto	MK-100
200301180649	02100910	XCTD-1	Auto	MK-100
200301181044	02100907	XCTD-1	Auto	MK-100
200301181437	02100909	XCTD-1	Auto	MK-100
200301181832	02100911	XCTD-1	Auto	MK-100
200301200645	02090873	XCTD-1	Auto	MK-100
200301201012	02100912	XCTD-1	Auto	MK-100
200301201356	02090871	XCTD-1	Auto	MK-100
200301201743	02090872	XCTD-1	Auto	MK-100
200301202135	02090874	XCTD-1	Auto	MK-100
200301210201	02090877	XCTD-1	Auto	MK-100
200301210450	02090875	XCTD-1	Auto	MK-100
200301210856	02090880	XCTD-1	Auto	MK-100
200301211303	02100882	XCTD-1	Auto	MK-100
200301211708	02090879	XCTD-1	Auto	MK-100
200301212116	02100883	XCTD-1	Auto	MK-100
200301220144	02090878	XCTD-1	Auto	MK-100
200301220424	02100881	XCTD-1	Auto	MK-100
200301220834	02100886	XCTD-1	Auto	MK-100
200301221240	02100885	XCTD-1	Auto	MK-100
200301221644	02100894	XCTD-1	Auto	MK-100
200301222048	02100897	XCTD-1	Auto	MK-100
200301250346	02100889	XCTD-1	Auto	MK-100
200301250804	02100888	XCTD-1	Auto	MK-100
200301251635	02100892	XCTD-1	Auto	MK-100
200301252056	02100890	XCTD-1	Auto	MK-100
200301260423	02100895	XCTD-1	Auto	MK-100
200301260850	02100898	XCTD-1	Auto	MK-100
200301261316	02100896	XCTD-1	Auto	MK-100
200301261745	02100899	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.

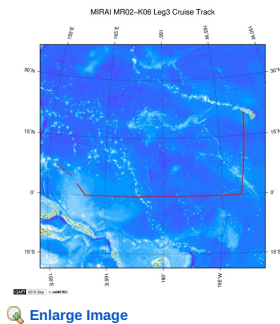
Related Information

#### MR02-K06 Leg3

Ship Name: MIRAI

Period: 2003-01-13 - 2003-01-31

Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)



#### Update History

2019-08-29	An observation data was registerd.
2017-06-14	An observation data was registerd.
2016-10-11	An observation data was registerd.

#### JAMSTEC

[Site Policy](#)  
[Privacy Policy](#)  
[Application for Data and Samples](#)  
[Data Policy](#)

[What's New](#)  
[Update History](#)  
[Feeds](#)

#### 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](#)  
[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:

Copyright 2011 Japan Agency for Marine-Earth Science and Technology



**JAMSTEC**  
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

国立研究開発法人  
海洋研究開発機構

## MIRAI MR02-K06 Leg3 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

 Cruise ID: [MR02-K06 Leg3](#)

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](#)

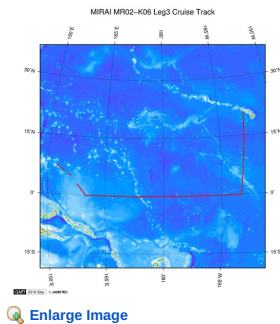
#### Related Information

### MR02-K06 Leg3

Ship Name: MIRAI

Period: 2003-01-13 - 2003-01-31

Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)



#### Update History

2019-08-29	An observation data was registerd.
2017-06-14	An observation data was registerd.
2016-10-11	An observation data was registerd.

#### JAMSTEC

[Site Policy](#)  
[Privacy Policy](#)  
[Application for Data and Samples](#)  
[Data Policy](#)

[What's New](#)  
[Update History](#)  
[Feeds](#)

#### 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](#)  
[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:

Copyright 2011 Japan Agency for Marine-Earth Science and Technology



**JAMSTEC**  
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

国立研究開発法人  
海洋研究開発機構

## MIRAI MR02-K06 Leg3 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: **MR02-K06 Leg3**

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

Data Policy: **JAMSTEC**

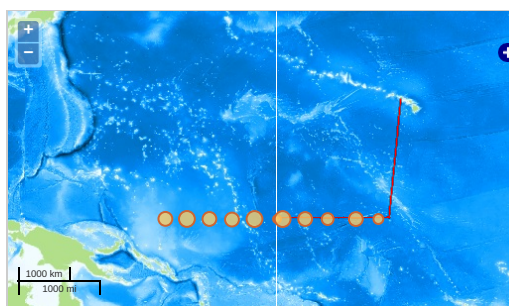
Observation Items: Depth, Temperature, Salinity

Science Keywords:

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

### Observation Map

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

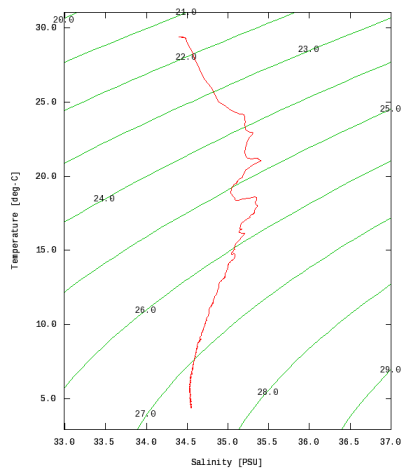
Imagery reproduced from ...

### Figures

200301160727



MR02-K06 Leg3: 200301160727  
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

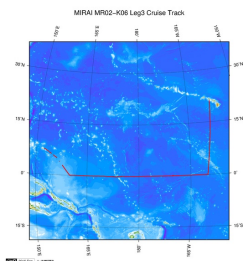
<input type="checkbox"/>	200301160727.dat
<input type="checkbox"/>	200301161033.dat
<input type="checkbox"/>	200301161418.dat
<input type="checkbox"/>	200301161803.dat
<input type="checkbox"/>	200301162150.dat
<input type="checkbox"/>	200301170242.dat
<input type="checkbox"/>	200301170426.dat
<input type="checkbox"/>	200301170815.dat
<input type="checkbox"/>	200301171205.dat
<input type="checkbox"/>	200301171600.dat
<input type="checkbox"/>	200301171957.dat
<input type="checkbox"/>	200301180241.dat
<input type="checkbox"/>	200301180649.dat
<input type="checkbox"/>	200301181044.dat

	200301181837.dat
	200301181832.dat
	200301200645.dat
	200301201012.dat
	200301201356.dat
	200301201743.dat
	200301202135.dat
	200301210201.dat
	200301210450.dat
	200301210856.dat
	200301211303.dat
	200301211708.dat
	200301212116.dat
	200301220144.dat
	200301220424.dat
	200301220834.dat
	200301221240.dat
	200301221644.dat
	200301222048.dat
	200301250346.dat
	200301250804.dat
	200301251635.dat
	200301252056.dat
	200301260423.dat
	200301260850.dat
	200301261316.dat
	200301261745.dat
	ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200301160727	2003-01-16 07:22	0.0233	160.1788
200301161033	2003-01-16 10:28	0.0333	161.0026
200301161418	2003-01-16 14:13	0.0225	162.0004
200301161803	2003-01-16 17:58	0.0073	163.0003
200301162150	2003-01-16 21:45	0.0106	164.0000
200301170242	2003-01-17 02:37	0.0145	164.5635
200301170426	2003-01-17 04:21	-0.0135	164.9998
200301170815	2003-01-17 08:10	-0.0083	165.9956
200301171205	2003-01-17 12:00	-0.0008	167.0004
200301171600	2003-01-17 15:55	0.0071	168.0000
200301171957	2003-01-17 19:52	-0.0005	169.0004
200301180241	2003-01-18 02:36	-0.0035	169.9891
200301180649	2003-01-18 06:44	-0.0531	171.0001
200301181044	2003-01-18 10:39	-0.0994	172.0010
200301181437	2003-01-18 14:32	-0.1488	173.0001
200301181832	2003-01-18 18:27	-0.1208	174.0003
200301200645	2003-01-20 06:40	0.0468	175.1056
200301201012	2003-01-20 10:07	-0.0008	176.0003
200301201356	2003-01-20 13:51	0.0010	177.0003
200301201743	2003-01-20 17:38	-0.0051	177.9998
200301202135	2003-01-20 21:30	-0.0048	179.0003
200301210201	2003-01-21 01:56	-0.0175	179.3009
200301210450	2003-01-21 04:45	-0.0163	180.0000
200301210856	2003-01-21 08:51	-0.0043	-179.0003
200301211303	2003-01-21 12:58	0.0071	-178.0001
200301211708	2003-01-21 17:03	0.0028	-176.9998
200301212116	2003-01-21 21:10	0.0008	-176.0001
200301220144	2003-01-22 01:39	0.0131	-175.6281
200301220424	2003-01-22 04:19	-0.0008	-175.0001
200301220834	2003-01-22 08:29	0.0080	-174.0001
200301221240	2003-01-22 12:35	-0.0023	-173.0004
200301221644	2003-01-22 16:39	-0.0088	-171.9993
200301222048	2003-01-22 20:43	-0.0125	-171.0001
200301250346	2003-01-25 03:41	-0.0048	-169.0001
200301250804	2003-01-25 07:59	0.0048	-168.0001
200301251635	2003-01-25 16:30	-0.0096	-166.0003
200301252056	2003-01-25 20:51	-0.0065	-165.0000
200301260423	2003-01-26 04:18	0.0008	-164.0003
200301260850	2003-01-26 08:45	0.0041	-163.0003
200301261316	2003-01-26 13:11	0.0011	-162.0003
200301261745	2003-01-26 17:40	0.0061	-161.0000

Related Information



[Enlarge Image](#)

**MR02-K06 Leg3**  
Ship Name: MIRAI  
Period: 2003-01-13 - 2003-01-31  
Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)

#### Update History

2019-08-29	An observation data was registered.
2017-06-14	An observation data was registered.
2016-10-11	An observation data was registered.

#### JAMSTEC

[Site Policy](#)  
[Privacy Policy](#)

[Application for Data and Samples](#)  
[Data Policy](#)

#### What's New

[Update History](#)  
[Feeds](#)

#### 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  
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:

Copyright 2011 Japan Agency for Marine-Earth Science and Technology



**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