

## MIRAI MR02-K03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR02-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

### 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
MIRAIOS06	01055188	XCTD-1	Hand	MK-100
MIRAIOS05	02048477	XCTD-1	Hand	MK-100
MIRAIOS04	01055182	XCTD-1	Hand	MK-100
MIRAIOS03	00030560	XCTD-1	Hand	MK-100
MIRAIOS02	00030559	XCTD-1	Hand	MK-100
MIRAIOS01	00030514	XCTD-1	Hand	MK-100
MIRAIIE01	00030577	XCTD-1	-	MK-100
MIRAIIE02	01055184	XCTD-1	-	MK-100
MIRAIIE03	01055187	XCTD-1	-	MK-100
MIRAIIE04	01055185	XCTD-1	-	MK-100
MIRAIIE05	01055183	XCTD-1	Hand	MK-100
MIRAIIE06	01055190	XCTD-1	Hand	MK-100
MIRAIIE07	01055186	XCTD-1	Hand	MK-100
MIRAI348	01024379	XCTD-1	Hand	MK-100
MIRAI349	01024380	XCTD-1	Hand	MK-100
MIRAI350	01024384	XCTD-1	-	MK-100
MIRAI351	01024381	XCTD-1	-	MK-100
MIRAI352	01024383	XCTD-1	-	MK-100
MIRAI353	01055191	XCTD-1	Hand	MK-100
MIRAI354	01024385	XCTD-1	Hand	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.

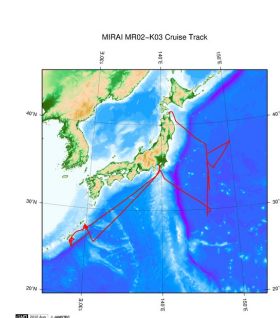
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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](#)

#### MR02-K03

Ship Name: MIRAI  
Period: 2002-05-26 - 2002-06-21  
Chief Scientist: Yasushi Yoshikawa (JAMSTEC)

#### Update History

2019-08-29	An observation data was registerd.
2017-06-14	An observation data was registerd.
2014-07-18	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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URASHIMA  
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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Dive ID:





## MIRAI MR02-K03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

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 Cruise ID: [MR02-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 : <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

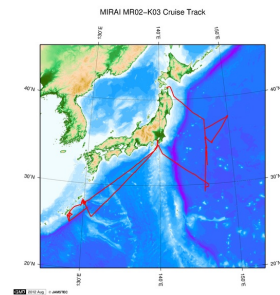
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

#### Sample Program

[ex\\_read2.f](#)

#### Related Information



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Ship Name: MIRAI

Period: 2002-05-26 - 2002-06-21

Chief Scientist: Yasushi Yoshikawa (JAMSTEC)

#### Update History

2019-08-29	An observation data was registerd.
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国立研究開発法人  
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JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

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Cruise ID: **MR02-K03**

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

Data Policy: **JAMSTEC**

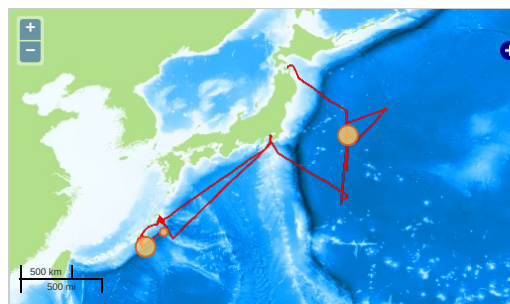
Observation Items: Depth, Temperature, Salinity

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.

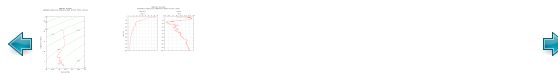


— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

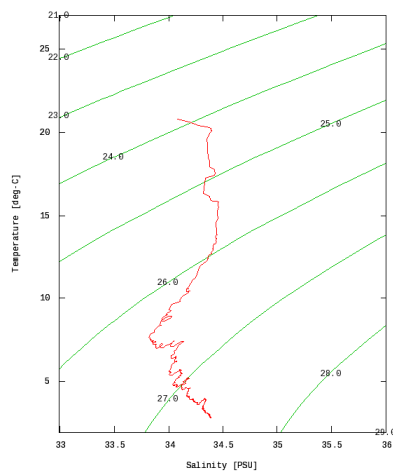
Imagery reproduced from ...

### Figures

mirai348



MR02-K03: mirai348  
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"/>	mirai348.dat
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<input type="checkbox"/>	mirai500.dat


 **File names**

 miraios02.dat

 miraios03.dat

 miraios04.dat

 miraios05.dat

 miraios06.dat

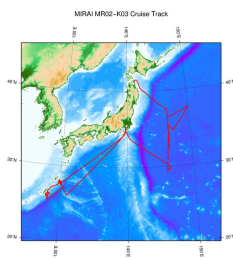
 ex\_read2.f (Sample Program)

● Observation List

The list of observation is shown as follows.

Observation	Time and Date	Lat. [°]	Lon. [°]
mirai348	2002-06-18 06:19	35.5043	146.5135
mirai349	2002-06-18 07:18	35.7500	146.5000
mirai350	2002-06-18 08:18	36.0000	146.4983
mirai351	2002-06-18 09:19	36.2583	146.5011
mirai352	2002-06-18 10:15	36.5000	146.4978
mirai353	2002-06-18 11:15	36.7500	146.5000
mirai354	2002-06-18 11:25	36.7500	146.5000
miraie01	2002-06-02 08:46	25.5970	128.5540
miraie02	2002-06-02 10:01	25.8165	128.8225
miraie03	2002-06-02 11:22	26.0360	129.0910
miraie04	2002-06-02 12:48	26.2553	129.3595
miraie05	2002-06-02 14:16	26.4983	129.6358
miraie06	2002-06-02 15:32	26.6936	129.8963
miraie07	2002-06-02 16:52	26.9138	130.1648
miraios01	2002-06-01 14:20	26.0750	127.9583
miraios02	2002-06-01 13:55	26.0000	128.0000
miraios03	2002-06-01 13:21	25.8695	128.0571
miraios04	2002-06-01 12:39	25.7094	128.1333
miraios05	2002-06-01 11:55	25.5436	128.2095
miraios06	2002-06-01 11:29	25.4549	128.2543

Related Information



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**MR02-K03**

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Period: 2002-05-26 - 2002-06-21

Chief Scientist: Yasushi Yoshikawa (JAMSTEC)

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