

## MIRAI MR04-03 Leg1 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR04-03 Leg1](#)

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/MR04-03\\_leg1-2\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR04-03_leg1-2_all.pdf)

### For Using Data

#### Principal Investigator

Data Management Office

JAMSTEC / BPPT joint cruise in the Indonesian waters.

#### 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			
Measurment 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
200406180730	03042858	XCTD-1	Auto	MK-100
200406200321	03042857	XCTD-1	Auto	MK-100
200406200516	03042851	XCTD-1	Auto	MK-100
200406200710	03042850	XCTD-1	Auto	MK-100
200406200906	03084514	XCTD-1	Auto	MK-100
200406201105	03042853	XCTD-1	Auto	MK-100
200406201308	03084511	XCTD-1	Auto	MK-100
200406201505	03042852	XCTD-1	Auto	MK-100
200406201703	03042855	XCTD-1	Auto	MK-100
200406201905	03042854	XCTD-1	Auto	MK-100
200406210757	03042856	XCTD-1	Auto	MK-100
200406212216	03042849	XCTD-1	Auto	MK-100
200406220852	03042739	XCTD-1	Auto	MK-100
200406221110	03042746	XCTD-1	Auto	MK-100
200406221329	03042748	XCTD-1	Auto	MK-100
200406221548	03042747	XCTD-1	Auto	MK-100
200406221809	03042738	XCTD-1	Auto	MK-100
200406222222	03042737	XCTD-1	Auto	MK-100
200406241328	03042745	XCTD-1	Auto	MK-100
200406241821	03042741	XCTD-1	Auto	MK-100
200406242315	03042743	XCTD-1	Auto	MK-100
200406250412	03042744	XCTD-1	Auto	MK-100
200406250903	03042742	XCTD-1	Auto	MK-100
200406251336	03084524	XCTD-1	Auto	MK-100
200406260245	03042740	XCTD-1	Auto	MK-100
200406260545	03084525	XCTD-1	Auto	MK-100
200406260911	03084526	XCTD-1	Auto	MK-100
200406261200	03084528	XCTD-1	Auto	MK-100
200406261456	03084527	XCTD-1	Auto	MK-100
200406261814	03084523	XCTD-1	Auto	MK-100
200406262325	03084522	XCTD-1	Auto	MK-100
200406270240	03084533	XCTD-1	Auto	MK-100
200406270555	03084529	XCTD-1	Auto	MK-100
200406270915	03084532	XCTD-1	Auto	MK-100
200406270925	03084531	XCTD-1	Auto	MK-100
200406271243	03084530	XCTD-1	Auto	MK-100
200406271544	03084534	XCTD-1	Auto	MK-100
200406272252	03084535	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.

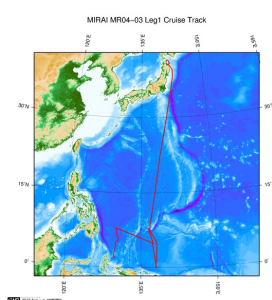
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



#### MR04-03 Leg1

Ship Name: MIRAI  
Period: 2004-06-06 - 2004-07-02  
Chief Scientist: Iwao Ueki (JAMSTEC)  
Project Name: [Tropical Ocean Climate Study (TOCS)]

#### Update History

2019-08-29	An observation data was registerd.
2017-06-14	An observation data was registerd.
2016-04-07	An observation data was registerd.
2014-07-24	An observation data was registerd.
2014-02-18	An observation data was registerd.
2012-11-25	An observation data was registerd.

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6K Camera DEEP TOW  
6K Sonar DEEP TOW  
KM-ROV  
POWER GRAB SAMPLER (SHELL)  
POWER GRAB SAMPLER (CLOW)  
BMS

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

Cruise ID: [MR04-03 Leg1](#)

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

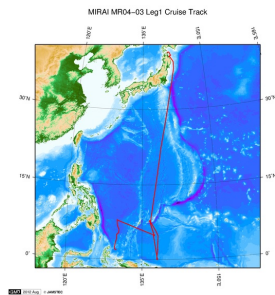
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

#### Sample Program

[ex\\_read2.f](#)

#### Related Information



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#### MR04-03 Leg1

Ship Name: MIRAI

Period: 2004-06-06 - 2004-07-02

Chief Scientist: Iwao Ueki (JAMSTEC)

Project Name: [Tropical Ocean Climate Study (TOCS)]

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Cruise ID: [MR04-03 Leg1](#)

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Data Policy: [JAMSTEC](#)

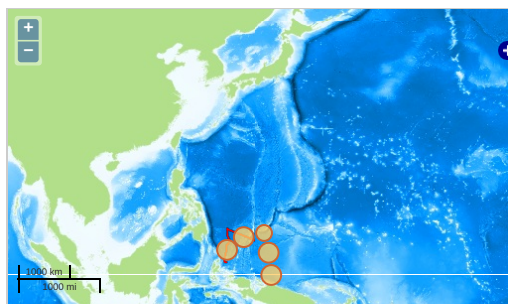
Observation Items: Depth, Temperature, Salinity

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.



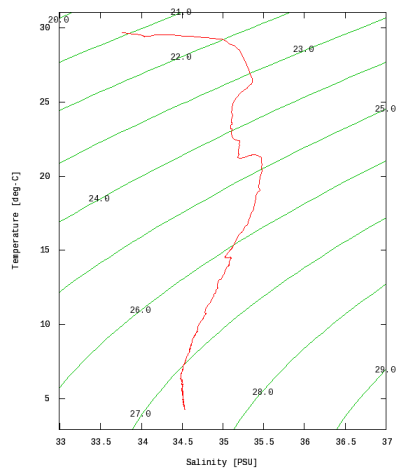
— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

### Figures

200406180730



MR04-03 Leg1: 200406180730  
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

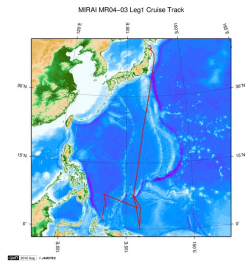
<input type="checkbox"/>	200406180730.dat
<input type="checkbox"/>	200406200321.dat
<input type="checkbox"/>	200406200516.dat
<input type="checkbox"/>	200406200710.dat
<input type="checkbox"/>	200406200906.dat
<input type="checkbox"/>	200406201105.dat
<input type="checkbox"/>	200406201308.dat
<input type="checkbox"/>	200406201505.dat
<input type="checkbox"/>	200406201703.dat
<input type="checkbox"/>	200406201905.dat
<input type="checkbox"/>	200406210757.dat
<input type="checkbox"/>	200406212216.dat
<input type="checkbox"/>	200406220852.dat
<input type="checkbox"/>	200406221110.dat

 200406180730.dat
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 200406270555.dat
 200406270915.dat
 200406270925.dat
 200406271243.dat
 200406271544.dat
 200406272252.dat
 ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200406180730	2004-06-18 07:25	0.0401	137.8758
200406200321	2004-06-20 03:16	0.5005	137.9584
200406200516	2004-06-20 05:11	1.0003	137.8750
200406200710	2004-06-20 07:05	1.5005	137.7983
200406200906	2004-06-20 09:01	1.9980	137.7204
200406201105	2004-06-20 11:00	2.5001	137.6436
200406201308	2004-06-20 13:03	3.0096	137.5650
200406201505	2004-06-20 15:00	3.5001	137.4855
200406201703	2004-06-20 16:58	3.9998	137.4158
200406201905	2004-06-20 19:00	4.4998	137.3208
200406210757	2004-06-21 07:52	4.8661	137.2771
200406212216	2004-06-21 22:11	4.9448	137.4148
200406220852	2004-06-22 08:47	5.5000	137.2263
200406221110	2004-06-22 11:05	6.0000	137.0700
200406221329	2004-06-22 13:24	6.5000	136.9068
200406221548	2004-06-22 15:43	7.0000	136.7596
200406221809	2004-06-22 18:04	7.5003	136.5980
200406222222	2004-06-22 22:17	7.8660	136.5068
200406241328	2004-06-24 13:23	5.5293	136.0000
200406241821	2004-06-24 18:16	5.9443	134.9983
200406242315	2004-06-24 23:10	6.3543	134.0010
200406250412	2004-06-25 04:08	6.7618	133.0000
200406250903	2004-06-25 08:58	7.1746	132.0000
200406251336	2004-06-25 13:31	7.5625	131.0000
200406260245	2004-06-26 02:40	7.9210	130.0631
200406260545	2004-06-26 05:40	7.5000	130.0936
200406260911	2004-06-26 09:06	6.9998	130.1365
200406261200	2004-06-26 11:55	6.5000	130.2790
200406261456	2004-06-26 14:51	5.9998	130.4704
200406261814	2004-06-26 18:09	5.4998	130.4251
200406262325	2004-06-26 23:20	5.0000	129.9988
200406270240	2004-06-27 02:35	4.5001	130.0305
200406270555	2004-06-27 05:50	4.0001	129.9603
200406270915	2004-06-27 09:13	3.5001	129.8203
200406270925	2004-06-27 09:20	3.4846	129.8160
200406271243	2004-06-27 12:38	3.0000	129.7206
200406271544	2004-06-27 15:39	2.4998	129.6388
200406272252	2004-06-27 22:47	2.1171	129.5896

Related Information



**MR04-03 Leg1**  
Ship Name: MIRAI  
Period: 2004-06-06 - 2004-07-02  
Chief Scientist: Iwao Ueki (JAMSTEC)  
Project Name: [Tropical Ocean Climate Study (TOCS)]

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