

## MIRAI MR06-04 Leg1 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR06-04 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/MR06-04\\_leg1-2\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR06-04_leg1-2_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
200608011122	03042883	XCTD-1	Auto	MK-100
200608011906	06037193	XCTD-1	Auto	MK-100
200608020618	06037189	XCTD-1	Auto	MK-100
200608021135	06037190	XCTD-1	Auto	MK-100
200608021907	06037192	XCTD-1	Auto	MK-100
200608030058	06037191	XCTD-1	Auto	MK-100
200608030626	06037194	XCTD-1	Auto	MK-100
200608032116	06037188	XCTD-1	Auto	MK-100
200608050441	03042882	XCTD-1	Auto	MK-100
200608051809	04120655	XCTD-1	Auto	MK-100
200608071325	04120658	XCTD-1	Auto	MK-100
200608100625	04120661	XCTD-1	Auto	MK-100
200608101207	06037186	XCTD-1	Auto	MK-100
200608101805	06037187	XCTD-1	Auto	MK-100
200608111205	06037184	XCTD-1	Auto	MK-100
200608111805	06037183	XCTD-1	Auto	MK-100
200608112149	06037185	XCTD-1	Auto	MK-100
200608120605	06058643	XCTD-1	Auto	MK-100
200608121009	06058640	XCTD-1	Auto	MK-100
200608121805	06037387	XCTD-1	Auto	MK-100
200608131805	06058637	XCTD-1	Auto	MK-100
200608140410	06058634	XCTD-1	Hand	MK-100
200608140420	06058633	XCTD-1	Hand	MK-100
200608140431	06058638	XCTD-1	Hand	MK-100
200608140439	06058636	XCTD-1	Hand	MK-100
200608140449	06058639	XCTD-1	Hand	MK-100
200608140838	06058644	XCTD-1	Auto	MK-100
200608141801	06037388	XCTD-1	Auto	MK-100
200608150922	06037578	XCTD-1	Auto	MK-100
200608150944	06037545	XCTD-1	Auto	MK-100
200608151004	06037546	XCTD-1	Auto	MK-100
200608151042	06037547	XCTD-1	Auto	MK-100
200608151059	06037393	XCTD-1	Auto	MK-100
200608151110	06037394	XCTD-1	Auto	MK-100
200608151121	06037549	XCTD-1	Auto	MK-100
200608151138	06037548	XCTD-1	Auto	MK-100
200608151155	06037389	XCTD-1	Auto	MK-100
200608151220	06037391	XCTD-1	Auto	MK-100
200608151230	06037392	XCTD-1	Auto	MK-100
200608151328	06037395	XCTD-1	Auto	MK-100
200608151805	06037398	XCTD-1	Auto	MK-100
200608152357	06037397	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.

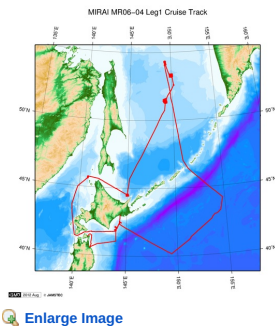
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



**MR06-04 Leg1**  
 Ship Name: MIRAI  
 Period: 2006-07-31 - 2006-08-19  
 Chief Scientist: Naomi Harada (JAMSTEC)  
 Project Name: [Paleoceanography Research]

#### Update History

2019-08-29	An observation data was registerd.
2017-06-14	An observation data was registerd.
2014-07-29	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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#### Go to a Cruise Information

Cruise ID:

#### Go to a Dive Information

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## MIRAI MR06-04 Leg1 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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Cruise ID: [MR06-04 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

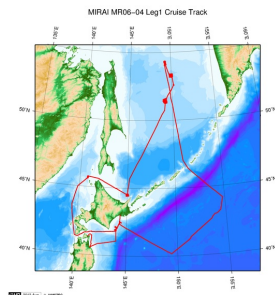
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

#### Sample Program

[ex\\_read2.f](#)

#### Related Information



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#### MR06-04 Leg1

Ship Name: MIRAI

Period: 2006-07-31 - 2006-08-19

Chief Scientist: Naomi Harada (JAMSTEC)

Project Name: [Paleoceanography Research]

#### Update History

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JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

国立研究開発法人  
海洋研究開発機構

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

Data Policy: [JAMSTEC](#)

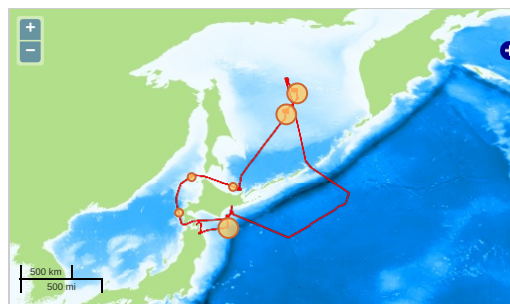
Observation Items: Depth, Temperature, Salinity

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.



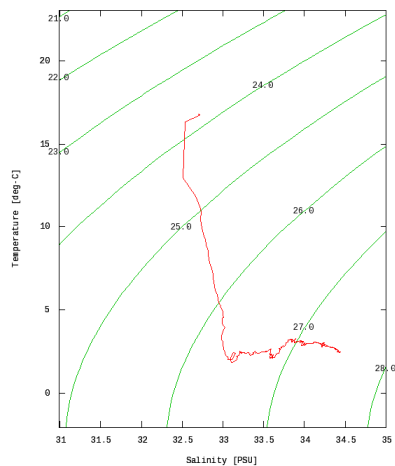
— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

### Figures

200608011906



MR06-04 Leg1: 200608011906  
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

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#### File names

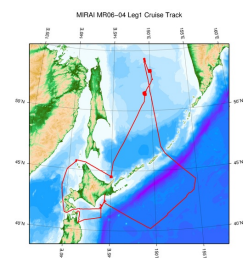
<input type="checkbox"/>	200608011906.dat
<input type="checkbox"/>	200608020618.dat
<input type="checkbox"/>	200608021135.dat
<input type="checkbox"/>	200608021907.dat
<input type="checkbox"/>	200608030058.dat
<input type="checkbox"/>	200608030626.dat
<input type="checkbox"/>	200608032116.dat
<input type="checkbox"/>	200608050441.dat
<input type="checkbox"/>	200608051809.dat
<input type="checkbox"/>	200608071325.dat
<input type="checkbox"/>	200608100625.dat
<input type="checkbox"/>	200608101207.dat
<input type="checkbox"/>	200608101805.dat
<input type="checkbox"/>	200608111205.dat

	2006081121905.dat
	200608112149.dat
	200608120605.dat
	200608121009.dat
	200608121805.dat
	200608131805.dat
	200608140410.dat
	200608140420.dat
	200608140431.dat
	200608140439.dat
	200608140449.dat
	200608140838.dat
	200608141801.dat
	200608150922.dat
	200608150944.dat
	200608151004.dat
	200608151042.dat
	200608151059.dat
	200608151110.dat
	200608151121.dat
	200608151138.dat
	200608151155.dat
	200608151220.dat
	200608151230.dat
	200608151328.dat
	200608151805.dat
	200608152357.dat
	ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
2006080111906	2006-08-01 19:01	41.0905	144.0050
200608020618	2006-08-02 06:13	42.4940	144.3033
200608021135	2006-08-02 11:30	42.5098	144.3286
200608021907	2006-08-02 19:02	42.5153	144.3281
200608030058	2006-08-03 00:53	42.5093	144.3271
200608030626	2006-08-03 06:21	42.5105	144.3300
200608032116	2006-08-03 21:11	41.8651	143.9535
200608050441	2006-08-05 04:36	42.4556	139.6339
200608051809	2006-08-05 18:04	45.6141	140.7473
200608071325	2006-08-07 13:20	44.7426	144.4220
200608100625	2006-08-10 06:20	51.1853	149.1530
200608101207	2006-08-10 12:02	51.2803	149.0996
200608101805	2006-08-10 18:00	51.4328	149.1303
200608111205	2006-08-11 12:00	51.4930	149.1386
200608111805	2006-08-11 18:00	51.5615	149.2835
200608112149	2006-08-11 21:44	51.2894	149.2043
200608120605	2006-08-12 06:00	52.4088	150.0826
200608121009	2006-08-12 10:04	53.0480	150.1225
200608121805	2006-08-12 18:00	53.2341	149.9583
200608131805	2006-08-13 18:00	53.2821	149.8715
200608140410	2006-08-14 04:05	53.3235	149.7376
200608140420	2006-08-14 04:15	53.3265	149.7376
200608140431	2006-08-14 04:26	53.3301	149.7376
200608140439	2006-08-14 04:34	53.3330	149.7376
200608140449	2006-08-14 04:44	53.3366	149.7376
200608140838	2006-08-14 08:34	54.0765	149.3866
200608141801	2006-08-14 17:56	54.2673	149.1955
200608150922	2006-08-15 09:17	54.1085	149.2233
200608150944	2006-08-15 09:39	54.1470	149.2235
200608151004	2006-08-15 10:00	54.1871	149.2236
200608151042	2006-08-15 10:37	54.1945	149.2241
200608151059	2006-08-15 10:54	54.2068	149.2153
200608151110	2006-08-15 11:05	54.2201	149.1933
200608151121	2006-08-15 11:16	54.2273	149.1938
200608151138	2006-08-15 11:33	54.2413	149.1931
200608151155	2006-08-15 11:50	54.2665	149.1935
200608151220	2006-08-15 12:15	54.3166	149.1933
200608151230	2006-08-15 12:25	54.3415	149.1928
200608151328	2006-08-15 13:23	54.2915	149.2235
200608151805	2006-08-15 18:00	53.1820	149.4704
200608152357	2006-08-15 23:52	52.1330	149.7731

Related Information



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#### MR06-04 Leg1

Ship Name: MIRAI  
Period: 2006-07-31 - 2006-08-19  
Chief Scientist: Naomi Harada (JAMSTEC)  
Project Name: [Paleoceanography Research]

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