

MIRAI MR07-03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR07-03](#)

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/MR07-03_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
200706120900	07033413	XCTD-1	Auto	MK-100
200706121400	07033412	XCTD-1	Auto	MK-100
200706141006	07033416	XCTD-1	Auto	MK-100
200706141521	07033415	XCTD-1	Auto	MK-100
200706160840	07033417	XCTD-1	Auto	MK-100
200706161243	07033401	XCTD-1	Auto	MK-100
200706161646	07033400	XCTD-1	Auto	MK-100
200706201235	07033420	XCTD-1	Auto	MK-100
200706210046	07033402	XCTD-1	Auto	MK-100
200706221100	07033405	XCTD-1	Hand	MK-100
200706221515	07033403	XCTD-1	Auto	MK-100
200706230224	07033406	XCTD-1	Auto	MK-100
200706230259	07033407	XCTD-1	Auto	MK-100
200706260116	07033408	XCTD-1	Auto	MK-100
200706290919	07033411	XCTD-1	Auto	MK-100
200706291224	07033409	XCTD-1	Auto	MK-100
200706291535	07033410	XCTD-1	Auto	MK-100
200707011043	07033388	XCTD-1	Auto	MK-100
200707011555	07033389	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.

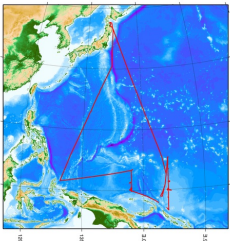
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



MR07-03
Ship Name: MIRAI
Period: 2007-05-31 - 2007-07-14
Chief Scientist: Iwao Ueki (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS)]

Update History	
2019-08-29	An observation data was registered.
2017-06-14	An observation data was registered.
2014-07-30	An observation data was registered.
2014-02-18	An observation data was registered.
2012-10-27	An observation data was registered.

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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

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Information of the Submersibles

KAIKO
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SHINKAI 6500
DEEP TOW
HYPER-DOLPHIN
URASHIMA
YOKOSUKA DEEP TOW
6K Camera DEEP TOW
6K Sonar DEEP TOW
KM-ROV
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Cruise ID:

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

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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

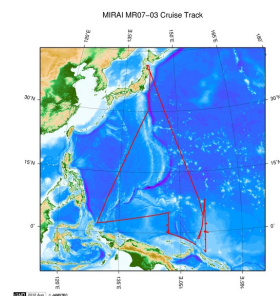
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



 [Enlarge Image](#)

MR07-03

Ship Name: MIRAI

Period: 2007-05-31 - 2007-07-14

Chief Scientist: Iwao Ueki (JAMSTEC)

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

Update History

2019-08-29	An observation data was registerd.
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[Feeds](#)

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[Amount of Public Info.](#)

Data

[Map Search](#)

[Data Tree](#)

[Detailed Search](#)

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Data Policy: **JAMSTEC**

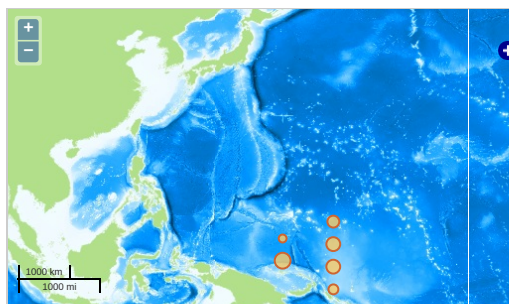
Observation Items: Depth, Temperature, Salinity

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.



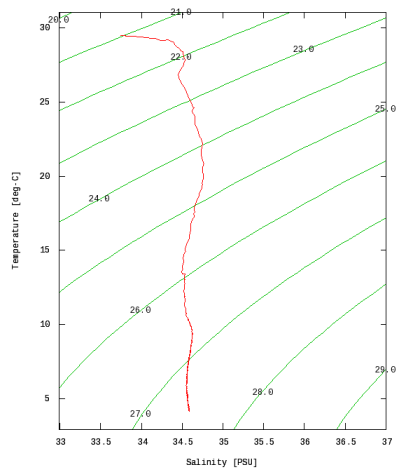
— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

Figures

200706120900



MR07-03: 200706120900
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"/>	200706120900.dat
<input type="checkbox"/>	200706121400.dat
<input type="checkbox"/>	200706141006.dat
<input type="checkbox"/>	200706141521.dat
<input type="checkbox"/>	200706160840.dat
<input type="checkbox"/>	200706161243.dat
<input type="checkbox"/>	200706161646.dat
<input type="checkbox"/>	200706201235.dat
<input type="checkbox"/>	200706210046.dat
<input type="checkbox"/>	200706221100.dat
<input type="checkbox"/>	200706221515.dat
<input type="checkbox"/>	200706230224.dat
<input type="checkbox"/>	200706230259.dat
<input type="checkbox"/>	200706260116.dat

- File names

2007062919.dat
- File names

200706291224.dat
- File names

200706291535.dat
- File names

200707011043.dat
- File names

200707011555.dat
- File names

ex_read2.f (Sample Program)

- Observation List

The list of observation is shown as follows.

Observation	Time and Date	Lat. [°]	Lon. [°]
200706120900	2007-06-12 08:55	7.0001	156.0126
200706121400	2007-06-12 13:55	6.0003	155.9568
200706141006	2007-06-14 10:01	3.9718	155.9911
200706141521	2007-06-14 15:16	3.0003	156.0031
200706160840	2007-06-16 08:35	1.4820	156.0004
200706161243	2007-06-16 12:38	1.0001	156.0149
200706161646	2007-06-16 16:41	0.5001	156.0295
200706201235	2007-06-20 12:30	-1.0000	155.9986
200706210046	2007-06-21 00:41	-2.0205	155.9558
200706221100	2007-06-22 10:54	-3.0325	155.9990
200706221515	2007-06-22 15:10	-3.9998	156.0071
200706230224	2007-06-23 02:19	-5.0300	156.0230
200706230259	2007-06-23 02:54	-4.9776	156.0163
200706260116	2007-06-26 01:11	0.0611	147.0053
200706290919	2007-06-29 09:14	0.5000	146.9930
200706291224	2007-06-29 12:19	1.0001	147.0036
200706291535	2007-06-29 15:30	1.5001	146.9990
200707011043	2007-07-01 10:38	3.0103	147.0233
200707011555	2007-07-01 15:50	4.0001	147.0055

Related Information

MR07-03 Cruise Track

MR07-03

Ship Name: MIRAI

Period: 2007-05-31 - 2007-07-14

Chief Scientist: Iwao Ueki (JAMSTEC)

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

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Data Policy

What's New

Update History

Feeds

Lists

Publication List

Amount of Public Info.

Data

Map Search

Data Tree

Detailed Search

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