

MIRAI MR06-01 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR06-01](#)

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/MR06-01_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
200602150440	05022105	XCTD-1	-	MK-100
200602150645	05022106	XCTD-1	-	MK-100
200602150849	05022107	XCTD-1	-	MK-100
200602150857	05022104	XCTD-1	-	MK-100
200602151055	05022103	XCTD-1	-	MK-100
200602151257	05022111	XCTD-1	-	MK-100
200602170410	05022114	XCTD-1	-	MK-100
200602170610	05022117	XCTD-1	-	MK-100
200602170810	05022109	XCTD-1	-	MK-100
200602171011	05022110	XCTD-1	-	MK-100
200602171213	05022108	XCTD-1	-	MK-100
200602190356	05022120	XCTD-1	-	MK-100
200602190556	05022116	XCTD-1	-	MK-100
200602190756	05022113	XCTD-1	-	MK-100
200602210337	05022119	XCTD-1	-	MK-100
200602210535	05022123	XCTD-1	-	MK-100
200602210734	05022122	XCTD-1	-	MK-100
200602230444	05022121	XCTD-1	-	MK-100
200602230647	05022118	XCTD-1	-	MK-100
200602230849	05022115	XCTD-1	-	MK-100
200602231052	05022138	XCTD-1	-	MK-100
200602231257	05022112	XCTD-1	-	MK-100
200602280811	05022147	XCTD-1	-	MK-100
200602281010	05022144	XCTD-1	-	MK-100
200602281209	05022141	XCTD-1	-	MK-100
200603030605	05022143	XCTD-1	-	MK-100
200603030613	05022140	XCTD-1	-	MK-100
200603030812	05022136	XCTD-1	-	MK-100
200603031014	05022145	XCTD-1	-	MK-100
200603031218	05022137	XCTD-1	-	MK-100
200603031428	05022146	XCTD-1	-	MK-100
200603070046	05022139	XCTD-1	-	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.

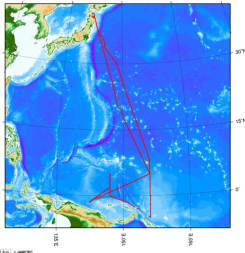
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



MR06-01
Ship Name: MIRAI
Period: 2006-02-05 - 2006-03-18
Chief Scientist: Yuji Kashino (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS)]

[Enlarge Image](#)

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

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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

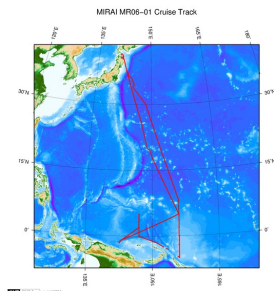
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



 [Enlarge Image](#)

MR06-01

Ship Name: MIRAI

Period: 2006-02-05 - 2006-03-18

Chief Scientist: Yuji Kashino (JAMSTEC)

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

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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

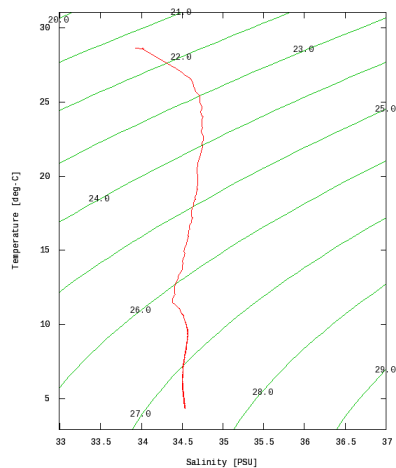
Imagery reproduced from ...

Figures

200602150440



MR06-01: 200602150440
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

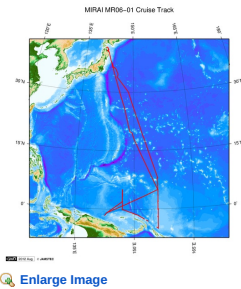
<input type="checkbox"/>	200602150440.dat
<input type="checkbox"/>	200602150645.dat
<input type="checkbox"/>	200602150849.dat
<input type="checkbox"/>	200602150857.dat
<input type="checkbox"/>	200602151055.dat
<input type="checkbox"/>	200602151257.dat
<input type="checkbox"/>	200602170410.dat
<input type="checkbox"/>	200602170610.dat
<input type="checkbox"/>	200602170810.dat
<input type="checkbox"/>	200602171011.dat
<input type="checkbox"/>	200602171213.dat
<input type="checkbox"/>	200602190356.dat
<input type="checkbox"/>	200602190556.dat
<input type="checkbox"/>	200602190756.dat

-  200602150337.dat
-  200602210535.dat
-  200602210734.dat
-  200602230444.dat
-  200602230647.dat
-  200602230849.dat
-  200602231052.dat
-  200602231257.dat
-  200602280811.dat
-  200602281010.dat
-  200602281209.dat
-  200603030605.dat
-  200603030613.dat
-  200603030812.dat
-  200603031014.dat
-  200603031218.dat
-  200603031428.dat
-  200603070046.dat
-  ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200602150440	2006-02-15 04:35	7.4996	155.8848
200602150645	2006-02-15 06:40	6.9998	155.9253
200602150849	2006-02-15 08:44	6.4998	155.9571
200602150857	2006-02-15 08:52	6.4755	155.9568
200602151055	2006-02-15 10:50	5.9998	155.9611
200602151257	2006-02-15 12:52	5.4998	155.9646
200602170410	2006-02-17 04:05	4.4998	156.0045
200602170610	2006-02-17 06:05	3.9998	156.0018
200602170810	2006-02-17 08:05	3.4998	155.9970
200602171011	2006-02-17 10:06	2.9998	155.9981
200602171213	2006-02-17 12:08	2.5000	155.9986
200602190356	2006-02-19 03:51	1.5000	155.9655
200602190556	2006-02-19 05:51	0.9998	155.9813
200602190756	2006-02-19 07:51	0.5000	155.9733
200602210337	2006-02-21 03:31	-0.5000	156.0318
200602210535	2006-02-21 05:30	-1.0000	156.0255
200602210734	2006-02-21 07:29	-1.5000	156.0148
200602230444	2006-02-23 04:39	-2.4998	156.0261
200602230647	2006-02-23 06:42	-3.0000	156.0223
200602230849	2006-02-23 08:44	-3.5000	156.0188
200602231052	2006-02-23 10:47	-4.0001	156.0268
200602231257	2006-02-23 12:52	-4.5000	156.0256
200602280811	2006-02-28 08:06	0.5000	147.0283
200602281010	2006-02-28 10:05	1.0000	147.0055
200602281209	2006-02-28 12:04	1.5000	146.9981
200603030605	2006-03-03 06:03	4.5000	146.9790
200603030613	2006-03-03 06:08	4.4838	146.9788
200603030812	2006-03-03 08:07	4.0000	146.9701
200603031014	2006-03-03 10:09	3.5000	146.9556
200603031218	2006-03-03 12:13	3.0001	146.9521
200603031428	2006-03-03 14:23	2.5000	146.9445
200603070046	2006-03-07 00:41	-2.4554	141.9305

Related Information



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Ship Name: MIRAI
Period: 2006-02-05 - 2006-03-18
Chief Scientist: Yuji Kashino (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS)]

Update History

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