

MIRAI MR09-04 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

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

Cruise ID: [MR09-04](#)

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/MR09-04_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.

$$Z = at + 10E^{-3} * bt^2$$

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
200911050013	09064691	XCTD-1	Auto	MK-130
200911050230	09064697	XCTD-1	Auto	MK-130
200911050505	09064695	XCTD-1	Auto	MK-130
200911051140	09064686	XCTD-1	Auto	MK-130
200911051422	09064696	XCTD-1	Auto	MK-130
200911051545	09064693	XCTD-1	Auto	MK-130
200911051708	09064692	XCTD-1	Auto	MK-130
200911051830	09064688	XCTD-1	Auto	MK-130
200911051950	09064694	XCTD-1	Auto	MK-130
200911052111	09074918	XCTD-1	Auto	MK-130
200911052232	09064687	XCTD-1	Auto	MK-130
200911052357	09064685	XCTD-1	Auto	MK-130
200911060122	09064681	XCTD-1	Auto	MK-130
200911060247	09064679	XCTD-1	Auto	MK-130
200911060410	09064586	XCTD-1	Auto	MK-130
200911060533	09064684	XCTD-1	Auto	MK-130
200911060655	09064682	XCTD-1	Auto	MK-130
200911060941	09064584	XCTD-1	Auto	MK-130
200911061248	09064690	XCTD-1	Auto	MK-130
200911061648	09064689	XCTD-1	Auto	MK-130
200911062253	09064680	XCTD-1	Auto	MK-130
200911070412	09064683	XCTD-1	Auto	MK-130
200911070934	09064678	XCTD-1	Auto	MK-130
200911140253	09075028	XCTD-1	Auto	MK-130
200911140510	09075022	XCTD-1	Auto	MK-130
200911140723	09064587	XCTD-1	Auto	MK-130
200911140933	09064585	XCTD-1	Auto	MK-130
200911141148	09075025	XCTD-1	Auto	MK-130
200911141406	09075019	XCTD-1	Auto	MK-130
200911160033	09075027	XCTD-1	Auto	MK-130
200911170504	09075024	XCTD-1	Auto	MK-130
200911182336	09075021	XCTD-1	Auto	MK-130
200911210430	09075018	XCTD-1	Auto	MK-130
200911222319	09075017	XCTD-1	Auto	MK-130
200911300147	09075020	XCTD-1	Auto	MK-130

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.

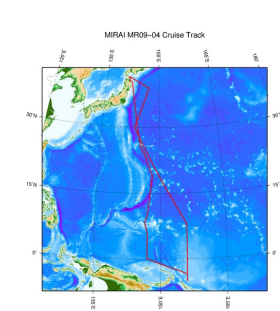
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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](#)

MR09-04

Ship Name: MIRAI
 Period: 2009-11-03 - 2009-12-12
 Chief Scientist: Yuji Kashino (JAMSTEC)
 Project Name: [Tropical Ocean Climate Study (TOCS), Station KEO]
 Proposal ▶ Tropical Ocean Climate Study
 Title:

Update History

2019-08-31 An observation data was registerd.

2017-06-14	An observation data was registerd.
2014-08-06	An observation data was registerd.
2014-02-18	An observation data was registerd.
2012-09-28	An observation data was registerd.

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HYPER-DOLPHIN
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6K Camera DEEP TOW
6K Sonar DEEP TOW
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Last Modified: 2019-08-31

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

Cruise ID: [MR09-04](#)

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 : 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

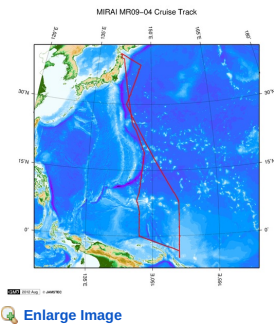
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



MR09-04

Ship Name: MIRAI

Period: 2009-11-03 - 2009-12-12

Chief Scientist: Yuji Kashino (JAMSTEC)

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

Proposal ▶ Tropical Ocean Climate Study

Title:

Update History

2019-08-31	An observation data was registerd.
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POWER GRAB SAMPLER

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Cruise ID: **MR09-04**

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

Data Policy: **JAMSTEC**

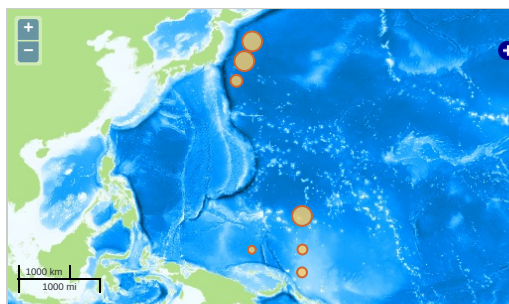
Observation Items: Depth, Temperature, Salinity

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

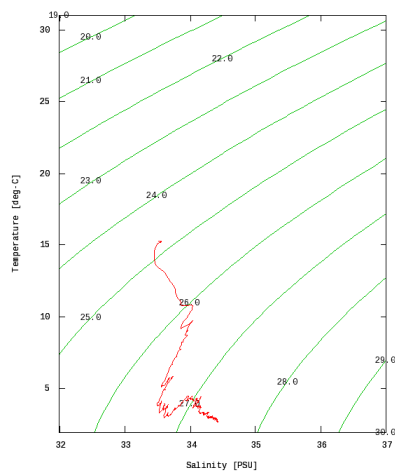
Imagery reproduced from ...

Figures

200911050013



MR09-04: 200911050013
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

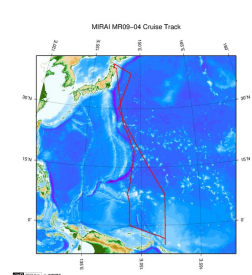
200911050013.dat
200911050230.dat
200911050505.dat
200911051140.dat
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 200911141406.dat
 200911160033.dat
 200911170504.dat
 200911182336.dat
 200911210430.dat
 200911222319.dat
 200911300147.dat
 ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200911050013	2009-11-05 00:15	39.0011	147.0998
200911050230	2009-11-05 02:32	38.5040	146.9018
200911050505	2009-11-05 05:06	38.0033	146.7013
200911051140	2009-11-05 11:41	37.4995	146.4996
200911051422	2009-11-05 14:23	37.0013	146.3003
200911051545	2009-11-05 15:46	36.7508	146.2003
200911051708	2009-11-05 17:09	36.5020	146.1008
200911051830	2009-11-05 18:31	36.2521	146.0003
200911051950	2009-11-05 19:51	36.0028	145.9018
200911052111	2009-11-05 21:12	35.7520	145.7996
200911052232	2009-11-05 22:33	35.5020	145.7006
200911052357	2009-11-05 23:58	35.2545	145.6014
200911060122	2009-11-06 01:24	35.0038	145.5016
200911060247	2009-11-06 02:49	34.7545	145.4013
200911060410	2009-11-06 04:12	34.5038	145.3015
200911060533	2009-11-06 05:34	34.2543	145.2024
200911060655	2009-11-06 06:57	34.0038	145.1010
200911060941	2009-11-06 09:42	33.5040	144.9019
200911061248	2009-11-06 12:49	33.0015	144.7005
200911061648	2009-11-06 16:50	32.5026	144.5004
200911062253	2009-11-06 22:54	32.0035	144.3026
200911070412	2009-11-07 04:13	31.0040	143.9016
200911070934	2009-11-07 09:35	30.0030	143.4995
200911140253	2009-11-14 02:54	8.0083	155.9556
200911140510	2009-11-14 05:11	7.5036	155.9996
200911140723	2009-11-14 07:24	7.0041	155.9991
200911140933	2009-11-14 09:35	6.5031	156.0033
200911141148	2009-11-14 11:49	6.0031	156.0006
200911141406	2009-11-14 14:07	5.5021	155.9998
200911160033	2009-11-16 00:35	4.9676	156.0470
200911170504	2009-11-17 05:05	2.0528	156.0228
200911182336	2009-11-18 23:37	0.0046	156.0441
200911210430	2009-11-21 04:31	-2.0098	155.9480
200911222319	2009-11-22 23:20	-5.0295	156.0170
200911300147	2009-11-30 01:48	1.9950	147.0305

Related Information



 [Enlarge Image](#)

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Ship Name: MIRAI
Period: 2009-11-03 - 2009-12-12
Chief Scientist: Yuji Kashino (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS), Station KEO]
Proposal ▶ Tropical Ocean Climate Study
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