

MIRAI MR12-03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

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

Cruise ID: [MR12-03](#)

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/MR12-03_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) (MR11-04 -)



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

In addition, coefficients of the rate equation are different by probe type.

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
201207250648	12057601	XCTD-1	Auto	MK-150N
201207260840	12057604	XCTD-1	Auto	MK-150N
201207261116	12057605	XCTD-1	Auto	MK-150N
201207261401	12057603	XCTD-1	Auto	MK-150N
201207261639	12057602	XCTD-1	Auto	MK-150N
201207280334	12057606	XCTD-1	Auto	MK-150N
201207290117	12057607	XCTD-1	Auto	MK-150N
201207312210	12057609	XCTD-1	Auto	MK-150N
201208010003	12057608	XCTD-1	Auto	MK-150N
201208010603	12057612	XCTD-1	Auto	MK-150N
201208010746	12057611	XCTD-1	Auto	MK-150N
201208010941	12057610	XCTD-1	Auto	MK-150N
201208011136	12057613	XCTD-1	Auto	MK-150N
201208020502	12057614	XCTD-1	Auto	MK-150N
201208020707	12057618	XCTD-1	Auto	MK-150N
201208020916	12057617	XCTD-1	Auto	MK-150N
201208021123	12057621	XCTD-1	Auto	MK-150N
201208021317	12057622	XCTD-1	Auto	MK-150N
201208021518	12057615	XCTD-1	Auto	MK-150N
201208021710	12057616	XCTD-1	Auto	MK-150N
201208021858	12057619	XCTD-1	Auto	MK-150N
201208022040	12057620	XCTD-1	Auto	MK-150N
201208022223	12057623	XCTD-1	Auto	MK-150N
201208041036	12057624	XCTD-1	Auto	MK-150N
201208051041	12057626	XCTD-1	Auto	MK-150N
201208051601	12057625	XCTD-1	Auto	MK-150N
201208060803	11125642	XCTD-1	Auto	MK-150N
201208100125	12036649	XCTD-1	Auto	MK-150N
201208102320	12036650	XCTD-1	Auto	MK-150N
201208160128	12057627	XCTD-1	Auto	MK-150N
201208190122	12057628	XCTD-1	Auto	MK-150N
201208190409	12057630	XCTD-1	Auto	MK-150N
201208190654	12057629	XCTD-1	Auto	MK-150N
201208190933	12057631	XCTD-1	Auto	MK-150N
201208191208	12057632	XCTD-1	Auto	MK-150N
201208191451	12057635	XCTD-1	Auto	MK-150N
201208191837	12057634	XCTD-1	Auto	MK-150N
201208191849	12057633	XCTD-1	Auto	MK-150N
201208210138	12057636	XCTD-1	Auto	MK-150N

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.

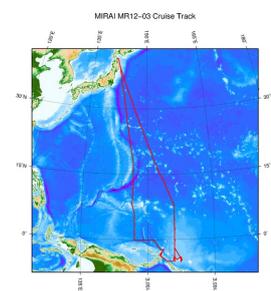
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



MR12-03

Ship Name: MIRAI
 Period: 2012-07-16 - 2012-08-29
 Chief Scientist: Yuji Kashino (JAMSTEC)
 Project Name: [Tropical Ocean Climate Study (TOCS)]

[Enlarge Image](#)

Update History	
2019-08-31	An observation data was registerd.
2017-06-14	An observation data was registerd.
2015-05-22	An observation data was registerd.
2014-09-10	An observation data was registerd.

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Dive ID:



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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

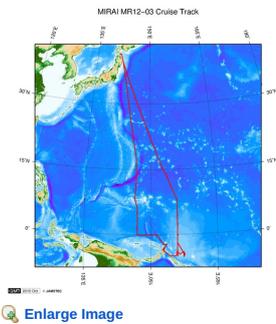
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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Sample Program

[ex_read2.f](#)

Related Information



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 Ship Name: MIRAI
 Period: 2012-07-16 - 2012-08-29
 Chief Scientist: Yuji Kashino (JAMSTEC)
 Project Name: [Tropical Ocean Climate Study (TOCS)]

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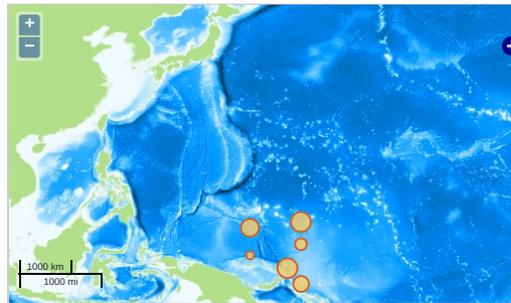
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 Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed
 Data Policy: **JAMSTEC**
 Observation Items: Depth, Temperature, Salinity
 Science Keywords:
 OCEANS > OCEAN > WATER
 TEMPERATURE TEMPERATURE
 OCEANS > SALINITY/DENSITY > SALINITY

Observation Map

1. Clicking the icon displays a balloon with observation information.
2. Then click the observation name, figures will be displayed.

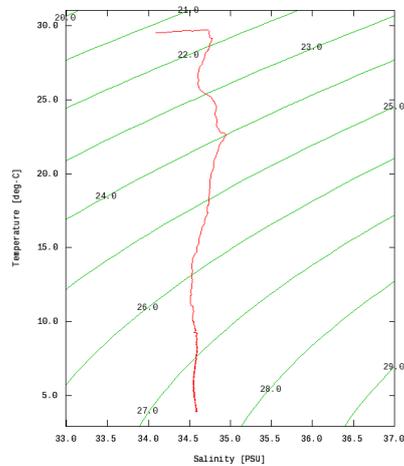


Figures

201207250648



MR12-03: 201207250648
 Expendable Conductivity-Temperature-Depth Profiler (XCTD): Salinity

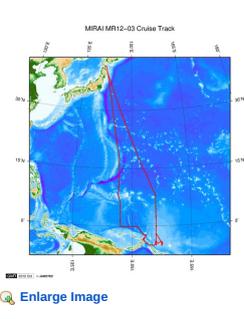


Only values evaluated as "good" : all flags are 0" are plotted in profiles.
 Please see Forast Page for the definition of quality flags.

Data List

[Add to Basket](#)

File names
<input type="checkbox"/> 201207250648.dat
<input type="checkbox"/> 201207260840.dat
<input type="checkbox"/> 201207261116.dat
<input type="checkbox"/> 201207261401.dat
<input type="checkbox"/> 201207261639.dat
<input type="checkbox"/> 201207280334.dat
<input type="checkbox"/> 201207290117.dat
<input type="checkbox"/> 201207312210.dat
<input type="checkbox"/> 201208010003.dat
<input type="checkbox"/> 201208010603.dat
<input type="checkbox"/> 201208010746.dat
<input type="checkbox"/> 201208010941.dat
<input type="checkbox"/> 201208011136.dat
<input type="checkbox"/> 201208020502.dat



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