

MIRAI MR07-01 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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Cruise ID: [MR07-01](#)

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/MR07-01_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.

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

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
200703070300	06037396	XCTD-1	Auto	MK-100
200703070708	06090159	XCTD-1	Auto	MK-100
200703071120	06090162	XCTD-1	Auto	MK-100
200703071531	06090171	XCTD-1	Auto	MK-100
200703080452	06090163	XCTD-1	Auto	MK-100
200703080932	06090169	XCTD-1	Auto	MK-100
200703081207	06090172	XCTD-1	Auto	MK-100
200703081609	06090170	XCTD-1	Auto	MK-100
200703090423	06090160	XCTD-1	Auto	MK-100
200703141019	05115772	XCTD-1	Auto	MK-100
200703151608	05115775	XCTD-1	Auto	MK-100
200703161601	05115776	XCTD-1	Auto	MK-100
200703180843	05115773	XCTD-1	Auto	MK-100
200703180858	05115774	XCTD-1	Auto	MK-100
200703182037	06079406	XCTD-1	Auto	MK-100
200703192036	05115777	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.

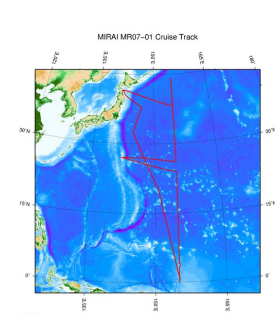
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



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MR07-01

Ship Name: MIRAI
Period: 2007-02-16 - 2007-03-26
Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)
Project Name: [Station KNOT]

Update History

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

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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

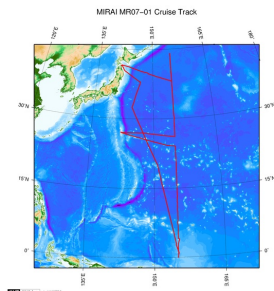
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



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Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)

Project Name: [Station KNOT]

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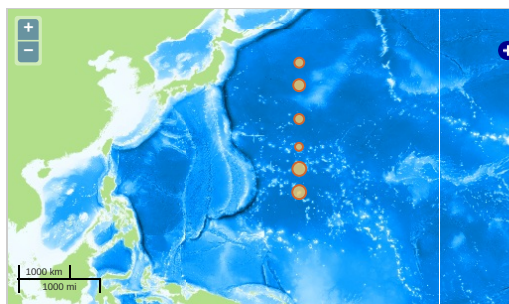
Observation Items: Depth, Temperature, Salinity

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.



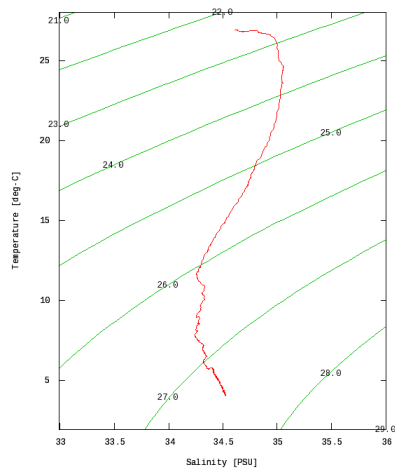
Imagery reproduced from ...

Figures

200703070300



MR07-01: 200703070300
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

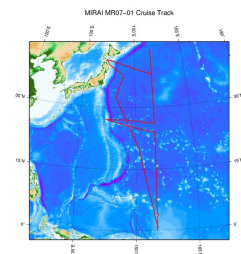
<input type="checkbox"/>	200703070300.dat
<input type="checkbox"/>	200703070708.dat
<input type="checkbox"/>	200703071120.dat
<input type="checkbox"/>	200703071531.dat
<input type="checkbox"/>	200703080452.dat
<input type="checkbox"/>	200703080932.dat
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<input type="checkbox"/>	200703090423.dat
<input type="checkbox"/>	200703141019.dat
<input type="checkbox"/>	200703151608.dat
<input type="checkbox"/>	200703161601.dat
<input type="checkbox"/>	200703180843.dat
<input type="checkbox"/>	200703180858.dat

-  20070307037.dat
-  200703192036.dat
-  ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200703070300	2007-03-07 02:55	16.0153	154.9970
200703070708	2007-03-07 07:03	17.0000	154.9996
200703071120	2007-03-07 11:15	17.9996	155.0001
200703071531	2007-03-07 15:26	19.0001	154.9996
200703080452	2007-03-08 04:47	20.1388	155.0190
200703080932	2007-03-08 09:27	21.3336	155.0001
200703081207	2007-03-08 12:02	22.0003	154.9993
200703081609	2007-03-08 16:04	23.0001	155.0023
200703090423	2007-03-09 04:18	24.0553	154.9621
200703141019	2007-03-14 10:14	29.0000	154.9935
200703151608	2007-03-15 16:03	32.0001	154.9943
200703161601	2007-03-16 15:56	35.0003	154.9890
200703180843	2007-03-18 08:38	37.9863	154.9918
200703180858	2007-03-18 08:53	37.9720	154.9695
200703182037	2007-03-18 20:32	38.9998	155.0111
200703192036	2007-03-19 20:31	41.0011	155.0078

Related Information



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