

MIRAI MR00-K07 Leg1 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-28

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Cruise ID: [MR00-K07 Leg1](#)

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/MR00-K07_leg1-2_all.pdf

For Using Data

Principal Investigator

Data Management Office

JAMSTEC / BPPT joint cruise in the Indonesian waters.

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			
Measurment 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
200010200608	00092610	XCTD-1	Hand	MK-100
200010200733	00092615	XCTD-1	-	MK-100
200010200857	00092609	XCTD-1	-	MK-100
200010201020	00092612	XCTD-1	Hand	MK-100
200010201147	00092608	XCTD-1	Hand	MK-100
200010201315	00092611	XCTD-1	Hand	MK-100
200010201446	00092616	XCTD-1	Hand	MK-100
200010201617	00092617	XCTD-1	Hand	MK-100
200010201751	00092618	XCTD-1	Hand	MK-100
200010201930	00092621	XCTD-1	Hand	MK-100
200010202050	00092620	XCTD-1	Hand	MK-100
200010202215	00092619	XCTD-1	Hand	MK-100
200010202342	00092758	XCTD-1	Hand	MK-100
200010210109	00092757	XCTD-1	-	MK-100
200010210237	00092756	XCTD-1	Hand	MK-100
200010210416	00092749	XCTD-1	-	MK-100
200010210651	00092752	XCTD-1	-	MK-100
200010210814	00092751	XCTD-1	-	MK-100
200010210938	00092753	XCTD-1	Hand	MK-100
200010211104	00092748	XCTD-1	Hand	MK-100
200010211231	00092750	XCTD-1	Hand	MK-100
200010211356	00092747	XCTD-1	Hand	MK-100
200010211520	00092746	XCTD-1	Hand	MK-100
200010211646	00092745	XCTD-1	Hand	MK-100
200010211811	00092694	XCTD-1	Hand	MK-100
200010211940	00092691	XCTD-1	-	MK-100
200010212107	00092695	XCTD-1	-	MK-100
200010212238	00092696	XCTD-1	-	MK-100
200010220004	00092687	XCTD-1	-	MK-100
200010220132	00092692	XCTD-1	Hand	MK-100
200010220301	00092693	XCTD-1	Hand	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.

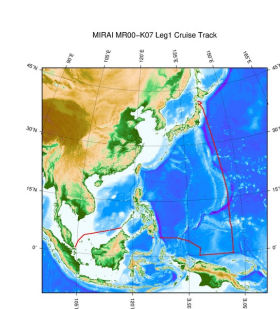
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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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MR00-K07 Leg1

Ship Name: MIRAI
Period: 2000-10-18 - 2000-11-08
Chief Scientist: Keisuke Mizuno (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS)]

Update History

2019-08-28	An observation data was registerd.
2017-06-14	An observation data was registerd.
2016-10-11	An observation data was registerd.

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

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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

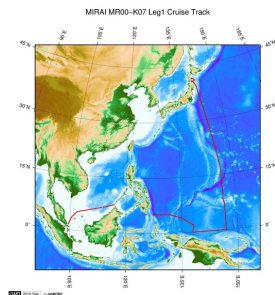
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



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Ship Name: MIRAI

Period: 2000-10-18 - 2000-11-08

Chief Scientist: Keisuke Mizuno (JAMSTEC)

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

Update History

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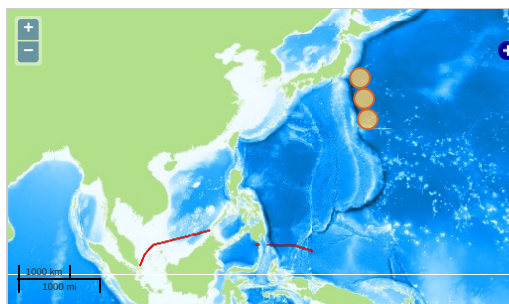
Observation Items: Depth, Temperature, Salinity

Science Keywords:

OCEANS > OCEAN > WATER
TEMPERATURE
OCEANS > SALINITY/DENSITY > SALINITY

Observation Map

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

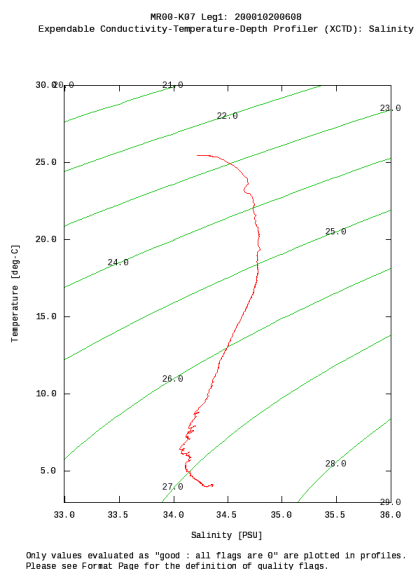


— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

Imagery reproduced from ...

Figures

200010200608





Data List


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File names


☐ 200010200608.dat
☐ 200010200733.dat
☐ 200010200857.dat
☐ 200010201020.dat
☐ 200010201147.dat
☐ 200010201315.dat
☐ 200010201446.dat
☐ 200010201617.dat
☐ 200010201751.dat
☐ 200010201930.dat
☐ 200010202050.dat
☐ 200010202215.dat
☐ 200010202342.dat
☐ 200010210109.dat


- 


ex_read237.dat
- 


200010210416.dat
- 


200010210651.dat
- 


200010210814.dat
- 


200010210938.dat
- 


200010211104.dat
- 


200010211231.dat
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200010211356.dat
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200010211520.dat
- 


200010211646.dat
- 


200010211811.dat
- 


200010211940.dat
- 

200010212107.dat
- 

200010212238.dat
- 

200010220004.dat
- 

200010220132.dat
- 

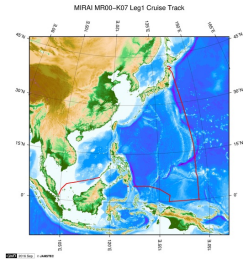
200010220301.dat
- 

ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200010200608	2000-10-20 06:02	35.0001	143.3605
200010200733	2000-10-20 07:28	34.6668	143.4588
200010200857	2000-10-20 08:51	34.3331	143.5271
200010201020	2000-10-20 10:15	34.0000	143.5826
200010201147	2000-10-20 11:42	33.6666	143.6485
200010201315	2000-10-20 13:10	33.3335	143.7070
200010201446	2000-10-20 14:41	33.0001	143.7741
200010201617	2000-10-20 16:12	32.6666	143.8451
200010201751	2000-10-20 17:46	32.3328	143.9120
200010201930	2000-10-20 19:25	31.9978	143.9976
200010202050	2000-10-20 20:45	31.6668	144.0403
200010202215	2000-10-20 22:09	31.3336	144.0923
200010202342	2000-10-20 23:37	31.0008	144.1455
200010210109	2000-10-21 01:04	30.6666	144.2093
200010210237	2000-10-21 02:32	30.3308	144.2748
200010210416	2000-10-21 04:11	29.9966	144.3341
200010210651	2000-10-21 06:45	29.6666	144.3938
200010210814	2000-10-21 08:08	29.3331	144.4466
200010210938	2000-10-21 09:33	29.0000	144.5111
200010211104	2000-10-21 10:59	28.6666	144.5693
200010211231	2000-10-21 12:25	28.3333	144.6248
200010211356	2000-10-21 13:51	28.0001	144.6803
200010211520	2000-10-21 15:15	27.6668	144.7403
200010211646	2000-10-21 16:40	27.3330	144.8015
200010211811	2000-10-21 18:06	27.0001	144.8503
200010211940	2000-10-21 19:35	26.6666	144.9060
200010212107	2000-10-21 21:02	26.3345	144.9758
200010212238	2000-10-21 22:32	26.0003	145.0315
200010220004	2000-10-21 23:59	25.6665	145.0831
200010220132	2000-10-22 01:26	25.3331	145.1350
200010220301	2000-10-22 02:56	25.0003	145.2051

Related Information



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Chief Scientist: Keisuke Mizuno (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS)]

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KM-ROV
POWER GRAB SAMPLER
(SHELL)
POWER GRAB SAMPLER
(CLOW)
BMS

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