

MIRAI MR00-K08 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-28

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

Cruise ID: [MR00-K08](#)

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

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
200101120850	00072087	XCTD-1	Hand	MK-100
200101140455	00072090	XCTD-1	-	MK-100
200101141227	00072093	XCTD-1	-	MK-100
200101141957	00072097	XCTD-1	-	MK-100
200101150529	00072094	XCTD-1	-	MK-100
200101150541	00072098	XCTD-1	-	MK-100
200101150554	00072088	XCTD-1	-	MK-100
200101151249	00072091	XCTD-1	-	MK-100
200101170549	00072099	XCTD-1	-	MK-100
200101171303	00061819	XCTD-1	-	MK-100
200101172012	00072095	XCTD-1	-	MK-100
200101180527	00092643	XCTD-1	-	MK-100
200101181255	00072089	XCTD-1	-	MK-100
200101181306	00092635	XCTD-1	-	MK-100
200101181318	00092636	XCTD-1	-	MK-100
200101182053	00072092	XCTD-1	-	MK-100
200101190628	00092638	XCTD-1	-	MK-100
200101201511	00061817	XCTD-1	-	MK-100
200101202239	00092640	XCTD-1	-	MK-100
200101210621	00092641	XCTD-1	-	MK-100
200101211406	00092637	XCTD-1	-	MK-100
200101220456	00092634	XCTD-1	-	MK-100
200101221211	00092647	XCTD-1	-	MK-100
200101221945	00092645	XCTD-1	-	MK-100
200101230911	00092644	XCTD-1	-	MK-100
200101241811	00103183	XCTD-1	-	MK-100
200101250139	00103180	XCTD-1	-	MK-100
200101261001	00092639	XCTD-1	-	MK-100
200101261714	00103182	XCTD-1	-	MK-100
200101270016	00103186	XCTD-1	-	MK-100
200101270853	00103185	XCTD-1	-	MK-100
200101271612	00103181	XCTD-1	-	MK-100
200101280418	00103177	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.

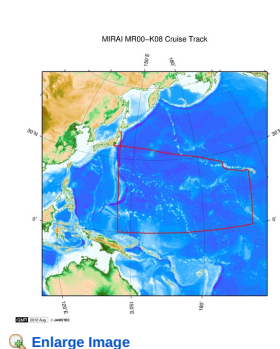
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



MR00-K08
Ship Name: MIRAI
Period: 2000-12-27 - 2001-02-07
Chief Scientist: Takeshi Kawano (JAMSTEC)

Update History

2019-08-28	An observation data was registered.
2017-06-14	An observation data was registered.
2014-07-12	An observation data was registered.
2014-02-18	An observation data was registered.
2012-12-25	An observation data was registered.

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What's New

Update History
Feeds

Lists

Publication List
Amount of Public Info.

Data

Map Search
Data Tree
Detailed Search

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SHINKAI 6500
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URASHIMA
YOKOSUKA DEEP TOW
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[ReadMe](#) [Observation Data](#) [Data Format](#)

Cruise ID: [MR00-K08](#)

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

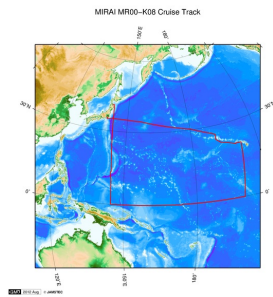
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



[Enlarge Image](#)

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Chief Scientist: Takeshi Kawano (JAMSTEC)

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[Update History](#)

[Feeds](#)

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[Publication List](#)

[Amount of Public Info.](#)

Data

[Map Search](#)

[Data Tree](#)

[Detailed Search](#)

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Data Policy: **JAMSTEC**

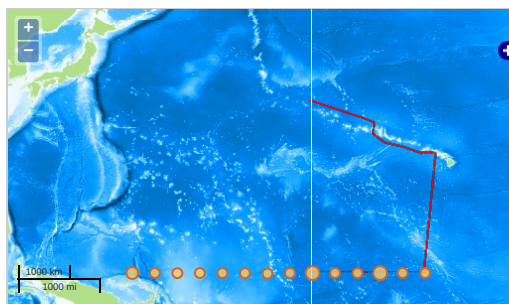
Observation Items: Depth, Temperature, Salinity

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 ...

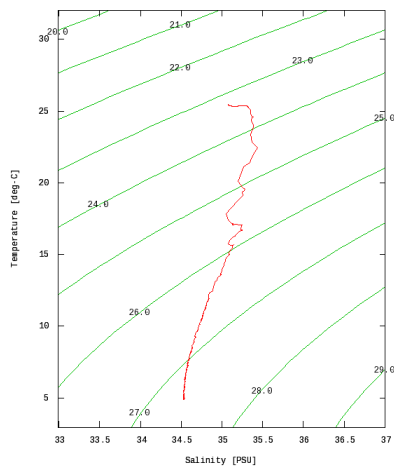
Figures

200101120850



MR00-K08: 200101120850

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

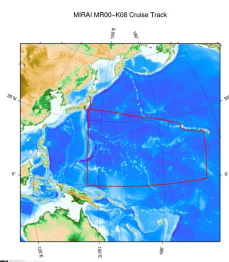
☐ 200101120850.dat
☐ 200101140455.dat
☐ 200101141227.dat
☐ 200101141957.dat
☐ 200101150529.dat
☐ 200101150541.dat
☐ 200101150554.dat
☐ 200101151249.dat
☐ 200101170549.dat
☐ 200101171303.dat
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☐ 200101180527.dat
☐ 200101181255.dat
☐ 200101181306.dat

 200101182053.dat
 200101190628.dat
 200101201511.dat
 200101202239.dat
 200101210621.dat
 200101211406.dat
 200101220456.dat
 200101221211.dat
 200101221945.dat
 200101230911.dat
 200101241811.dat
 200101250139.dat
 200101261001.dat
 200101261714.dat
 200101270016.dat
 200101270853.dat
 200101271612.dat
 200101280418.dat
 ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200101120850	2001-01-12 08:45	-0.0011	-160.0008
200101140455	2001-01-14 04:50	0.0023	-162.0006
200101141227	2001-01-14 12:22	0.0000	-164.0010
200101141957	2001-01-14 19:52	-0.0018	-165.9998
200101150529	2001-01-15 05:24	-0.0016	-168.0006
200101150541	2001-01-15 05:36	-0.0010	-168.0463
200101150554	2001-01-15 05:49	-0.0003	-168.0925
200101151249	2001-01-15 12:44	-0.0020	-170.0006
200101170549	2001-01-17 05:44	0.0006	-172.0058
200101171303	2001-01-17 12:59	-0.0018	-174.0006
200101172012	2001-01-17 20:07	0.0006	-176.0006
200101180527	2001-01-18 05:22	0.0018	-178.0621
200101181255	2001-01-18 12:50	-0.0023	179.9993
200101181306	2001-01-18 13:01	-0.0020	179.9601
200101181318	2001-01-18 13:13	-0.0015	179.9173
200101182053	2001-01-18 20:48	0.0006	177.9996
200101190628	2001-01-19 06:23	-0.0001	175.9956
200101201511	2001-01-20 15:06	0.0030	173.9996
200101202239	2001-01-20 22:34	-0.1128	171.9998
200101210621	2001-01-21 06:15	-0.0628	170.0011
200101211406	2001-01-21 14:01	-0.0186	167.9998
200101220456	2001-01-22 04:51	0.0015	165.9980
200101221211	2001-01-22 12:05	0.0008	163.9998
200101221945	2001-01-22 19:40	0.0028	161.9998
200101230911	2001-01-23 09:06	-0.0025	160.0021
200101241811	2001-01-24 18:06	0.0015	157.9995
200101250139	2001-01-25 01:34	-0.0176	155.9995
200101261001	2001-01-26 09:55	0.0001	153.9990
200101261714	2001-01-26 17:08	0.0071	151.9998
200101270016	2001-01-27 00:11	0.0003	149.9991
200101270853	2001-01-27 08:48	0.0028	148.0000
200101271612	2001-01-27 16:07	-0.0086	145.9995
200101280418	2001-01-28 04:13	-0.0003	145.0015

Related Information



 [Enlarge Image](#)

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Chief Scientist: Takeshi Kawano (JAMSTEC)

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Data
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[Data Tree](#)
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