

MIRAI MR10-01 Leg2 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

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Cruise ID: [MR10-01 Leg2](#)

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/MR10-01_leg1-2_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
201002110634	07116482	XCTD-1	Auto	MK-130
201002111449	07116475	XCTD-1	Auto	MK-130
201002111739	07116480	XCTD-1	Auto	MK-130
201002112022	07116478	XCTD-1	Auto	MK-130
201002112258	07126974	XCTD-1	Auto	MK-130
201002120021	07126976	XCTD-1	Auto	MK-130
201002120142	07126973	XCTD-1	Auto	MK-130
201002120312	07126975	XCTD-1	Auto	MK-130
201002120455	07116484	XCTD-1	Auto	MK-130
201002120632	07116483	XCTD-1	Auto	MK-130
201002120759	07116479	XCTD-1	Auto	MK-130
201002121056	07116476	XCTD-1	Auto	MK-130
201002121341	07116477	XCTD-1	Auto	MK-130
201002121626	07116485	XCTD-1	Auto	MK-130
201002130301	07116481	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.

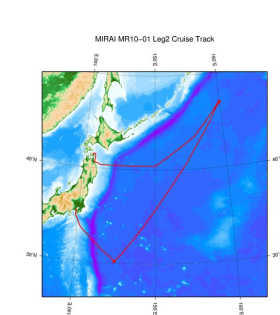
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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](#)

MR10-01 Leg2

Ship Name: MIRAI
Period: 2010-02-07 - 2010-02-24
Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)
Project Name: [Station K2, Station S1]
Proposal ▶ Change in material cycles and ecosystem by the climate change and its feed back
Title:

Update History

2019-08-31	An observation data was registered.
2017-06-14	An observation data was registered.
2014-08-06	An observation data was registered.
2014-02-18	An observation data was registered.
2012-09-28	An observation data was registered.

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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

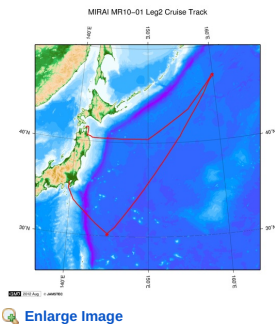
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



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Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)

Project Name: [Station K2, Station S1]

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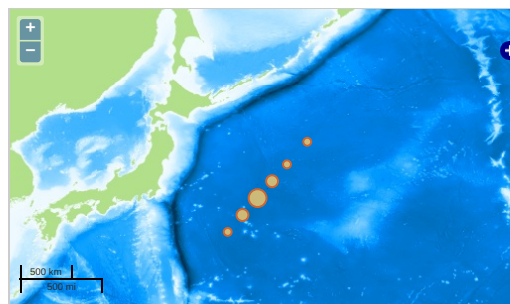
Observation Items: Depth, Temperature, Salinity

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.

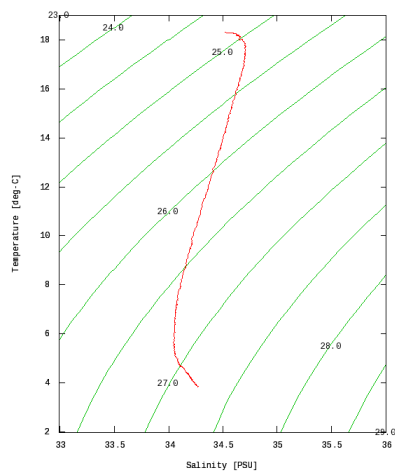


Figures

201002110634



MR10-01 Leg2: 201002110634
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

☐ 201002110634.dat
☐ 201002111449.dat
☐ 201002111739.dat
☐ 201002112022.dat
☐ 201002112258.dat
☐ 201002120021.dat
☐ 201002120142.dat
☐ 201002120312.dat
☐ 201002120455.dat
☐ 201002120632.dat
☐ 201002120759.dat
☐ 201002121056.dat
☐ 201002121341.dat
☐ 201002121626.dat

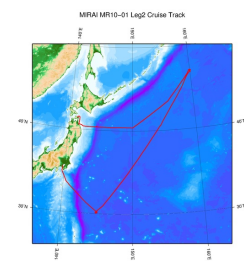
 [File names301.dat](#)

 [ex_read2.f \(Sample Program\)](#)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
201002110634	2010-02-11 06:36	31.9968	146.7485
201002111449	2010-02-11 14:50	33.4966	148.0598
201002111739	2010-02-11 17:41	33.9986	148.5290
201002112022	2010-02-11 20:24	34.4960	148.9595
201002112258	2010-02-11 22:59	34.9968	149.4000
201002120021	2010-02-12 00:22	35.2493	149.6058
201002120142	2010-02-12 01:44	35.4963	149.8103
201002120312	2010-02-12 03:13	35.7473	150.0258
201002120455	2010-02-12 04:56	35.9973	150.2473
201002120632	2010-02-12 06:33	36.2503	150.4710
201002120759	2010-02-12 08:01	36.4963	150.6885
201002121056	2010-02-12 10:57	36.9961	151.1228
201002121341	2010-02-12 13:42	37.4963	151.5481
201002121626	2010-02-12 16:27	37.9965	152.0111
201002130301	2010-02-13 03:02	39.9973	153.8128

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