

## MIRAI MR16-09 Leg1 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

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

Cruise ID: [MR16-09 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/MR16-09\\_leg1-4\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR16-09_leg1-4_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 -)



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
201701010151	14088777	XCTD-1	Auto	MK-150N
201701040112	14088776	XCTD-1	Auto	MK-150N
201701050239	14088779	XCTD-1	Auto	MK-150N
201701070242	14088780	XCTD-1	Auto	MK-150N
201701090124	14088781	XCTD-1	Auto	MK-150N
201701110054	14088782	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.

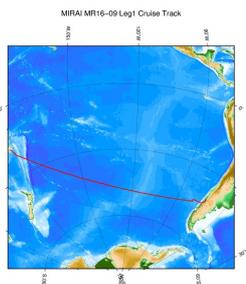
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



[Enlarge Image](#)

#### MR16-09 Leg1

Ship Name: MIRAI

Period: 2016-12-26 - 2017-01-17

Chief Scientist: Akihiko Murata (JAMSTEC)

Proposal ▶ Ship-borne measurements of aerosols in the marine atmosphere: Investigation of potential influence of marine aerosol particles on the climate;

#### Update History

2019-08-31	An observation data was registerd.
2019-03-29	An observation data was registerd.

#### JAMSTEC

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[What's New](#)

[Update History](#)

[Feeds](#)

#### Lists

[Publication List](#)

[Amount of Public Info.](#)

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[Map Search](#)

[Data Tree](#)

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#### Go to a Cruise Information

Cruise ID:

#### Go to a Dive Information

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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 : <a href="#">'Definition of Quality Control Flags'</a>
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.

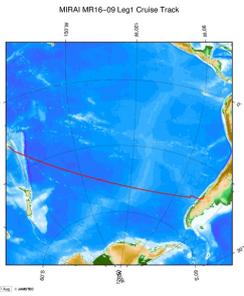
[QUALITY CONTROL AND PROCESSING OF HISTORICAL OCEANOGRAPHIC TEMPERATURE, SALINITY, AND OXYGEN DATA](#)

**Sample Program**

[ex\\_read2.f](#)

**Related Information**

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**MR16-09 Leg1**

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Period: 2016-12-26 - 2017-01-17

Chief Scientist: Akihiko Murata (JAMSTEC)

Proposal ▶ Ship-borne measurements of aerosols in the marine atmosphere: Investigation of potential influence of marine aerosol particles on the climate;

**Update History**

2019-08-31	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](#)
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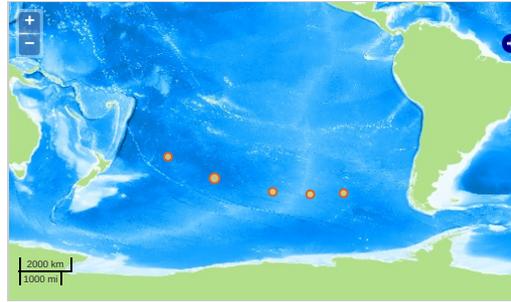
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Science Keywords:

OCEANS > OCEAN > WATER  
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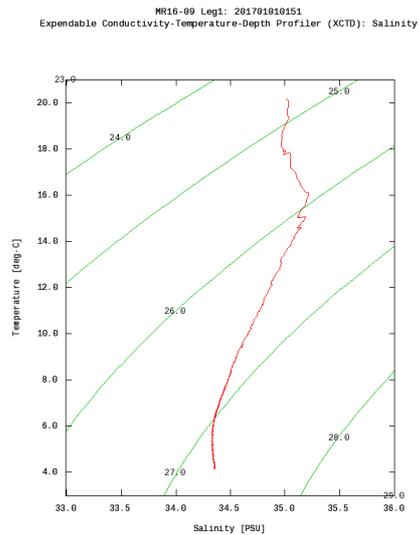
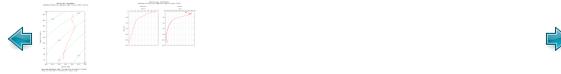
#### Observation Map

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



#### Figures

201701010151



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

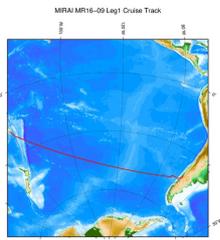
[Add to Basket](#)

<input type="checkbox"/> File names
<input type="checkbox"/> 201701010151.dat
<input type="checkbox"/> 201701040112.dat
<input type="checkbox"/> 201701050239.dat
<input type="checkbox"/> 201701070242.dat
<input type="checkbox"/> 201701090124.dat
<input type="checkbox"/> 201701110054.dat
<input type="checkbox"/> ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
201701010151	2017-01-01 01:54	-35.6935	-161.0320
201701040112	2017-01-04 01:13	-43.3521	-144.5863
201701050239	2017-01-05 02:40	-45.2265	-138.1946
201701070242	2017-01-07 02:44	-48.1743	-124.0086
201701090124	2017-01-09 01:25	-49.0733	-110.7781
201701110054	2017-01-11 00:55	-48.6496	-99.0293

#### Related Information



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[Amount of Public Info.](#)

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[Map Search](#)

[Data Tree](#)

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