

MIRAI MR18-05C Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2020-12-25

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

Cruise ID: [MR18-05C](#)

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/MR18-05C_all.pdf

For Using Data

Principal Investigator

Data Management Office

Use Constraints

See [Terms and Conditions](#) about constrain of use.

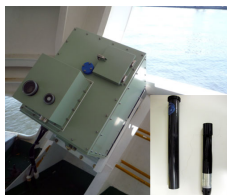
Data Citation

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.

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

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
201810310028	17025082	XCTD-1	Auto	MK-150N
201811010152	17025084	XCTD-1	Auto	MK-150N
201811060451	17121099	XCTD-1	Auto	MK-150N
201811060633	17121104	XCTD-1	Auto	MK-150N
201811060807	18086029	XCTD-1	Auto	MK-150N
201811060936	17121105	XCTD-1	Auto	MK-150N
201811061109	17121102	XCTD-1	Auto	MK-150N
201811061240	17121103	XCTD-1	Auto	MK-150N
201811061411	17121101	XCTD-1	Auto	MK-150N
201811150101	17121100	XCTD-1	Auto	MK-150N
201811201034	17121098	XCTD-1	Auto	MK-150N
201811202301	17121090	XCTD-1	Auto	MK-150N
201811230658	17121093	XCTD-1	Auto	MK-150N
201811231839	17121095	XCTD-1	Auto	MK-150N
201811232006	17121087	XCTD-1	Auto	MK-150N
201811232145	17121086	XCTD-1	Auto	MK-150N
201811232347	17121089	XCTD-1	Auto	MK-150N
201811240122	17121092	XCTD-1	Auto	MK-150N
201811250815	18086017	XCTD-1	Auto	MK-150N
201811270341	17121091	XCTD-1	Auto	MK-150N
201811271211	17121096	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.

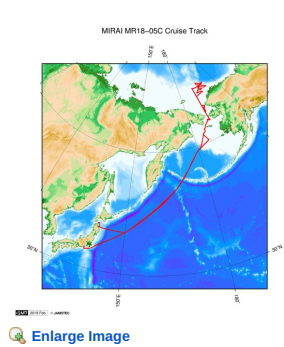
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



MR18-05C
Ship Name: MIRAI
Period: 2018-10-24 - 2018-12-06
Chief Scientist: Jun Inoue (National Institute of Polar Research)
Project Name: [Arctic Ocean Climate System Reaserch]
Proposal ▶ Predictability study on weather and sea-ice forecasts linked with user engagement
Title:

Update History

2020-12-25 An observation data was registerd.

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SHINKAI 6500
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HYPER-DOLPHIN
URASHIMA
YOKOSUKA DEEP TOW
6K Camera DEEP TOW
6K Sonar DEEP TOW
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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

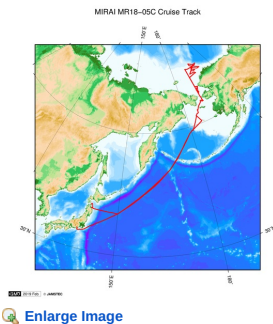
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



MR18-05C

Ship Name: MIRAI

Period: 2018-10-24 - 2018-12-06

Chief Scientist: Jun Inoue (National Institute of Polar Research)

Project Name: [Arctic Ocean Climate System Research]

Proposal ▶ Predictability study on weather and sea-ice forecasts linked with user engagement

Title:

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Data Policy: **JAMSTEC**

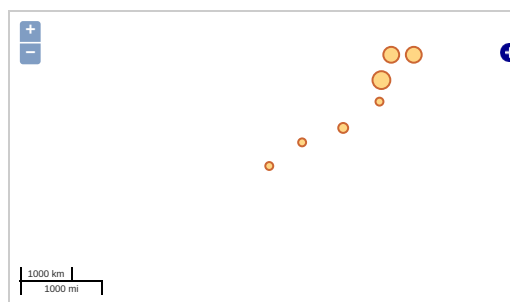
Observation Items: Depth, Temperature, Salinity

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.

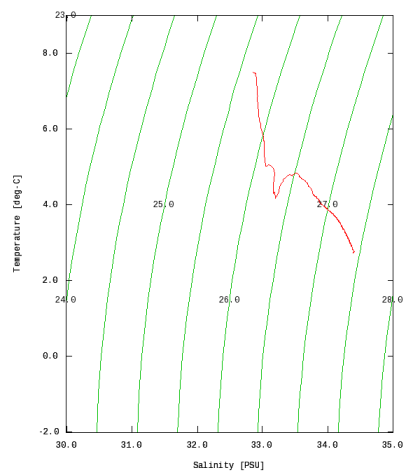


Figures

201810310028



MR18-05C: 201810310028
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

[Add to Basket](#)

File names

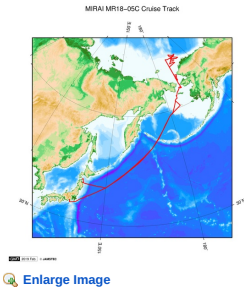
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<input type="checkbox"/>	201811010152.dat
<input type="checkbox"/>	201811060451.dat
<input type="checkbox"/>	201811060633.dat
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<input type="checkbox"/>	201811061411.dat
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<input type="checkbox"/>	201811202301.dat
<input type="checkbox"/>	201811230658.dat
<input type="checkbox"/>	201811231839.dat

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-  201811232145.dat
-  201811232347.dat
-  201811240122.dat
-  201811250815.dat
-  201811270341.dat
-  201811271211.dat
-  ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
201810310028	2018-10-31 00:29	53.2483	171.3393
201811010152	2018-11-01 01:53	57.4443	177.1743
201811060451	2018-11-06 04:53	73.0001	-167.0013
201811060633	2018-11-06 06:37	73.0000	-166.0003
201811060807	2018-11-06 08:08	73.0000	-164.9890
201811060936	2018-11-06 09:39	73.0001	-164.0013
201811061109	2018-11-06 11:11	73.0003	-163.0010
201811061240	2018-11-06 12:44	73.0005	-162.0003
201811061411	2018-11-06 14:14	72.9996	-161.0004
201811150101	2018-11-15 01:02	72.9978	-161.9995
201811201034	2018-11-20 10:35	71.7551	-167.0091
201811202301	2018-11-20 23:03	73.0041	-161.9855
201811230658	2018-11-23 07:02	68.5013	-168.7475
201811231839	2018-11-23 18:40	67.6826	-168.9223
201811232006	2018-11-23 20:08	67.7831	-168.6006
201811232145	2018-11-23 21:46	67.8985	-168.2368
201811232347	2018-11-23 23:48	68.0140	-167.8660
201811240122	2018-11-24 01:24	68.1275	-167.4930
201811250815	2018-11-25 08:16	64.6781	-169.0898
201811270341	2018-11-27 03:43	60.0090	-175.5351
201811271211	2018-11-27 12:12	59.2903	-178.5455

Related Information



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Period: 2018-10-24 - 2018-12-06
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