

MIRAI MR10-07 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

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

Cruise ID: [MR10-07](#)

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/MR10-07_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
201011240309	08048292	XCTD-1	Auto	MK-130
201011260300	10069401	XCTD-1	Auto	MK-130
201011260514	10069402	XCTD-1	Auto	MK-130
201011260636	10069404	XCTD-1	Auto	MK-130
201011260813	10069395	XCTD-1	Auto	MK-130
201011260944	10069403	XCTD-1	Auto	MK-130
201011261110	10069400	XCTD-1	Auto	MK-130
201011261239	10069399	XCTD-1	Auto	MK-130
201011261410	10069398	XCTD-1	Auto	MK-130
201011261541	10069489	XCTD-1	Auto	MK-130
201011261718	10079647	XCTD-1	Auto	MK-130
201011261846	10079646	XCTD-1	Auto	MK-130
201011262017	10079645	XCTD-1	Auto	MK-130
201011262158	10069406	XCTD-1	Auto	MK-130
201011262329	10069405	XCTD-1	Auto	MK-130
201011270102	10079644	XCTD-1	Auto	MK-130
201011270231	10079653	XCTD-1	Auto	MK-130
201011270407	10079655	XCTD-1	Auto	MK-130
201011270551	10079650	XCTD-1	Auto	MK-130
201011270734	10079648	XCTD-1	Auto	MK-130
201011270921	10079651	XCTD-1	Auto	MK-130
201011271121	10079649	XCTD-1	Auto	MK-130
201011271251	10079654	XCTD-1	Auto	MK-130
201011271508	10079652	XCTD-1	Auto	MK-130
201012050232	10027040	XCTD-1	Auto	MK-130
201012050818	10027041	XCTD-1	Auto	MK-130
201012051046	09075023	XCTD-1	Auto	MK-130
201012051316	09075026	XCTD-1	Auto	MK-130
201012102337	10027042	XCTD-1	Auto	MK-130
201012170916	10027043	XCTD-1	Auto	MK-130
201012181351	10027044	XCTD-1	Auto	MK-130
201012181456	10090169	XCTD-1	Auto	MK-130
201012181600	10090170	XCTD-1	Auto	MK-130
201012181706	10027047	XCTD-1	Auto	MK-130
201012181813	10090168	XCTD-1	Auto	MK-130
201012181920	10090171	XCTD-1	Auto	MK-130
201012182029	10027046	XCTD-1	Auto	MK-130
201012182143	10027045	XCTD-1	Auto	MK-130
201012190309	10090175	XCTD-1	Auto	MK-130
201012190413	10090174	XCTD-1	Auto	MK-130
201012190519	10090172	XCTD-1	Auto	MK-130
201012190625	10090173	XCTD-1	Auto	MK-130
201012191312	10090176	XCTD-1	Auto	MK-130
201012192036	10090177	XCTD-1	Auto	MK-130
201012200349	10090178	XCTD-1	Auto	MK-130
201012201100	10090179	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.

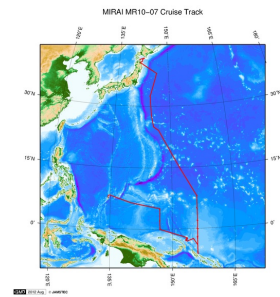
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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](#)

MR10-07

Ship Name: MIRAI

Period: 2010-11-23 - 2010-12-30

Chief Scientist: Yuji Kashino (JAMSTEC)

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

Proposal ▶ Tropical Ocean Climate Study

Title:

Update History

2019-08-31	An observation data was registered.
2017-06-14	An observation data was registered.
2014-08-08	An observation data was registered.
2014-02-18	An observation data was registered.
2012-12-13	An observation data was registered.

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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

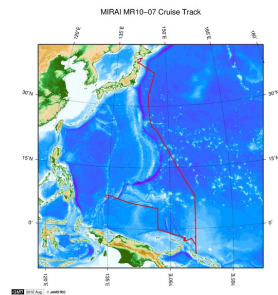
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



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MR10-07

Ship Name: MIRAI

Period: 2010-11-23 - 2010-12-30

Chief Scientist: Yuji Kashino (JAMSTEC)

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

Proposal ▶ Tropical Ocean Climate Study

Title:

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Data Policy: **JAMSTEC**

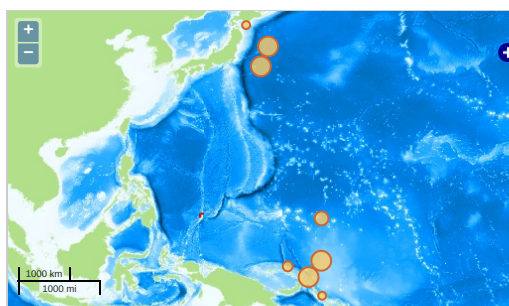
Observation Items: Depth, Temperature, Salinity

Science Keywords:

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

Observation Map

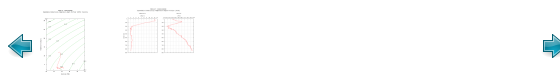
1. Clicking the icon displays a balloon with observation information.
2. Then click the observation name, figures will be displayed.



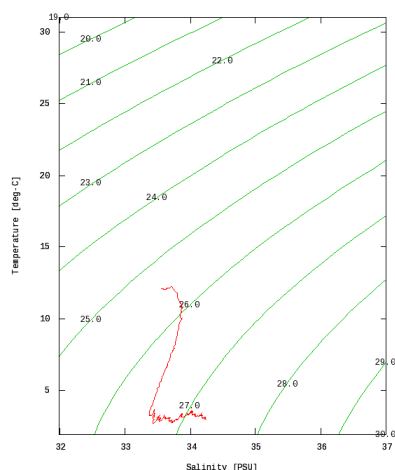
— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

Figures

201011240309



MR10-07: 201011240309
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

<input type="checkbox"/>	201011240309.dat
<input type="checkbox"/>	201011260300.dat
<input type="checkbox"/>	201011260514.dat
<input type="checkbox"/>	201011260636.dat
<input type="checkbox"/>	201011260813.dat
<input type="checkbox"/>	201011260944.dat
<input type="checkbox"/>	201011261110.dat
<input type="checkbox"/>	201011261239.dat
<input type="checkbox"/>	201011261410.dat
<input type="checkbox"/>	201011261541.dat
<input type="checkbox"/>	201011261718.dat
<input type="checkbox"/>	201011261846.dat
<input type="checkbox"/>	201011262017.dat
<input type="checkbox"/>	201011262158.dat

	201011270102329.dat
	201011270102.dat
	201011270231.dat
	201011270407.dat
	201011270551.dat
	201011270734.dat
	201011270921.dat
	201011271121.dat
	201011271251.dat
	201011271508.dat
	201012050232.dat
	201012050818.dat
	201012051046.dat
	201012051316.dat
	201012102337.dat
	201012170916.dat
	201012181351.dat
	201012181456.dat
	201012181600.dat
	201012181706.dat
	201012181813.dat
	201012181920.dat
	201012182029.dat
	201012182143.dat
	201012190309.dat
	201012190413.dat
	201012190519.dat
	201012190625.dat
	201012191312.dat
	201012192036.dat
	201012200349.dat
	201012201100.dat
	ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
201011240309	2010-11-24 03:10	41.8215	142.6115
201011260300	2010-11-26 03:01	38.0331	146.5085
201011260514	2010-11-26 05:15	37.7450	146.3178
201011260636	2010-11-26 06:37	37.5043	146.2261
201011260813	2010-11-26 08:14	37.2395	146.1846
201011260944	2010-11-26 09:46	36.9816	146.0873
201011261110	2010-11-26 11:11	36.7293	146.0066
201011261239	2010-11-26 12:40	36.4913	145.9236
201011261410	2010-11-26 14:12	36.2386	145.8420
201011261541	2010-11-26 15:42	35.9910	145.7498
201011261718	2010-11-26 17:19	35.7325	145.6636
201011261846	2010-11-26 18:47	35.4875	145.5838
201011262017	2010-11-26 20:18	35.2443	145.4970
201011262158	2010-11-26 22:00	34.9825	145.4130
201011262329	2010-11-26 23:30	34.7451	145.3323
201011270102	2010-11-27 01:03	34.5006	145.2258
201011270231	2010-11-27 02:32	34.2480	145.1658
201011270407	2010-11-27 04:08	33.9961	145.0828
201011270551	2010-11-27 05:52	33.7526	144.9878
201011270734	2010-11-27 07:35	33.4971	144.9093
201011270921	2010-11-27 09:22	33.2488	144.8271
201011271121	2010-11-27 11:22	32.9646	144.7406
201011271251	2010-11-27 12:52	32.7563	144.6550
201011271508	2010-11-27 15:09	32.4486	144.5565
201012050232	2010-12-05 02:33	7.5001	156.0006
201012050818	2010-12-05 08:20	6.5000	155.9998
201012051046	2010-12-05 10:47	6.0000	155.9996
201012051316	2010-12-05 13:17	5.5000	155.9996
201012102337	2010-12-10 23:38	-0.0216	155.9471
201012170916	2010-12-17 09:17	-6.2288	156.1033
201012181351	2010-12-18 13:52	-2.4143	154.9996
201012181456	2010-12-18 14:57	-2.4995	154.7833
201012181600	2010-12-18 16:01	-2.5823	154.5666
201012181706	2010-12-18 17:07	-2.6665	154.3496
201012181813	2010-12-18 18:14	-2.7498	154.1333
201012181920	2010-12-18 19:21	-2.8333	153.9165
201012182029	2010-12-18 20:31	-2.9161	153.6973
201012182143	2010-12-18 21:44	-3.0003	153.4830
201012190309	2010-12-19 03:10	-2.2386	153.5313
201012190413	2010-12-19 04:14	-2.4166	153.4168
201012190519	2010-12-19 05:20	-2.5998	153.3009
201012190625	2010-12-19 06:26	-2.7831	153.1878
201012191312	2010-12-19 13:13	-2.0000	153.0000
201012192036	2010-12-19 20:37	-1.4998	151.4848
201012200349	2010-12-20 03:50	-1.0118	149.9995
201012201100	2010-12-20 11:01	-0.5173	148.5000

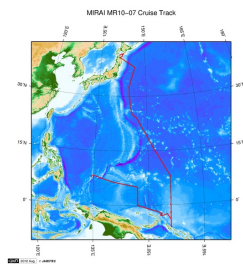
Observation

Time and Date

Lat. [°]

Lon. [°]

Related Information

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MR10-07

Ship Name: MIRAI

Period: 2010-11-23 - 2010-12-30

Chief Scientist: Yuji Kashino (JAMSTEC)

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

Proposal ▶ Tropical Ocean Climate Study

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