

MIRAI MR02-K04 Leg1 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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Cruise ID: [MR02-K04 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/MR02-K04_leg1_all.pdf

For Using Data

Principal Investigator

Data Management Office

JAMSTEC / BPPT joint cruise in the Indonesian waters.

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			
Measurment 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
200207030601	02059143	XCTD-1	Auto	MK-100
200207031005	01127082	XCTD-1	Auto	MK-100
200207050708	01127079	XCTD-1	Auto	MK-100
200207051121	01127077	XCTD-1	Auto	MK-100
200207051147	01127080	XCTD-1	Auto	MK-100
200207061229	01127083	XCTD-1	Auto	MK-100
200207070652	01127086	XCTD-1	Auto	MK-100
200207081303	01127087	XCTD-1	Auto	MK-100
200207090642	02059144	XCTD-1	Auto	MK-100
200207091025	01127084	XCTD-1	Auto	MK-100
200207091219	01127078	XCTD-1	Auto	MK-100
200207091612	02059147	XCTD-1	Auto	MK-100
200207091959	01127081	XCTD-1	Auto	MK-100
200207092359	02059146	XCTD-1	Auto	MK-100
200207100350	02059150	XCTD-1	Auto	MK-100
200207100733	02059154	XCTD-1	Auto	MK-100
200207101120	02059155	XCTD-1	Auto	MK-100
200207101502	02059148	XCTD-1	Auto	MK-100
200207110923	02059149	XCTD-1	Auto	MK-100
200207120606	02059152	XCTD-1	Auto	MK-100
200207120931	02059156	XCTD-1	Auto	MK-100
200207130741	02059151	XCTD-1	Auto	MK-100
200207131011	02059167	XCTD-1	Auto	MK-100
200207131237	02059164	XCTD-1	Auto	MK-100
200207131500	02059161	XCTD-1	Auto	MK-100
200207131552	02059166	XCTD-1	Auto	MK-100
200207131642	02059168	XCTD-1	Auto	MK-100
200207131734	02059157	XCTD-1	Auto	MK-100
200207131826	02059160	XCTD-1	Auto	MK-100
200207131919	02059163	XCTD-1	Auto	MK-100
200207132013	02059158	XCTD-1	Auto	MK-100
200207132106	02059165	XCTD-1	Auto	MK-100
200207132231	02059162	XCTD-1	Auto	MK-100
200207140923	02059159	XCTD-1	Auto	MK-100
200207142059	02059169	XCTD-1	Auto	MK-100
200207150127	02059175	XCTD-1	Auto	MK-100
200207150549	02059172	XCTD-1	Auto	MK-100
200207151017	02059170	XCTD-1	Auto	MK-100
200207151452	02059171	XCTD-1	Auto	MK-100
200207151935	02059180	XCTD-1	Auto	MK-100
200207160010	02059179	XCTD-1	Auto	MK-100
200207160446	02059174	XCTD-1	Auto	MK-100
200207160928	02059173	XCTD-1	Auto	MK-100
200207161417	02059184	XCTD-1	Auto	MK-100
200207161726	02059177	XCTD-1	Auto	MK-100
200207161816	02059176	XCTD-1	Auto	MK-100
200207161905	02059183	XCTD-1	Auto	MK-100
200207161954	02059178	XCTD-1	Auto	MK-100
200207162041	02059181	XCTD-1	Auto	MK-100
200207162111	02059182	XCTD-1	Auto	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

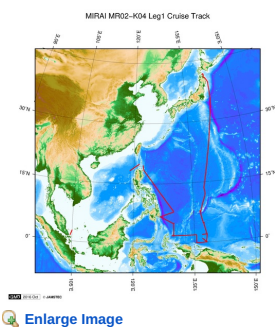
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure.

- 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.



MR02-K04 Leg1
Ship Name: MIRAI
Period: 2002-06-24 - 2002-07-23
Chief Scientist: Yoshifumi Kuroda (JAMSTEC)

Update History

2019-08-29	An observation data was registered.
2017-06-14	An observation data was registered.
2016-10-17	An observation data was registered.

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国立研究開発法人
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MIRAI MR02-K04 Leg1 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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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

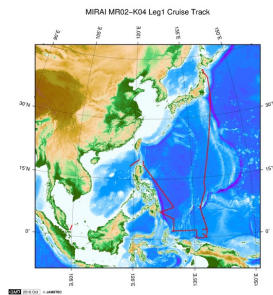
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



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MR02-K04 Leg1

Ship Name: MIRAI

Period: 2002-06-24 - 2002-07-23

Chief Scientist: Yoshifumi Kuroda (JAMSTEC)

Update History

2019-08-29	An observation data was registerd.
2017-06-14	An observation data was registerd.
2016-10-17	An observation data was registerd.

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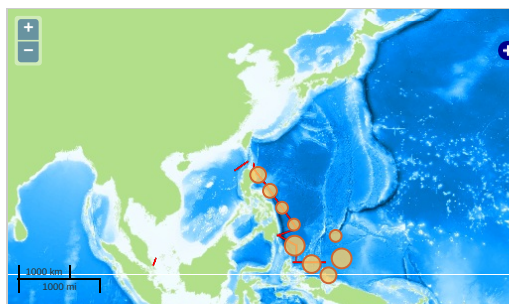
Observation Items: Depth, Temperature, Salinity

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.

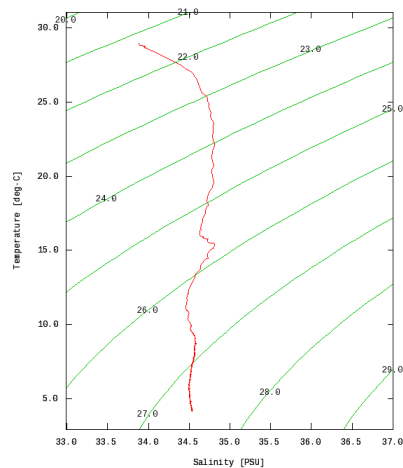


Figures

200207030601



MR02-K04 Leg1: 200207030601
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"/>	200207030601.dat
<input type="checkbox"/>	200207031005.dat
<input type="checkbox"/>	200207050708.dat
<input type="checkbox"/>	200207051121.dat
<input type="checkbox"/>	200207051147.dat
<input type="checkbox"/>	200207061229.dat
<input type="checkbox"/>	200207070652.dat
<input type="checkbox"/>	200207081303.dat
<input type="checkbox"/>	200207090642.dat
<input type="checkbox"/>	200207091025.dat
<input type="checkbox"/>	200207091219.dat
<input type="checkbox"/>	200207091612.dat
<input type="checkbox"/>	200207091959.dat
<input type="checkbox"/>	200207092359.dat

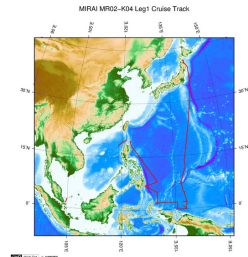
 20020703050.dat
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 200207101120.dat
 200207101502.dat
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 200207120606.dat
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 200207161417.dat
 200207161726.dat
 200207161816.dat
 200207161905.dat
 200207161954.dat
 200207162041.dat
 200207162111.dat
 ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200207030601	2002-07-03 05:56	7.0021	136.7628
200207031005	2002-07-03 10:00	6.0003	136.9691
200207050708	2002-07-05 07:03	4.0013	137.5665
200207051121	2002-07-05 11:16	2.9990	137.8291
200207051147	2002-07-05 11:42	2.9913	137.8453
200207061229	2002-07-06 12:24	2.0001	137.0011
200207070652	2002-07-07 06:47	1.0005	138.0050
200207081303	2002-07-08 12:58	0.9991	137.0008
200207090642	2002-07-09 06:37	0.0023	137.0000
200207091025	2002-07-09 10:20	0.0008	136.0001
200207091219	2002-07-09 12:14	0.0000	135.5000
200207091612	2002-07-09 16:07	0.9998	135.4983
200207091959	2002-07-09 19:54	2.0001	135.4998
200207092359	2002-07-09 23:54	2.0003	134.5000
200207100350	2002-07-10 03:45	2.0023	133.5000
200207100733	2002-07-10 07:28	1.9996	132.4998
200207101120	2002-07-10 11:15	2.0000	131.5000
200207101502	2002-07-10 14:57	2.0000	130.5001
200207110923	2002-07-11 09:18	2.0005	129.5001
200207120606	2002-07-12 06:01	3.0003	129.9233
200207120931	2002-07-12 09:26	4.0003	129.9476
200207130741	2002-07-13 07:36	5.2641	129.5003
200207131011	2002-07-13 10:06	5.5363	129.0001
200207131237	2002-07-13 12:32	5.8178	128.5004
200207131500	2002-07-13 14:55	6.0996	127.9996
200207131552	2002-07-13 15:47	6.1956	127.8340
200207131642	2002-07-13 16:37	6.2868	127.6670
200207131734	2002-07-13 17:29	6.3778	127.5005
200207131826	2002-07-13 18:21	6.4681	127.3338
200207131919	2002-07-13 19:14	6.5593	127.1666
200207132013	2002-07-13 20:08	6.6608	127.0000
200207132106	2002-07-13 21:01	6.7580	126.8335
200207132231	2002-07-13 22:26	6.8756	126.6238
200207140923	2002-07-14 09:18	6.9996	127.2458
200207142059	2002-07-14 20:54	8.0001	129.9996
200207150127	2002-07-15 01:22	9.0000	129.3596
200207150549	2002-07-15 05:44	9.9996	128.6563
200207151017	2002-07-15 10:12	10.9998	127.9508
200207151452	2002-07-15 14:47	12.0000	127.2476
200207151935	2002-07-15 19:30	13.0000	126.5073
200207160010	2002-07-16 00:05	13.9993	125.8271
200207160446	2002-07-16 04:41	14.9998	125.1098

Observation	Time and Date	Lat. (N)	Lon. (E)
200207160928	2002-07-16 09:23	18.0623	122.4000
200207161417	2002-07-16 14:12	16.9991	123.6358
200207161726	2002-07-16 17:21	17.6668	123.1305
200207161816	2002-07-16 18:11	17.8335	123.0093
200207161905	2002-07-16 19:00	17.9998	122.8810
200207161954	2002-07-16 19:49	18.1668	122.7538
200207162041	2002-07-16 20:36	18.3333	122.6245
200207162111	2002-07-16 21:06	18.4333	122.5466

Related Information



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MR02-K04 Leg1

Ship Name: MIRAI

Period: 2002-06-24 - 2002-07-23

Chief Scientist: Yoshifumi Kuroda (JAMSTEC)

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2019-08-29	An observation data was registerd.
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