

## MIRAI MR01-K01 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR01-K01](#)

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/MR01-K01\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR01-K01_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
200102151531	00092764	XCTD-1	Auto	MK-100
200102151658	00092766	XCTD-1	Auto	MK-100
200102151857	00092765	XCTD-1	Auto	MK-100
200102152053	00092768	XCTD-1	Auto	MK-100
200102152252	00092763	XCTD-1	Auto	MK-100
200102160014	00092769	XCTD-1	Auto	MK-100
200102160330	00092770	XCTD-1	Auto	MK-100
200102160341	00092767	XCTD-1	Auto	MK-100
200102160502	00113311	XCTD-1	Auto	MK-100
200102160644	00092760	XCTD-1	Auto	MK-100
200102160808	00092762	XCTD-1	Auto	MK-100
200102160940	00092759	XCTD-1	Auto	MK-100
200102161056	00092761	XCTD-1	Auto	MK-100
200102161220	00113312	XCTD-1	Auto	MK-100
200102161334	00113310	XCTD-1	Auto	MK-100
200102161500	00113313	XCTD-1	Auto	MK-100
200102161639	00092633	XCTD-1	Auto	MK-100
200102161823	00092629	XCTD-1	Auto	MK-100
200102161947	00092632	XCTD-1	Auto	MK-100
200102162122	00092631	XCTD-1	Auto	MK-100
200102162245	00092628	XCTD-1	Auto	MK-100
200102170104	00092681	XCTD-1	Auto	MK-100
200102170308	00092624	XCTD-1	Auto	MK-100
200102170743	00092627	XCTD-1	Auto	MK-100
200102170953	00092626	XCTD-1	Auto	MK-100
200102171213	00092669	XCTD-1	Auto	MK-100
200102171412	00092683	XCTD-1	Auto	MK-100
200102171831	00092625	XCTD-1	Auto	MK-100
200102172038	00092630	XCTD-1	Auto	MK-100
200102172244	00092622	XCTD-1	Auto	MK-100
200102180245	00092623	XCTD-1	Auto	MK-100
200102180452	00092656	XCTD-1	Auto	MK-100
200102180658	00092658	XCTD-1	Auto	MK-100
200102230608	00092654	XCTD-1	Auto	MK-100
200102231008	00092653	XCTD-1	Auto	MK-100
200102250528	00092651	XCTD-1	Auto	MK-100
200102250923	00092652	XCTD-1	Auto	MK-100
200102270647	00092648	XCTD-1	Auto	MK-100
200103030425	00092649	XCTD-1	Auto	MK-100
200103060442	00092708	XCTD-1	Auto	MK-100
200103060843	00092650	XCTD-1	Auto	MK-100
200103130816	00092707	XCTD-1	Auto	MK-100
200103140740	00092706	XCTD-1	Auto	MK-100
200103141132	00092703	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.

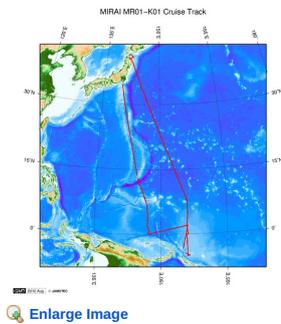
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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.

#### Related Information



**MR01-K01**  
 Ship Name: MIRAI  
 Period: 2001-02-14 - 2001-03-22  
 Chief Scientist: Kentaro Ando (JAMSTEC)  
 Project Name: [Tropical Ocean Climate Study (TOCS)]

**Update History**

2019-08-29	An observation data was registered.
2017-06-14	An observation data was registered.
2014-07-16	An observation data was registered.
2014-02-18	An observation data was registered.
2012-12-25	An observation data was registered.

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 JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

## MIRAI MR01-K01 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR01-K01](#)

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 : <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

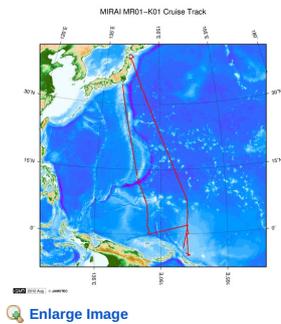
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

#### Sample Program

[ex\\_read2.f](#)

#### Related Information



**MR01-K01**  
 Ship Name: MIRAI  
 Period: 2001-02-14 - 2001-03-22  
 Chief Scientist: Kentaro Ando (JAMSTEC)  
 Project Name: [Tropical Ocean Climate Study (TOCS)]

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**MIRAI MR01-K01 Expendable Conductivity-Temperature-Depth Profiler (XCTD)**

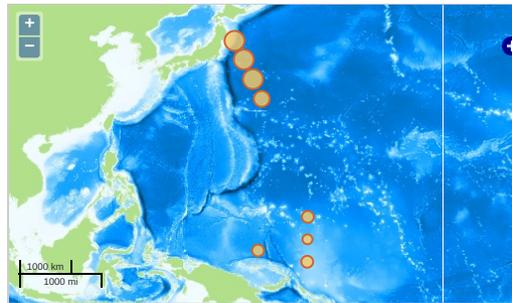
Last Modified: 2019-08-29

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

Cruise ID: **MR01-K01**  
 Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed  
 Data Policy: **JAMSTEC**  
 Observation Items: Depth, Temperature, Salinity  
 Science Keywords:  
 OCEANS > OCEAN > WATER  
 TEMPERATURE 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.



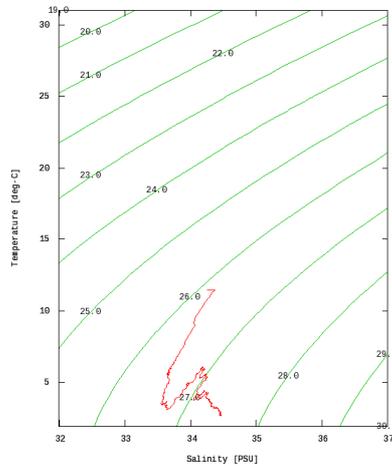
— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

**Figures**

200102151531



MR01-K01: 200102151531  
 Expendable Conductivity-Temperature-Depth Profiler (XCTD): Salinity



Only values evaluated as "good" : all flags are 0" are plotted in profiles.  
 Please see Forast Page for the definition of quality flags.

**Data List**

[Add to Basket](#)

File names
<input type="checkbox"/> 200102151531.dat
<input type="checkbox"/> 200102151658.dat
<input type="checkbox"/> 200102151857.dat
<input type="checkbox"/> 200102152053.dat
<input type="checkbox"/> 200102152252.dat
<input type="checkbox"/> 200102160014.dat
<input type="checkbox"/> 200102160330.dat
<input type="checkbox"/> 200102160341.dat
<input type="checkbox"/> 200102160502.dat
<input type="checkbox"/> 200102160644.dat
<input type="checkbox"/> 200102160808.dat
<input type="checkbox"/> 200102160940.dat
<input type="checkbox"/> 200102161056.dat
<input type="checkbox"/> 200102161220.dat

 200102161531.dat
 200102161500.dat
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 200102161823.dat
 200102161947.dat
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 200102270647.dat
 200103030425.dat
 200103060442.dat
 200103060843.dat
 200103130816.dat
 200103140740.dat
 200103141132.dat
 ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200102151531	2001-02-15 15:26	38.3326	143.0565
200102151658	2001-02-15 16:52	38.0000	143.2050
200102151857	2001-02-15 18:52	37.6661	143.3941
200102152053	2001-02-15 20:48	37.3593	143.5765
200102152252	2001-02-15 22:47	36.9981	143.7330
200102160014	2001-02-16 00:09	36.6946	143.8531
200102160330	2001-02-16 03:27	36.3303	144.0675
200102160341	2001-02-16 03:36	36.3066	144.0776
200102160502	2001-02-16 04:57	36.0151	144.2130
200102160644	2001-02-16 06:38	35.6725	144.3741
200102160808	2001-02-16 08:02	35.3470	144.5291
200102160940	2001-02-16 09:35	34.9981	144.6858
200102161056	2001-02-16 10:51	34.6790	144.8181
200102161220	2001-02-16 12:15	34.3331	144.9493
200102161334	2001-02-16 13:29	33.9993	144.9953
200102161500	2001-02-16 14:55	33.6665	145.1703
200102161639	2001-02-16 16:34	33.3495	145.4591
200102161823	2001-02-16 18:18	33.0001	145.6356
200102161947	2001-02-16 19:42	32.6816	145.7833
200102162122	2001-02-16 21:17	32.3285	145.9325
200102162245	2001-02-16 22:40	32.0180	146.0826
200102170104	2001-02-17 00:58	31.5008	146.3048
200102170308	2001-02-17 03:03	31.0258	146.5165
200102170743	2001-02-17 07:38	30.4990	146.7453
200102170953	2001-02-17 09:48	30.0168	146.9703
200102171213	2001-02-17 12:08	29.5000	147.1958
200102171412	2001-02-17 14:07	29.0316	147.4056
200102171831	2001-02-17 18:25	28.5001	147.6363
200102172038	2001-02-17 20:33	28.0001	147.8556
200102172244	2001-02-17 22:39	27.5260	148.0811
200102180245	2001-02-18 02:40	27.0053	148.2829
200102180452	2001-02-18 04:47	26.5001	148.5063
200102180658	2001-02-18 06:53	26.0023	148.7186
200102230608	2001-02-23 06:03	6.9998	155.9921
200102231008	2001-02-23 10:03	5.9970	156.0316
200102250528	2001-02-25 05:22	3.9995	156.0045
200102250923	2001-02-25 09:18	2.9951	155.9313
200102270647	2001-02-27 06:42	0.9951	155.9818
200103030425	2001-03-03 04:20	-1.0011	155.8838
200103060442	2001-03-06 04:37	-3.0001	155.9780
200103060843	2001-03-06 08:38	-4.0026	156.0006
200103130816	2001-03-13 08:11	1.0005	147.2030
200103140740	2001-03-14 07:35	3.0003	146.9726
200103141132	2001-03-14 11:27	4.0003	147.0028

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 Period: 2001-02-14 - 2001-03-22  
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[Enlarge Image](#)

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