

## MIRAI MR02-K06 Leg2 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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

Cruise ID: [MR02-K06 Leg2](#)

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-K06\\_leg2\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR02-K06_leg2_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
200212171159	02090733	XCTD-1	Auto	MK-100
200212171603	02090735	XCTD-1	Auto	MK-100
200212172016	02090736	XCTD-1	Auto	MK-100
200212180102	02090734	XCTD-1	Auto	MK-100
200212180522	02090730	XCTD-1	Auto	MK-100
200212180940	02090732	XCTD-1	Auto	MK-100
200212181353	02090731	XCTD-1	Auto	MK-100
200212200219	02090725	XCTD-1	Auto	MK-100
200212200627	02090728	XCTD-1	Auto	MK-100
200212201039	02090726	XCTD-1	Auto	MK-100
200212220204	02090727	XCTD-1	Auto	MK-100
200212220758	02090737	XCTD-1	Auto	MK-100
200212230841	02090739	XCTD-1	Auto	MK-100
200212231253	02090738	XCTD-1	Auto	MK-100
200212250201	02090741	XCTD-1	Auto	MK-100
200212250555	02090743	XCTD-1	Auto	MK-100
200212250943	02090744	XCTD-1	Auto	MK-100
200212251335	02090740	XCTD-1	Auto	MK-100
200212251720	02090745	XCTD-1	Auto	MK-100
200212290730	02090746	XCTD-1	Auto	MK-100
200212291127	02090748	XCTD-1	Auto	MK-100
200212291522	02090747	XCTD-1	Auto	MK-100
200212310120	02090749	XCTD-1	Auto	MK-100
200212310536	02090715	XCTD-1	Auto	MK-100
200301030548	02090718	XCTD-1	Auto	MK-100
200301030939	02090721	XCTD-1	Auto	MK-100
200301040237	02090724	XCTD-1	Auto	MK-100
200301050839	02090713	XCTD-1	Auto	MK-100
200301051223	02090714	XCTD-1	Auto	MK-100
200301060255	02090717	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.

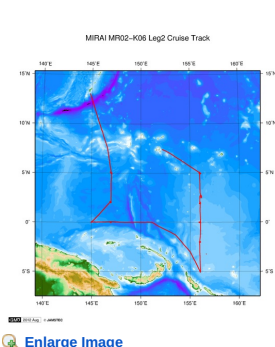
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



#### MR02-K06 Leg2

Ship Name: MIRAI  
Period: 2002-12-17 - 2003-01-12  
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.
2014-07-18	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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## MIRAI MR02-K06 Leg2 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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 Cruise ID: [MR02-K06 Leg2](#)

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

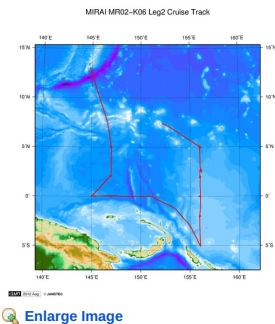
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

#### Sample Program

[ex\\_read2.f](#)

#### Related Information



#### MR02-K06 Leg2

Ship Name: MIRAI

Period: 2002-12-17 - 2003-01-12

Chief Scientist: Kentaro Ando (JAMSTEC)

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

#### Update History

2019-08-29	An observation data was registerd.
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#### Information of the Ships

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#### Information of the Submersibles

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DEEP TOW

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URASHIMA

YOKOSUKA DEEP TOW

6K Camera DEEP TOW

6K Sonar DEEP TOW

KM-ROV

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Cruise ID: **MR02-K06 Leg2**

Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed

Data Policy: **JAMSTEC**

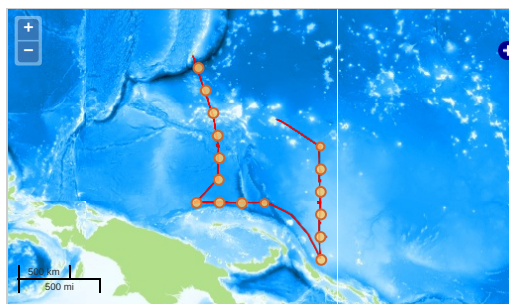
Observation Items: Depth, Temperature, Salinity

Science Keywords:

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

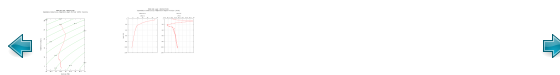
### Observation Map

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

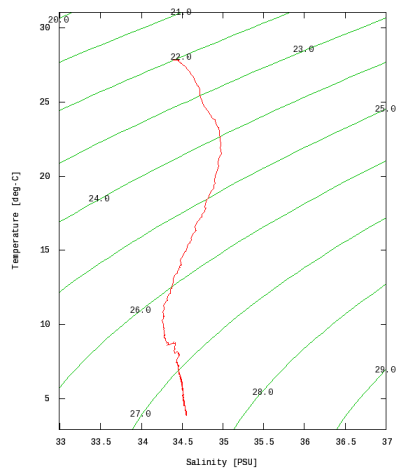


### Figures

200212171159



MR02-K06 Leg2: 200212171159  
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

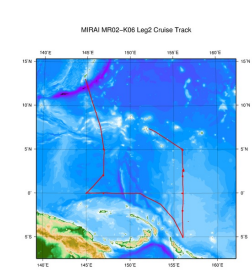
<input type="checkbox"/>	200212171159.dat
<input type="checkbox"/>	200212171603.dat
<input type="checkbox"/>	200212172016.dat
<input type="checkbox"/>	200212180102.dat
<input type="checkbox"/>	200212180522.dat
<input type="checkbox"/>	200212180940.dat
<input type="checkbox"/>	200212181353.dat
<input type="checkbox"/>	200212200219.dat
<input type="checkbox"/>	200212200627.dat
<input type="checkbox"/>	200212201039.dat
<input type="checkbox"/>	200212220204.dat
<input type="checkbox"/>	200212220758.dat
<input type="checkbox"/>	200212230841.dat
<input type="checkbox"/>	200212231253.dat

 <a href="#">File names</a>
 200212250555.dat
 200212250943.dat
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 200212291127.dat
 200212291522.dat
 200212310120.dat
 200212310536.dat
 200301030548.dat
 200301030939.dat
 200301040237.dat
 200301050839.dat
 200301051223.dat
 200301060255.dat
 ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200212171159	2002-12-17 11:54	12.0000	145.1443
200212171603	2002-12-17 15:58	11.0001	145.4663
200212172016	2002-12-17 20:11	10.0011	145.7963
200212180102	2002-12-18 00:57	9.0001	146.1385
200212180522	2002-12-18 05:17	7.9998	146.4668
200212180940	2002-12-18 09:35	7.0011	146.7030
200212181353	2002-12-18 13:48	5.9928	146.8506
200212200219	2002-12-20 02:15	4.9675	147.0321
200212200627	2002-12-20 06:22	4.0001	146.9993
200212201039	2002-12-20 10:34	3.0003	147.0020
200212220204	2002-12-22 01:59	2.0745	146.9453
200212220758	2002-12-22 07:53	0.9996	145.9680
200212230841	2002-12-23 08:36	0.0261	144.9701
200212231253	2002-12-23 12:48	0.0353	146.0006
200212250201	2002-12-25 01:56	0.0535	147.0106
200212250555	2002-12-25 05:50	0.0016	148.0001
200212250943	2002-12-25 09:38	-0.0003	148.9990
200212251335	2002-12-25 13:30	0.0000	150.0003
200212251720	2002-12-25 17:15	0.0001	150.9998
200212290730	2002-12-29 07:25	-5.0311	156.0430
200212291127	2002-12-29 11:22	-3.9998	155.9995
200212291522	2002-12-29 15:17	-3.0006	155.9683
200212310120	2002-12-31 01:15	-2.0190	155.9635
200212310536	2002-12-31 05:31	-1.0000	156.0191
200301030548	2003-01-03 05:43	0.0073	156.0351
200301030939	2003-01-03 09:34	1.0005	155.9990
200301040237	2003-01-04 02:32	2.0378	156.0193
200301050839	2003-01-05 08:34	3.0008	156.0021
200301051223	2003-01-05 12:18	4.0003	155.9876
200301060255	2003-01-06 02:50	5.0250	155.9683

Related Information



 [Enlarge Image](#)

**MR02-K06 Leg2**  
Ship Name: MIRAI  
Period: 2002-12-17 - 2003-01-12  
Chief Scientist: Kentaro Ando (JAMSTEC)  
Project Name: [Tropical Ocean Climate Study (TOCS)]

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KM-ROV

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Dive ID:

POWER GRAB SAMPLER  
(SHELL)  
POWER GRAB SAMPLER  
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