

MIRAI MR02-K02 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-29

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Cruise ID: [MR02-K02](#)

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

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
200202240105	01116650	XCTD-1	Auto	MK-100
200202240235	01116652	XCTD-1	Auto	MK-100
200202240728	01116651	XCTD-1	Auto	MK-100
200202240856	01116653	XCTD-1	Auto	MK-100
200202271416	01116662	XCTD-1	Auto	MK-100
200202271836	01116659	XCTD-1	Auto	MK-100
200202272300	01116654	XCTD-1	Auto	MK-100
200202280928	01116657	XCTD-1	Auto	MK-100
200203020604	01116658	XCTD-1	Auto	MK-100
200203021005	01116665	XCTD-1	Auto	MK-100
200203040528	01116664	XCTD-1	Auto	MK-100
200203040926	01116663	XCTD-1	Auto	MK-100
200203060452	01116637	XCTD-1	Auto	MK-100
200203100445	01116638	XCTD-1	Auto	MK-100
200203120421	01116640	XCTD-1	Auto	MK-100
200203120811	01116639	XCTD-1	Auto	MK-100
200203171346	01116641	XCTD-1	Auto	MK-100
200203190431	01116643	XCTD-1	Auto	MK-100
200203190818	01116642	XCTD-1	Auto	MK-100
200203210918	01116645	XCTD-1	Auto	MK-100
200203211315	01116644	XCTD-1	Auto	MK-100
200203212300	02017313	XCTD-1	Auto	MK-100
200203220302	02017316	XCTD-1	Auto	MK-100
200203220709	01116648	XCTD-1	Auto	MK-100
200203221112	01116646	XCTD-1	Auto	MK-100
200203221524	01116649	XCTD-1	Auto	MK-100
200203280608	01075855	XCTD-1	Auto	MK-100
200203280739	01075856	XCTD-1	Auto	MK-100
200203281236	01075857	XCTD-1	Auto	MK-100
200203281405	01075860	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.

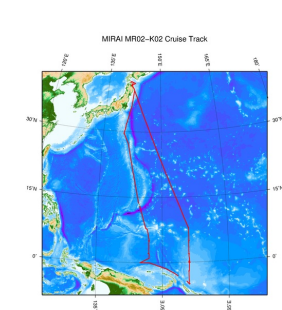
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



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MR02-K02

Ship Name: MIRAI
Period: 2002-02-21 - 2002-03-30
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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Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed

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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

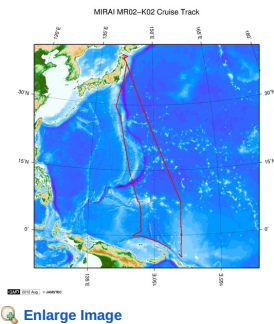
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



MR02-K02
Ship Name: MIRAI
Period: 2002-02-21 - 2002-03-30
Chief Scientist: Kentaro Ando (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS)]

Update History

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

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Data Policy: **JAMSTEC**

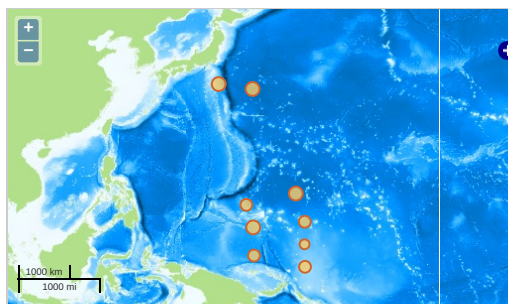
Observation Items: Depth, Temperature, Salinity

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

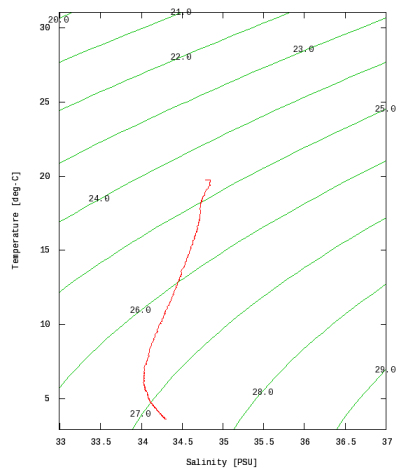
Imagery reproduced from ...

Figures

200202240105



MR02-K02: 200202240105
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

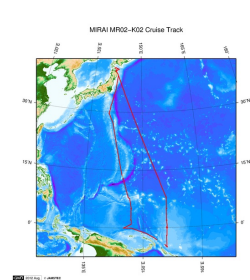
<input type="checkbox"/>	200202240105.dat
<input type="checkbox"/>	200202240235.dat
<input type="checkbox"/>	200202240728.dat
<input type="checkbox"/>	200202240856.dat
<input type="checkbox"/>	200202271416.dat
<input type="checkbox"/>	200202271836.dat
<input type="checkbox"/>	200202272300.dat
<input type="checkbox"/>	200202280928.dat
<input type="checkbox"/>	200203020604.dat
<input type="checkbox"/>	200203021005.dat
<input type="checkbox"/>	200203040528.dat
<input type="checkbox"/>	200203040926.dat
<input type="checkbox"/>	200203060452.dat
<input type="checkbox"/>	200203100445.dat

 Files
 200203120811.dat
 200203171346.dat
 200203190431.dat
 200203190818.dat
 200203210918.dat
 200203211315.dat
 200203212300.dat
 200203220302.dat
 200203220709.dat
 200203221112.dat
 200203221524.dat
 200203280608.dat
 200203280739.dat
 200203281236.dat
 200203281405.dat
 ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200202240105	2002-02-24 01:00	30.5738	146.7481
200202240235	2002-02-24 02:30	30.2170	146.8918
200202240728	2002-02-24 07:22	29.5406	147.1675
200202240856	2002-02-24 08:51	29.1760	147.3303
200202271416	2002-02-27 14:10	12.0088	154.4331
200202271836	2002-02-27 18:30	11.0001	154.7915
200202272300	2002-02-27 22:55	9.9998	155.1833
200202280928	2002-02-28 09:23	9.0093	155.5680
200203020604	2002-03-02 05:59	7.0003	156.0163
200203021005	2002-03-02 10:00	6.0001	156.0276
200203040528	2002-03-04 05:23	4.0000	155.9785
200203040926	2002-03-04 09:21	3.0000	155.9830
200203060452	2002-03-06 04:47	1.0001	156.0796
200203100445	2002-03-10 04:40	-0.9998	156.0618
200203120421	2002-03-12 04:15	-3.0005	155.9768
200203120811	2002-03-12 08:06	-4.0000	156.0026
200203171346	2002-03-17 13:41	0.9998	147.0013
200203190431	2002-03-19 04:26	3.0000	146.9353
200203190818	2002-03-19 08:13	4.0001	146.9493
200203210918	2002-03-21 09:13	6.0003	146.8643
200203211315	2002-03-21 13:10	6.9998	146.7125
200203212300	2002-03-21 22:55	8.0011	146.2098
200203220302	2002-03-22 02:57	8.9998	145.9368
200203220709	2002-03-22 07:04	10.0000	145.6485
200203221112	2002-03-22 11:07	11.0001	145.3830
200203221524	2002-03-22 15:18	11.9998	145.0990
200203280608	2002-03-28 06:03	31.4458	140.7401
200203280739	2002-03-28 07:34	31.7925	140.8280
200203281236	2002-03-28 12:30	32.4123	141.0538
200203281405	2002-03-28 14:00	32.7756	141.1396

Related Information



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MR02-K02
Ship Name: MIRAI
Period: 2002-02-21 - 2002-03-30
Chief Scientist: Kentaro Ando (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS)]

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2019-08-29	An observation data was registered.
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POWER GRAB SAMPLER
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POWER GRAB SAMPLER
(CLOW)
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