MIRAI MR00-K02 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-28

ReadMe | Observation Data | Data Format

Cruise ID: MR00-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			
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.

$$Z = at + 10E^{-3} * bt^{2}$$

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
200002281304	-	XCTD-1	-	MK-100
200003010125	-	XCTD-1	-	MK-100
200003010522	-	XCTD-1	-	MK-100
200003011201	-	XCTD-1	-	MK-100
200003011607	-	XCTD-1	-	MK-100
200003050650	-	XCTD-1	-	MK-100
200003051230	-	XCTD-1	-	MK-100
200003070523	-	XCTD-1	-	MK-100
200003090456	-	XCTD-1	-	MK-100
200003110431	-	XCTD-1	-	MK-100
200003110833	-	XCTD-1	-	MK-100
200003120156	-	XCTD-1	-	MK-100
200003130810	-	XCTD-1	-	MK-100
200003131317	-	XCTD-1	-	MK-100
200003210416	-	XCTD-1	-	MK-100
200003210545	-	XCTD-1	-	MK-100
200003210716	-	XCTD-1	-	MK-100
200003210844	-	XCTD-1	-	MK-100
200003211012	-	XCTD-1	-	MK-100
200003211137	-	XCTD-1	-	MK-100
200003211303	-	XCTD-1	-	MK-100
200003211428	-	XCTD-1	-	MK-100
200003211552	-	XCTD-1	-	MK-100
200003211716	-	XCTD-1	-	MK-100
200003211844	-	XCTD-1	-	MK-100
200003212012	-	XCTD-1	-	MK-100
200003212137	-	XCTD-1	-	MK-100
200003212231	-	XCTD-1	-	MK-100
200003212240	-	XCTD-1	-	MK-100
200003212252	-	XCTD-1	-	MK-100
200003212353	-	XCTD-1	-	MK-100
200003220106	-	XCTD-1	-	MK-100
200003220121	-	XCTD-1	-	MK-100
200003220129	-	XCTD-1	-	MK-100
200003220228	-	XCTD-1	-	MK-100
200003220358	-	XCTD-1	-	MK-100
200003220526	-	XCTD-1	-	MK-100
200003220658	-	XCTD-1	-	MK-100
200003220833	-	XCTD-1	-	MK-100
200003221009	-	XCTD-1	-	MK-100
200003221142	-	XCTD-1	-	MK-100
200003221315	-	XCTD-1	-	MK-100
200003221447	-	XCTD-1	-	MK-100
200003221620	-	XCTD-1	-	MK-100
200003221752	-	XCTD-1	-	MK-100
200003221925	-	XCTD-1	-	MK-100
200003222103	-	XCTD-1	-	MK-100
200003222236	-	XCTD-1	-	MK-100
200003230003	-	XCTD-1	-	MK-100

Data processing

(1) For sensor's stablility, 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

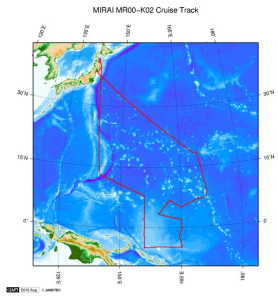
3) The broad range check set up at given ocean space and depth

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

MR00-K02
Ship Name: MIRAI
Period: 2000-02-12 - 2000-03-25
Chief Scientist: Yoshifumi Kuroda (JAMSTEC)
Project Name: [Tropical Ocean Climate Study (TOCS)]

Update History

2019-08-28	An observation data was registerd.
2017-06-14	An observation data was registerd.
2014-07-12	An observation data was registerd.
2014-02-18	An observation data was registerd.
2012-12-25	An observation data was registerd.

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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

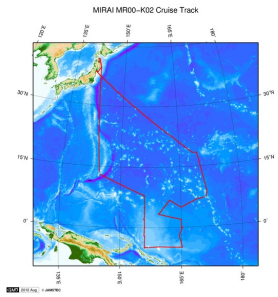
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

QUALITY CONTROL AND PROCESSING OF HISTORICAL OCEANOGRAPHIC TEMPERATURE, SALINITY, AND OXYGEN DATA

Sample Program

ex_read2.f

Related Information



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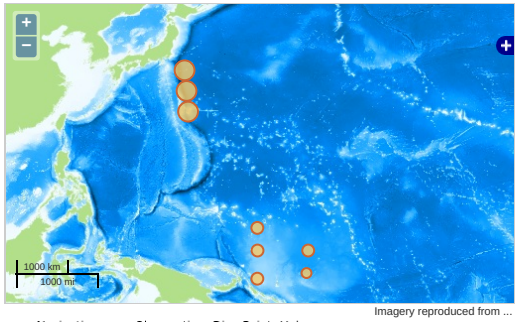
OCEANS	> SALINITY/DENSITY	> SALINITY

Observation Map

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

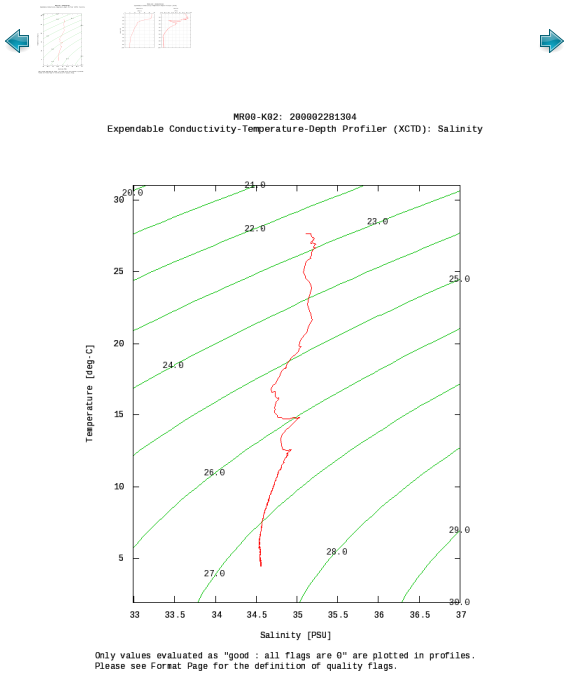


Imagery reproduced from ...

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

Figures

200002281304



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
200002281304.dat
200003010125.dat
200003010522.dat
200003011201.dat
200003011607.dat
200003050650.dat
200003051230.dat
200003070523.dat
200003090456.dat
200003110431.dat
200003110833.dat
200003120156.dat
200003130810.dat
200003131317.dat

File names

200003210416.dat
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200003210716.dat
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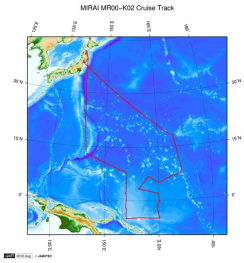
200003221009.dat
200003221142.dat
200003221315.dat
200003221447.dat
200003221620.dat
200003221752.dat
200003221925.dat
200003222103.dat
200003222236.dat
200003230003.dat
ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200002281304	2000-02-28 12:59	1.0009	165.0000
200003010125	2000-03-01 01:20	-1.0009	164.8303
200003010522	2000-03-01 05:19	-1.9250	164.4285
200003011201	2000-03-01 11:56	-2.9991	164.7026
200003011607	2000-03-01 16:02	-4.0000	164.9470
200003050650	2000-03-05 06:44	-4.0001	155.9661
200003051230	2000-03-05 12:25	-3.0000	156.0073
200003070523	2000-03-07 05:17	-0.9476	155.9518
200003090456	2000-03-09 04:51	1.0006	155.9986
200003110431	2000-03-11 04:26	3.0000	156.0011
200003110833	2000-03-11 08:28	3.9998	156.0171
200003120156	2000-03-12 01:51	5.0206	155.9623
200003130810	2000-03-13 08:05	6.0006	156.0509
200003131317	2000-03-13 13:12	6.9998	155.9884
200003210416	2000-03-21 04:11	25.6633	143.6671
200003210545	2000-03-21 05:40	25.9996	143.6458
200003210716	2000-03-21 07:11	26.3363	143.6008
200003210844	2000-03-21 08:39	26.6653	143.5678
200003211012	2000-03-21 10:07	27.0018	143.5511
200003211137	2000-03-21 11:32	27.3308	143.5308
200003211303	2000-03-21 12:58	27.6653	143.5110
200003211428	2000-03-21 14:23	27.9985	143.4678
200003211552	2000-03-21 15:47	28.3331	143.4356
200003211716	2000-03-21 17:11	28.6668	143.4259
200003211844	2000-03-21 18:39	29.0000	143.4090
200003212012	2000-03-21 20:08	29.3351	143.3935
200003212137	2000-03-21 21:32	29.6661	143.3676
200003212231	2000-03-21 22:26	29.8808	143.3441
200003212240	2000-03-21 22:35	29.9158	143.3383
200003212252	2000-03-21 22:46	29.9531	143.3315
200003212353	2000-03-21 23:47	30.0166	143.3069
200003220106	2000-03-22 01:00	30.0208	143.3020
200003220121	2000-03-22 01:16	30.0643	143.2995
200003220129	2000-03-22 01:24	30.0971	143.2981
200003220228	2000-03-22 02:24	30.3326	143.2933
200003220358	2000-03-22 03:54	30.6660	143.2600
200003220526	2000-03-22 05:22	31.0006	143.2410
200003220658	2000-03-22 06:54	31.3335	143.2160
200003220833	2000-03-22 08:29	31.6641	143.1741
200003221009	2000-03-22 10:04	31.9996	143.1415
200003221142	2000-03-22 11:38	32.3335	143.1175
200003221315	2000-03-22 13:10	32.6650	143.0803
200003221447	2000-03-22 14:43	33.0003	143.0470

Observation	Time and Date	Lat. [°]	Lon. [°]
200003221620	2000-03-22 16:15	33.3321	143.0206
200003221752	2000-03-22 17:47	33.6665	143.0125
200003221925	2000-03-22 19:20	34.0000	143.0066
200003222103	2000-03-22 20:58	34.3340	142.9778
200003222236	2000-03-22 22:31	34.6666	142.9211
200003230003	2000-03-22 23:58	35.0001	142.8903

Related Information



Enlarge Image

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