MIRAI MR99-K05 Leg1 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-28

ReadMe | Observation Data | Data Format

Cruise ID: MR99-K05 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

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
199908281328	-	XCTD-1	-	MK-100
199908282238	-	XCTD-1	-	MK-100
199908290138	-	XCTD-1	-	MK-100
199908290439	-	XCTD-1	-	MK-100
199908291031	-	XCTD-1	-	MK-100
199908291317	-	XCTD-1	-	MK-100
199908291606	-	XCTD-1	-	MK-100
199908291900	-	XCTD-1	-	MK-100
199908292158	-	XCTD-1	-	MK-100
199908300052	-	XCTD-1	-	MK-100
199908300348	-	XCTD-1	-	MK-100
199908301247	-	XCTD-1	-	MK-100
199908301536	-	XCTD-1	-	MK-100
199908301834	-	XCTD-1	-	MK-100
199908310257	-	XCTD-1	-	MK-100
199908310547	-	XCTD-1	-	MK-100
199908310844	-	XCTD-1	-	MK-100
199908311137	-	XCTD-1	-	MK-100
199908311424	-	XCTD-1	-	MK-100
199908311704	-	XCTD-1	-	MK-100
199908311947	-	XCTD-1	-	MK-100
199908312226	-	XCTD-1	-	MK-100
199909010105	-	XCTD-1	-	MK-100
199909010347	-	XCTD-1	-	MK-100
199909010633	-	XCTD-1	-	MK-100
199909010921	-	XCTD-1	-	MK-100
199909011206	-	XCTD-1	-	MK-100
199909011451	-	XCTD-1	-	MK-100
199909011737	-	XCTD-1	-	MK-100
199909012019	-	XCTD-1	-	MK-100
199909012301	-	XCTD-1	-	MK-100
199909020144	-	XCTD-1	-	MK-100
199909020425	-	XCTD-1	-	MK-100
199909020708	-	XCTD-1	-	MK-100
199909020949	-	XCTD-1	-	MK-100
199909021226	-	XCTD-1	-	MK-100
199909021506	-	XCTD-1	-	MK-100
199909021747	-	XCTD-1	-	MK-100
199909022028	-	XCTD-1	-	MK-100
199909022306	-	XCTD-1	-	MK-100
199909030147	-	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

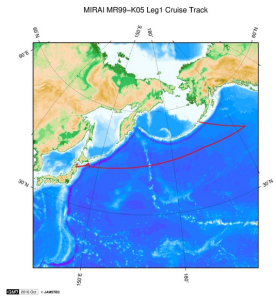
3) The broad range check set up at given ocean space and depth

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

MR99-K05 Leg1
Ship Name: MIRAI
Period: 1999-08-23 - 1999-09-10
Chief Scientist: Masao Fukasawa (JAMSTEC)
Project Name: [POST-WOCE Hydrography]

Update History

2019-08-28	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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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'.

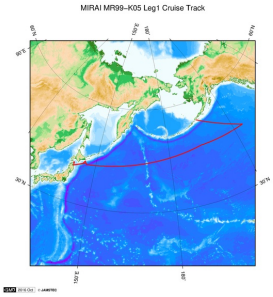
Definition of Quality Control Flags
1. Depth Flags
- 0 - accepted value
- 1 - error in recorded depth (same or less than previous depth)
- 2 - density inversion

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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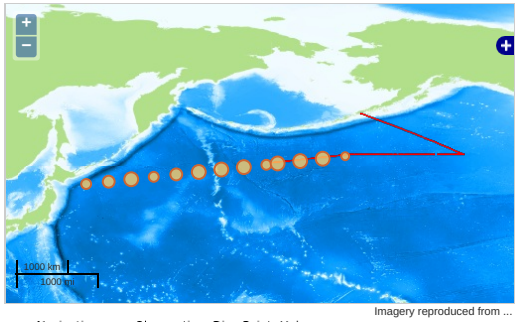
OCEANS	> SALINITY/DENSITY	> SALINITY

Observation Map

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

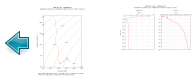


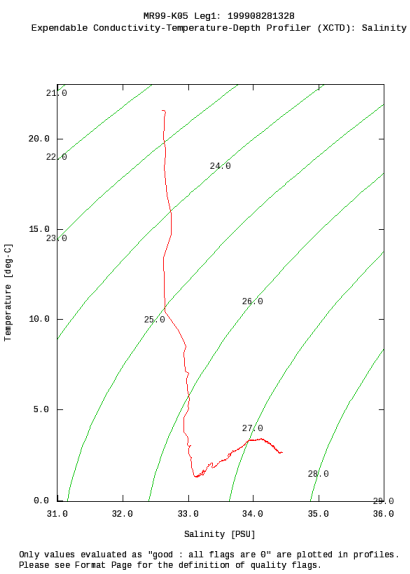
Imagery reproduced from ...

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

Figures

199908281328





Data List

Add to Basket

File names
199908281328.dat
199908282238.dat
199908290138.dat
199908290439.dat
199908291031.dat
199908291317.dat
199908291606.dat
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199908300348.dat
199908301247.dat
199908301536.dat
199908301834.dat

Filenames
199908310257.dat
199908310547.dat
199908310844.dat
199908311137.dat
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199909010105.dat
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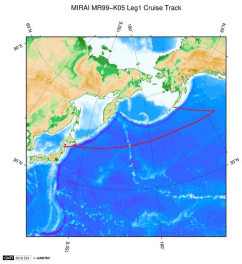
199909012019.dat
199909012301.dat
199909020144.dat
199909020425.dat
199909020708.dat
199909020949.dat
199909021226.dat
199909021506.dat
199909021747.dat
199909022028.dat
199909022306.dat
199909030147.dat
ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
199908281328	1999-08-28 13:23	41.9676	146.9998
199908282238	1999-08-28 22:33	42.2756	149.9998
199908290138	1999-08-29 01:33	42.3830	151.0000
199908290439	1999-08-29 04:34	42.4916	152.0001
199908291031	1999-08-29 10:25	42.7015	154.0003
199908291317	1999-08-29 13:12	42.8135	155.0004
199908291606	1999-08-29 16:01	42.9159	156.0004
199908291900	1999-08-29 18:54	43.0261	156.9985
199908292158	1999-08-29 21:53	43.1336	158.0008
199908300052	1999-08-30 00:47	43.2426	159.0001
199908300348	1999-08-30 03:43	43.3393	160.0001
199908301247	1999-08-30 12:41	43.6726	162.9998
199908301536	1999-08-30 15:31	43.7640	164.0001
199908301834	1999-08-30 18:28	43.8890	164.9993
199908310257	1999-08-31 02:52	44.1030	167.0000
199908310547	1999-08-31 05:42	44.2118	167.9993
199908310844	1999-08-31 08:39	44.3131	168.9990
199908311137	1999-08-31 11:31	44.4203	170.0000
199908311424	1999-08-31 14:18	44.5391	171.0001
199908311704	1999-08-31 16:59	44.6555	171.9998
199908311947	1999-08-31 19:42	44.7460	173.0001
199908312226	1999-08-31 22:20	44.8543	173.9990
199909010105	1999-09-01 01:00	44.9671	175.0008
199909010347	1999-09-01 03:42	45.0655	175.9993
199909010633	1999-09-01 06:28	45.1785	176.9991
199909010921	1999-09-01 09:15	45.2831	178.0000
199909011206	1999-09-01 12:01	45.3786	179.0000
199909011451	1999-09-01 14:45	45.4956	179.9993
199909011737	1999-09-01 17:32	45.6175	-179.0001
199909012019	1999-09-01 20:14	45.7116	-178.0010
199909012301	1999-09-01 22:56	45.8161	-176.9996
199909020144	1999-09-02 01:39	45.9423	-176.0000
199909020425	1999-09-02 04:19	46.0375	-175.0006
199909020708	1999-09-02 07:02	46.1465	-174.0003
199909020949	1999-09-02 09:43	46.2515	-173.0000
199909021226	1999-09-02 12:21	46.3489	-171.9998
199909021506	1999-09-02 15:00	46.4586	-171.0010
199909021747	1999-09-02 17:42	46.5763	-170.0001
199909022028	1999-09-02 20:23	46.6795	-169.0004
199909022306	1999-09-02 23:01	46.7853	-167.9998
199909030147	1999-09-03 01:41	46.9015	-167.0001

Related Information



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