MIRAI MR12-E03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

ReadMe   Observation Data   Data Format

Cruise ID: MR12-E03
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/MR12-E03_all.pdf

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ℹ **For Using Data**

Principal Investigator

    Data Management Office

Use Constraints

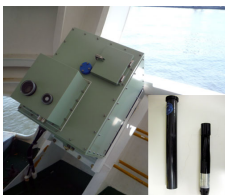   See **Terms and Conditions** about constrain of use.

Data Citation

    See **Terms and Conditions** about data citation.

Instrument

Instrument:

Expendable conductivity temperature depth measurements (XCTD) (MR11-04 -)

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.

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
201209070129	12036661	XCTD-1	Auto	MK-150N
201209170310	11125785	XCTD-1	Auto	MK-150N
201209180507	11125786	XCTD-1	Auto	MK-150N
201209182047	12036652	XCTD-1	Auto	MK-150N
201209182354	11125644	XCTD-1	Auto	MK-150N
201209190156	11125643	XCTD-1	Auto	MK-150N
201209201151	11125793	XCTD-1	Auto	MK-150N
201209201245	11125795	XCTD-1	Auto	MK-150N
201209201338	11125790	XCTD-1	Auto	MK-150N
201209201419	11125787	XCTD-1	Auto	MK-150N
201209201500	11125792	XCTD-1	Auto	MK-150N
201209201543	11125789	XCTD-1	Auto	MK-150N
201209210944	12036658	XCTD-1	Auto	MK-150N
201209211106	12036655	XCTD-1	Auto	MK-150N
201209211225	11125796	XCTD-1	Auto	MK-150N
201209222329	11125791	XCTD-1	Auto	MK-150N
201209230412	12036653	XCTD-1	Auto	MK-150N
201209230507	11125788	XCTD-1	Auto	MK-150N
201209230837	12036659	XCTD-1	Auto	MK-150N
201209230935	11125794	XCTD-1	Auto	MK-150N
201209231425	12036651	XCTD-1	Auto	MK-150N
201209231531	12036656	XCTD-1	Auto	MK-150N
201209232203	12036654	XCTD-1	Auto	MK-150N
201209232304	11125713	XCTD-1	Auto	MK-150N
201209240345	11125714	XCTD-1	Auto	MK-150N
201209240435	12036657	XCTD-1	Auto	MK-150N
201209240908	12036660	XCTD-1	Auto	MK-150N
201209241009	11125715	XCTD-1	Auto	MK-150N
201209260217	11125722	XCTD-1	Auto	MK-150N
201209260251	11125723	XCTD-1	Auto	MK-150N
201209260337	11125721	XCTD-1	Auto	MK-150N
201209260412	11125719	XCTD-1	Auto	MK-150N
201209260454	11125716	XCTD-1	Auto	MK-150N
201209260540	11125717	XCTD-1	Auto	MK-150N
201209260614	11125720	XCTD-1	Auto	MK-150N
201209260736	11125718	XCTD-1	Auto	MK-150N
201209260856	11125799	XCTD-1	Auto	MK-150N
201209270510	11125806	XCTD-1	Auto	MK-150N
201209270548	11125804	XCTD-1	Auto	MK-150N
201209270627	11125800	XCTD-1	Auto	MK-150N
201209270706	11125797	XCTD-1	Auto	MK-150N
201209270748	11125803	XCTD-1	Auto	MK-150N
201209270826	11125805	XCTD-1	Auto	MK-150N
201209270903	11125801	XCTD-1	Auto	MK-150N
201209271448	11125808	XCTD-1	Auto	MK-150N
201209271622	11125802	XCTD-1	Auto	MK-150N
201209272027	11125807	XCTD-1	Auto	MK-150N
201209272208	11125798	XCTD-1	Auto	MK-150N
201209280216	10121328	XCTD-1	Auto	MK-150N
201209280244	10121320	XCTD-1	Auto	MK-150N
201209280311	10121326	XCTD-1	Auto	MK-150N
201209280339	10121323	XCTD-1	Auto	MK-150N
201209280407	10121329	XCTD-1	Auto	MK-150N
201209280450	10121327	XCTD-1	Auto	MK-150N
201209280533	10121318	XCTD-1	Auto	MK-150N
201209280702	10121321	XCTD-1	Auto	MK-150N
201209280824	11125647	XCTD-1	Auto	MK-150N
201209280946	11125645	XCTD-1	Auto	MK-150N
201209281105	11125646	XCTD-1	Auto	MK-150N
201209281241	12036662	XCTD-1	Auto	MK-150N
201209281431	10121324	XCTD-1	Auto	MK-150N
201209290503	10121319	XCTD-1	Auto	MK-150N
201209291049	10121325	XCTD-1	Auto	MK-150N
201209292107	10121322	XCTD-1	Auto	MK-150N

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

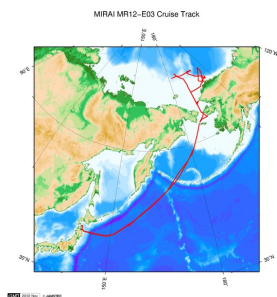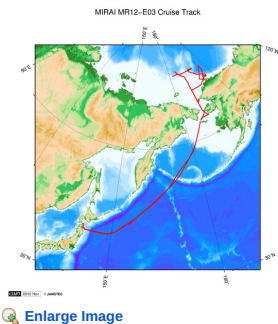QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure.

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

MIRAI MR12-E03 Cruise Track

Enlarge Image

MR12-E03
Ship Name: MIRAI
Period: 2012-09-03 - 2012-10-17
Chief Scientist: Takashi Kikuchi (JAMSTEC)
Project Name: [Arctic Ocean Climate System Reaserch]
Proposal ▶ Ecosystem studies on the Arctic Ocean declining sea ice
Title:

Update History

2019-08-31	An observation data was registerd.
2017-06-14	An observation data was registerd.
2015-05-22	An observation data was registerd.
2014-10-17	An observation data was registerd.

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HAKUHO MARU

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SHINKAI 6500
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HYPER-DOLPHIN
URASHIMA
YOKOSUKA DEEP TOW
6K Camera DEEP TOW
6K Sonar DEEP TOW
KM-ROV
POWER GRAB SAMPLER (SHELL)
POWER GRAB SAMPLER (CLOW)
BMS

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Dive ID: [---- ▼] [   ] Go

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MIRAI MR12-E03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

ReadMe **Observation Data** **Data Format**

Cruise ID: **MR12-E03**
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 : **'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

MIRAI MR12-E03 Cruise Track

Enlarge Image

MR12-E03
Ship Name: MIRAI
Period: 2012-09-03 - 2012-10-17
Chief Scientist: Takashi Kikuchi (JAMSTEC)
Project Name: [Arctic Ocean Climate System Reaserch]
Proposal ▶ Ecosystem studies on the Arctic Ocean declining sea ice
Title:

Update History	
2019-08-31	An observation data was registerd.
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SHINKAI 6500
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HYPER-DOLPHIN
URASHIMA
YOKOSUKA DEEP TOW
6K Camera DEEP TOW
6K Sonar DEEP TOW
KM-ROV
POWER GRAB SAMPLER (SHELL)
POWER GRAB SAMPLER (CLOW)
BMS

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Go to a Dive Information
Dive ID: [----▼] [____] Go

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MIRAI MR12-E03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

ReadMe	Observation Data	Data Format

Cruise ID: **MR12-E03**
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

Observation Map

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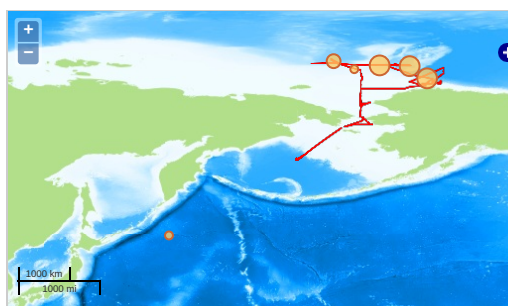
Imagery reproduced from ...

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

Figures
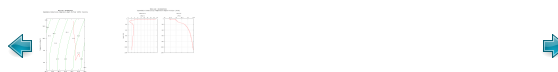
201209070129

MR12-E03: 201209070129
Expendable Conductivity-Temperature-Depth Profiler (XCTD): Salinity
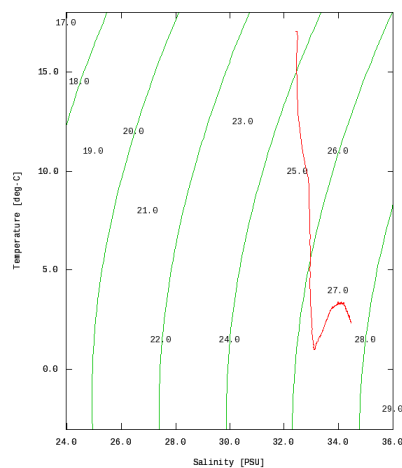
Only values evaluated as "good : all flags are 0" are plotted in profiles.
Please see Format Page for the definition of quality flags.

Data List

Add to Basket

☐	File names
☐	201209070129.dat
☐	201209170310.dat
☐	201209180507.dat
☐	201209182047.dat
☐	201209182354.dat
☐	201209190156.dat
☐	201209201151.dat
☐	201209201245.dat
☐	201209201338.dat
☐	201209201419.dat
☐	201209201500.dat
☐	201209201543.dat
☐	201209210944.dat
☐	201209211106.dat

- [ ] File name 225.dat
- [ ] 201209222329.dat
- [ ] 201209230412.dat
- [ ] 201209230507.dat
- [ ] 201209230837.dat
- [ ] 201209230935.dat
- [ ] 201209231425.dat
- [ ] 201209231531.dat
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- [ ] 201209232304.dat
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- [ ] 201209260217.dat
- [ ] 201209260251.dat
- [ ] 201209260337.dat
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- [ ] 201209260454.dat
- [ ] 201209260540.dat
- [ ] 201209260614.dat
- [ ] 201209260736.dat
- [ ] 201209260856.dat
- [ ] 201209270510.dat
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- [ ] 201209280702.dat
- [ ] 201209280824.dat
- [ ] 201209280946.dat
- [ ] 201209281105.dat
- [ ] 201209281241.dat
- [ ] 201209281431.dat
- [ ] 201209290503.dat
- [ ] 201209291049.dat
- [ ] 201209292107.dat
- [ ] ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
201209070129	2012-09-07 01:31	44.8058	157.2630
201209170310	2012-09-17 03:12	74.3346	-169.8333
201209180507	2012-09-18 05:10	75.7485	-173.5015
201209182047	2012-09-18 20:48	75.2516	-173.2641
201209182354	2012-09-18 23:56	75.2831	-174.7565
201209190156	2012-09-19 02:00	75.2518	-176.5015
201209201151	2012-09-20 11:54	75.0001	-165.3345
201209201245	2012-09-20 12:48	74.9998	-164.6675
201209201338	2012-09-20 13:41	75.0000	-163.9996
201209201419	2012-09-20 14:22	74.9993	-163.5006
201209201500	2012-09-20 15:04	75.0014	-162.9956
201209201543	2012-09-20 15:46	75.0003	-162.4988
201209210944	2012-09-21 09:47	74.8666	-159.9998
201209211106	2012-09-21 11:08	74.8660	-160.7498
201209211225	2012-09-21 12:28	74.8670	-161.4995
201209222329	2012-09-22 23:31	74.7998	-163.7411
201209230412	2012-09-23 04:14	74.4665	-163.1205
201209230507	2012-09-23 05:10	74.3161	-162.7331
201209230837	2012-09-23 08:40	74.0501	-161.9010
201209230935	2012-09-23 09:39	73.9166	-161.4528
201209231425	2012-09-23 14:28	73.6498	-160.6723
201209231531	2012-09-23 15:34	73.4998	-160.3330
201209232203	2012-09-23 22:07	73.2330	-159.5665
201209232304	2012-09-23 23:07	73.1163	-159.1165
201209240345	2012-09-24 03:48	72.9333	-158.2315
201209240435	2012-09-24 04:38	72.8665	-157.7829
201209240908	2012-09-24 09:11	72.7000	-156.9005
201209241009	2012-09-24 10:11	72.6005	-156.4493

Observation	Time and Date	Lat. [°]	Lon. [°]
201209260251	2012-09-26 02:54	71.6413	-154.9178
201209260337	2012-09-26 03:38	71.6756	-155.0068
201209260412	2012-09-26 04:15	71.6985	-155.0840
201209260454	2012-09-26 04:57	71.7258	-155.1831
201209260540	2012-09-26 05:42	71.7651	-155.2691
201209260614	2012-09-26 06:17	71.7975	-155.3390
201209260736	2012-09-26 07:39	71.8666	-155.4950
201209260856	2012-09-26 08:58	71.9316	-155.6579
201209270510	2012-09-27 05:13	72.1661	-154.4998
201209270548	2012-09-27 05:51	72.0833	-154.5008
201209270627	2012-09-27 06:29	72.0001	-154.5004
201209270706	2012-09-27 07:10	71.9166	-154.5001
201209270748	2012-09-27 07:50	71.8335	-154.4993
201209270826	2012-09-27 08:28	71.7501	-154.4995
201209270903	2012-09-27 09:05	71.6666	-154.5008
201209271448	2012-09-27 14:51	71.6441	-154.9023
201209271622	2012-09-27 16:25	71.7071	-155.0308
201209272027	2012-09-27 20:30	71.7730	-155.2185
201209272208	2012-09-27 22:11	71.8726	-155.4908
201209280216	2012-09-28 02:19	72.1668	-155.7938
201209280244	2012-09-28 02:47	72.2500	-155.6876
201209280311	2012-09-28 03:14	72.3335	-155.5735
201209280339	2012-09-28 03:42	72.4165	-155.4618
201209280407	2012-09-28 04:11	72.4998	-155.3516
201209280450	2012-09-28 04:54	72.6251	-155.1876
201209280533	2012-09-28 05:37	72.7496	-155.0205
201209280702	2012-09-28 07:04	73.0003	-154.6841
201209280824	2012-09-28 08:27	73.2498	-154.3461
201209280946	2012-09-28 09:49	73.4998	-154.0026
201209281105	2012-09-28 11:08	73.7500	-153.9995
201209281241	2012-09-28 12:44	74.0000	-153.9975
201209281431	2012-09-28 14:34	74.2500	-153.9928
201209290503	2012-09-29 05:06	74.2501	-154.6048
201209291049	2012-09-29 10:53	73.7501	-155.8050
201209292107	2012-09-29 21:10	73.2500	-157.0045

Related Information

MIRAI MR12-E03 Cruise Track

Enlarge Image

MR12-E03
Ship Name: MIRAI
Period: 2012-09-03 - 2012-10-17
Chief Scientist: Takashi Kikuchi (JAMSTEC)
Project Name: [Arctic Ocean Climate System Reaserch]
Proposal ▶ Ecosystem studies on the Arctic Ocean declining sea ice
Title:

Update History

2019-08-31	An observation data was registerd.
2017-06-14	An observation data was registerd.
2015-05-22	An observation data was registerd.
2014-10-17	An observation data was registerd.

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Data Policy

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Information of the Ships
NATSUSHIMA
KAIYO
YOKOSUKA
MIRAI
KAIREI
CHIKYU
KAIMEI
SHINSEI MARU
HAKUHO MARU

Information of the Submersibles
KAIKO
SHINKAI 2000
SHINKAI 6500
DEEP TOW
HYPER-DOLPHIN
URASHIMA
YOKOSUKA DEEP TOW
6K Camera DEEP TOW
6K Sonar DEEP TOW
KM-ROV
POWER GRAB SAMPLER (SHELL)
POWER GRAB SAMPLER (CLOW)
BMS

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