MIRAI MR11-03 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

ReadMe | Observation Data | Data Format

Cruise ID: MR11-03
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/MR11-03_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			
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
201104260527	10027081	XCTD-1	Auto	MK-130
201104260657	10079659	XCTD-1	Auto	MK-130
201104260828	10079660	XCTD-1	Auto	MK-130
201104260957	10027082	XCTD-1	Auto	MK-130
201104261133	10079657	XCTD-1	Auto	MK-130
201104261305	10079658	XCTD-1	Auto	MK-130
201104261431	10027118	XCTD-1	Auto	MK-130
201104261604	10027116	XCTD-1	Auto	MK-130
201104261737	10027117	XCTD-1	Auto	MK-130
201104261907	10037384	XCTD-1	Auto	MK-130
201104262025	10079656	XCTD-1	Auto	MK-130
201104262204	10037382	XCTD-1	Auto	MK-130
201104262334	10037379	XCTD-1	Auto	MK-130
201104270104	10037383	XCTD-1	Auto	MK-130
201104270235	10037380	XCTD-1	Auto	MK-130
201104270405	10027115	XCTD-1	Auto	MK-130
201104270535	10027114	XCTD-1	Auto	MK-130
201104270704	10027113	XCTD-1	Auto	MK-130
201104270832	10037378	XCTD-1	Auto	MK-130
201104271001	10037381	XCTD-1	Auto	MK-130
201104271132	10037375	XCTD-1	Auto	MK-130
201104271303	10037377	XCTD-1	Auto	MK-130
201104271448	10037376	XCTD-1	Auto	MK-130

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.

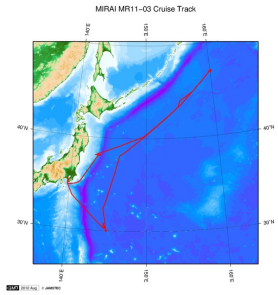
1) The gradient check of adjacent depth data
2) The density inversion check
3) The broad range check set up at given ocean space and depth

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

MR11-03
Ship Name: MIRAI
Period: 2011-04-14 - 2011-05-05
Chief Scientist: Makio Honda (JAMSTEC)
Project Name: [Station K2,Station S1,Station KEO,Station KNOT]
Proposal Title: Studies on the microbial-geochemical processes that regulate the operation of the biological pump in the subarctic and subtropical regions of the western North Pacific

Update History

2019-08-31	An observation data was registerd.
2017-06-14	An observation data was registerd.
2014-08-08	An observation data was registerd.
2014-02-18	An observation data was registerd.
2013-07-18	An observation data was registerd.

KM-ROV
POWER GRAB SAMPLER (SHELL)
POWER GRAB SAMPLER (CLOW)
BMS

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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

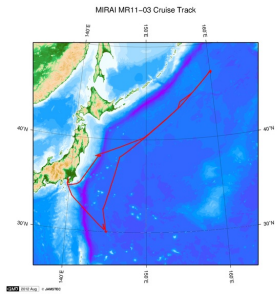
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

ex_read2.f

Related Information



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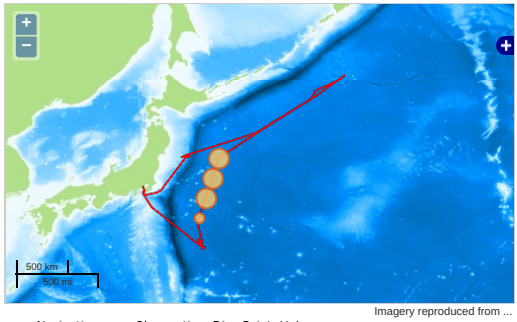
OCEANS	> SALINITY/DENSITY	> SALINITY

Observation Map

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

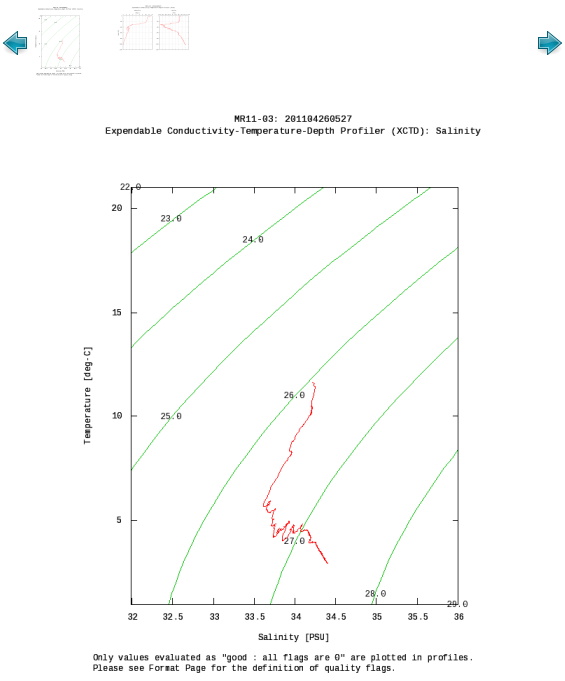


Imagery reproduced from ...

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

Figures

201104260527



Data List

Add to Basket

File names
201104260527.dat
201104260657.dat
201104260828.dat
201104260957.dat
201104261133.dat
201104261305.dat
201104261431.dat
201104261604.dat
201104261737.dat
201104261907.dat
201104262025.dat
201104262204.dat
201104262334.dat
201104270104.dat

File names
201104270235.dat
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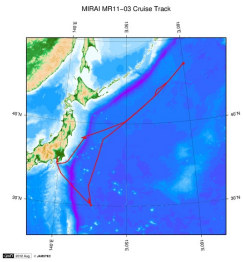
201104270535.dat
201104270704.dat
201104270832.dat
201104271001.dat
201104271132.dat
201104271303.dat
201104271448.dat
ex_read2.f (Sample Program)

- Observation List

The list of observation is shown as follows.

Observation	Time and Date	Lat. [°]	Lon. [°]
201104260527	2011-04-26 05:28	38.0441	146.3705
201104260657	2011-04-26 06:58	37.7686	146.3175
201104260828	2011-04-26 08:29	37.5051	146.2313
201104260957	2011-04-26 09:59	37.2500	146.1333
201104261133	2011-04-26 11:34	36.9968	146.0523
201104261305	2011-04-26 13:06	36.7463	145.9796
201104261431	2011-04-26 14:32	36.5046	145.9043
201104261604	2011-04-26 16:05	36.2530	145.8358
201104261737	2011-04-26 17:38	36.0150	145.7498
201104261907	2011-04-26 19:08	35.7561	145.6750
201104262025	2011-04-26 20:26	35.4926	145.5910
201104262204	2011-04-26 22:05	35.2573	145.4861
201104262334	2011-04-26 23:35	34.9933	145.3986
201104270104	2011-04-27 01:05	34.7445	145.3190
201104270235	2011-04-27 02:36	34.5003	145.2435
201104270405	2011-04-27 04:06	34.2593	145.1691
201104270535	2011-04-27 05:36	34.0123	145.0798
201104270704	2011-04-27 07:05	33.7671	144.9878
201104270832	2011-04-27 08:33	33.5128	144.9208
201104271001	2011-04-27 10:03	33.2606	144.8410
201104271132	2011-04-27 11:33	32.9965	144.7628
201104271303	2011-04-27 13:04	32.7413	144.6383
201104271448	2011-04-27 14:49	32.4590	144.5411

Related Information



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