MIRAI MR13-01 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-28

ReadMe | Observation Data | Data Format

Cruise ID: MR13-01
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/MR13-01_all.pdf

For Using Data

Principal Investigator
Data Management Office

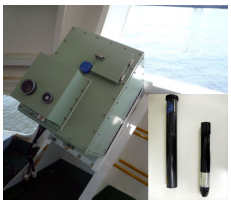
JAMSTEC / BPPT joint cruise in the Indonesian waters.

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 (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.

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

Where Z(m) is the depth and t(sec) is the elapsed time.

In addition, coefficients of the fall-rate equation are different by XBT 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 Type
201303050432	12089059	XCTD-1	Auto	MK-150N
201303080541	12099297	XCTD-1	Auto	MK-150N
201303080756	12099298	XCTD-1	Auto	MK-150N
201303081009	12089062	XCTD-1	Auto	MK-150N
201303081222	12089060	XCTD-1	Auto	MK-150N
201303081437	12089061	XCTD-1	Auto	MK-150N
201303100616	12099303	XCTD-1	Auto	MK-150N
201303100931	12099306	XCTD-1	Hand	MK-150N
201303101233	12099300	XCTD-1	Hand	MK-150N
201303101536	12099299	XCTD-1	Hand	MK-150N
201303101825	12099305	XCTD-1	Hand	MK-150N
201303102135	12099301	XCTD-1	Hand	MK-150N
201303110033	12099307	XCTD-1	Auto	MK-150N
201303110324	12099310	XCTD-1	Auto	MK-150N
201303110733	12099311	XCTD-1	Auto	MK-150N
201303110947	12099312	XCTD-1	Auto	MK-150N
201303111231	12099309	XCTD-1	Auto	MK-150N
201303111540	12099308	XCTD-1	Auto	MK-150N
201303121555	12099313	XCTD-1	Auto	MK-150N
201303121816	12099314	XCTD-1	Auto	MK-150N
201303122029	12099315	XCTD-1	Auto	MK-150

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

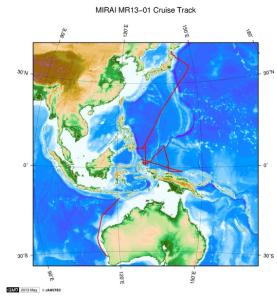
3) The broad range check set up at given ocean space and depth

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

MR13-01
Ship Name: MIRAI
Period: 2013-02-18 - 2013-03-28
Chief Scientist: Yuji Kashino (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.
2016-04-07	An observation data was registerd.
2015-05-22	An observation data was registerd.
2015-03-28	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

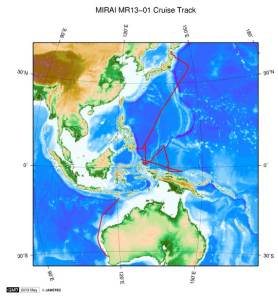
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

ex_read2.f

Related Information



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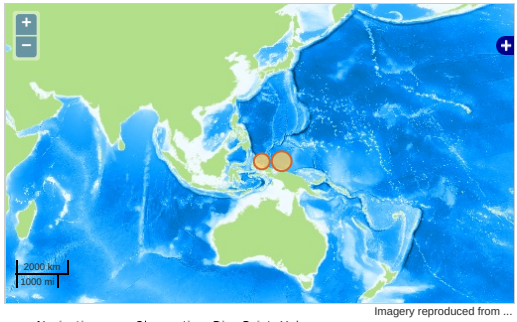
OCEANS	> SALINITY/DENSITY	> SALINITY

Observation Map

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

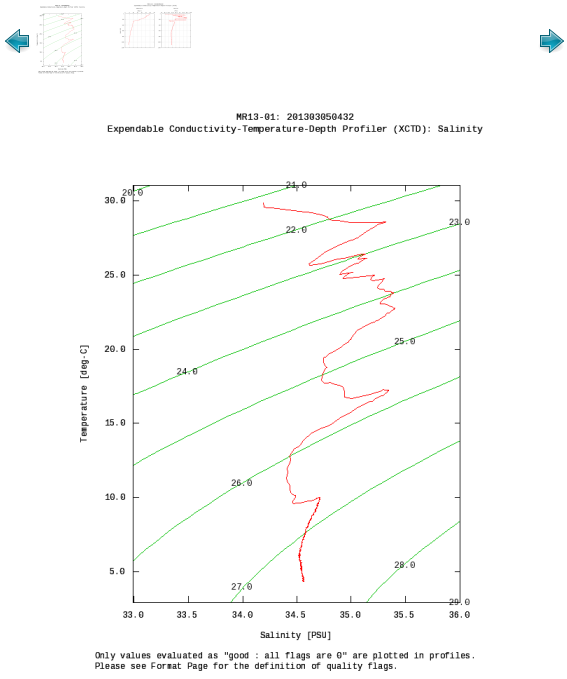


Imagery reproduced from ...

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

Figures

201303050432



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
201303050432.dat
201303080541.dat
201303080756.dat
201303081009.dat
201303081222.dat
201303081437.dat
201303100616.dat
201303100931.dat
201303101233.dat
201303101536.dat
201303101825.dat
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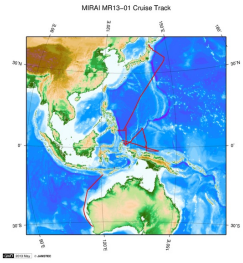
File names
201303050733.dat
201303110947.dat
201303111231.dat
201303111540.dat
201303121555.dat
201303121816.dat
201303122029.dat
ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
201303050432	2013-03-05 04:36	2.0678	138.0663
201303080541	2013-03-08 05:42	5.5001	137.0831
201303080756	2013-03-08 07:57	6.0031	136.9665
201303081009	2013-03-08 10:11	6.4998	136.8501
201303081222	2013-03-08 12:24	7.0011	136.7331
201303081437	2013-03-08 14:40	7.4991	136.6163
201303100616	2013-03-10 06:17	6.9905	135.9906
201303100931	2013-03-10 09:32	6.4666	135.4663
201303101233	2013-03-10 12:34	5.9916	134.9916
201303101536	2013-03-10 15:37	5.5003	134.5003
201303101825	2013-03-10 18:26	5.0008	134.0678
201303102135	2013-03-10 21:37	4.5001	133.5013
201303110033	2013-03-11 00:35	3.9995	132.9991
201303110324	2013-03-11 03:25	3.4996	132.4996
201303110733	2013-03-11 07:35	2.5848	132.0001
201303110947	2013-03-11 09:49	2.4158	131.4981
201303111231	2013-03-11 12:33	2.0000	131.0003
201303111540	2013-03-11 15:42	1.5000	130.4536
201303121555	2013-03-12 15:58	2.0000	128.9996
201303121816	2013-03-12 18:18	1.9998	129.5000
201303122029	2013-03-12 20:31	2.0001	130.0003

Related Information



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