MIRAI MR13-E02 Leg2 Expendable Bathythermograph (XBT)

Last Modified: 2019-09-28

ReadMe Observation Data Data Format

Cruise ID: **MR13-E02 Leg2**
Expendable Bathythermograph (XBT): Processed (DMO)-QCed
Data Policy: **JAMSTEC**
Observation Items: Depth, Temperature
Science Keywords:

   OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE

Cruise Report
http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR13-E02_leg2_all.pdf

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>   Data Management Office
>
> **Use Constraints**
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>
> **Data Citation**
>   See **Terms and Conditions** about data citation.

Instrument

Instrument:
Expendable bathythermograph (XBT)
(MR11-04 -)

Instrument:
Expendable bathythermograph (XBT) (
- MR11-E02)

Overview

   Using XBT (eXpendable Bathy Thermograph) system, the vertical distribution of water temperature is observed during free fall of its probe part in the seawater. On board, the analogue signal is converted to the temperature by data processor and the data is stored in PC. Depth data is calculated from the elapsed time.

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 : 50 msec

   (3) XBT probe specifications

Probe Type	TSK T-5	TSK T-6	TSK T-7	TSK T-10
Temperature range [deg-C]	-2 to 35			
Temperature accuracy [deg-C]	+/- 0.2			
Temperature resolution [deg-C]	0.01			
Measurment depth [m]	1830	460	760	300
Depth accuracy [m]	5 or +/- 2% of depth; whichever is larger			
Maximum elapsed time [sec]	291	73	123	48
Rated ship speed [knot]	6	15	15	10

   Since XBT 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 T-5	TSK T-6	TSK T-7	TSK T-10
Coefficient-a	6.828	6.691	6.691	6.301
Coefficient-b	-1.82	-2.25	-2.25	-2.16

   * Coefficients listed above are supplied by Sippican, Inc. in USA.

Coefficients listed above are supplied by Sippican, Inc., in USA.

The list of an XBT type used in each cast is as follows.

Cast name	Probe Serial No.	Probe Type	Launcher	Converter
201312120711	-	T-5	Hand	MK-150N
201312132228	-	T-5	Hand	MK-150N
201312150635	-	T-5	Hand	MK-150N
201312151936	-	T-5	Hand	MK-150N
201312170543	-	T-5	Hand	MK-150N
201312172315	-	T-5	Hand	MK-150N

Data processing

(1) For sensor's stablility, values of less than 1 m for temperature 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 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
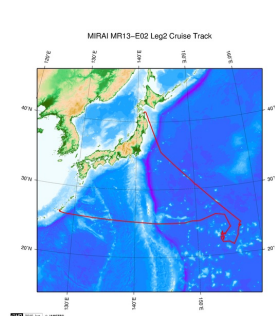In addition, an abnormal value is identified by a visual check, and the data after visual QC is released.

Note

(1) It is reported that T-5 probes produced by Tsurumi Seiki Co. Ltd. (TSK T-5 probes) have a fall-rate bias. Please see the following about publication policy of XBT fall-rate bias correction data.
Publication policy of XBT fall-rate bias correction data

Related Information

MIRAI MR13-E02 Leg2 Cruise Track

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MR13-E02 Leg2
Ship Name: MIRAI
Period: 2013-12-10 - 2013-12-24
Chief Scientist: Koichi Iijima (JAMSTEC)
Proposal Survey of REY-rich mud around Minami-Torishima Island
Title:

Update History

2019-09-28	An observation data was registerd.
2017-06-29	An observation data was registerd.
2015-12-22	An observation data was registerd.

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

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Data Policy: **JAMSTEC**

XBT DMO

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	XBT
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	45 - 55	Flag	-	i11	1 - 7 : space 8 : flag of depth 9 : flag of temperature 10 - 11 : space * reference : '**Definition of Quality Control Flags**'
4	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

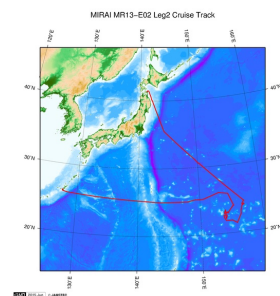   * Range and gradient check is performed to XBT data.

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 MR13-E02 Leg2 Cruise Track

MR13-E02 Leg2
Ship Name: MIRAI
Period: 2013-12-10 - 2013-12-24
Chief Scientist: Koichi Iijima (JAMSTEC)
Proposal Survey of REY-rich mud around Minami-Torishima Island
Title:

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JAMSTEC 国立研究開発法人
海洋研究開発機構
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

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Cruise ID: **MR13-E02 Leg2**
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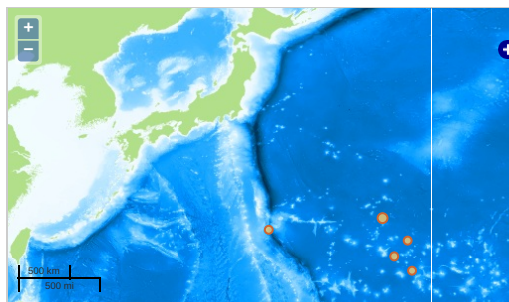**Data Policy**: **JAMSTEC**
Observation Items: Depth, Temperature
Science Keywords:

| OCEANS | > OCEAN TEMPERATURE | > WATER TEMPERATURE |

Observation Map

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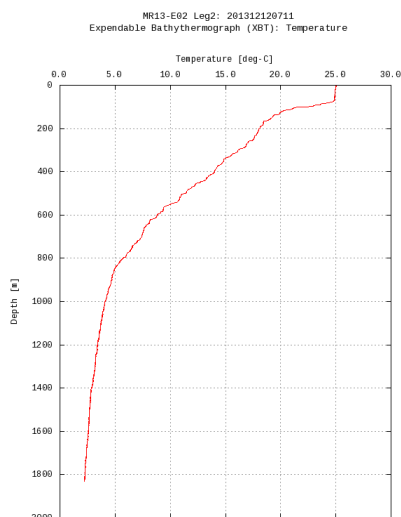2. Then click the observation name, figures will be displayed.

Imagery reproduced from ...

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

Figures

201312120711

MR13-E02 Leg2: 201312120711
Expendable Bathythermograph (XBT): Temperature

Only values evaluated as "good : all flags are 0" are plotted in profiles.
Please see Format Page for the definition of quality flags.
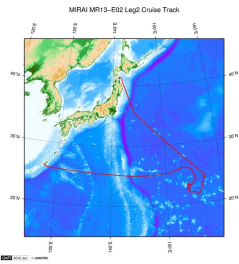
Data List

Add to Basket

	File names
☐	201312120711.dat
☐	201312132228.dat
☐	201312150635.dat
☐	201312151936.dat
☐	201312170543.dat
☐	201312172315.dat
☐	ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
201312120711	2013-12-12 07:15	25.0373	143.0058
201312132228	2013-12-13 22:29	26.0710	153.1071
201312150635	2013-12-15 06:36	25.8306	154.5720
201312151936	2013-12-15 19:38	24.0745	155.3360
201312170543	2013-12-17 05:50	22.6781	154.1453
201312172315	2013-12-17 23:20	21.4058	155.7258

Related Information

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MR13-E02 Leg2
Ship Name: MIRAI
Period: 2013-12-10 - 2013-12-24
Chief Scientist: Koichi Iijima (JAMSTEC)
Proposal Survey of REY-rich mud around Minami-Torishima Island
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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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Cruise ID: [＿＿＿＿] [Go]

Go to a Dive Information
Dive ID: [----] [＿＿] [Go]