MIRAI MR00-K03 Expendable Bathythermograph (XBT) Fall-rate bias corrected

Last Modified: 2019-10-04

ReadMe | Observation Data | Data Format

Cruise ID: MR00-K03
Expendable Bathythermograph (XBT) Fall-rate bias corrected: 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/MR00-K03_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 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.

Correction method

Fall-rate bias corrected data using new coefficients of Kizu et al. (2005) for all TSK T-5 probes.

[Reference]
Kizu et al. (2005): A New Fall-Rate Equation for T-5 Expendable Bathythermograph (XBT) by TSK. Journal of Oceanography, Vol. 61, pp. 115 to 121

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.

The corrected data were calculated using new coefficients and elapsed time.
The elapsed time was calculated from the original depth which had been calculated by manufacture's coefficients.

Probe Type	TSK T-5 (New Coefficients of Kizu et al.)	TSK T-5 (Manufacture's Coefficients)
Coefficient-a	6.54071	6.828
Coefficient-b	-1.8691	-1.82

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

Cast name	Probe Serial No.	Probe Type	Launcher	Converter
200005110119p	-	T-5	Auto	MK-30N
200005150037p	-	T-5	Auto	MK-30N
200005150632p	-	T-5	Auto	MK-30N
200005151522p	-	T-5	Auto	MK-30N
200005151657p	-	T-5	Auto	MK-30N
200005160326p	-	T-5	Auto	MK-30N
200005311639p	-	T-5	Auto	MK-30N
200006031320p	-	T-5	Auto	MK-30N
200006031757p	-	T-5	Auto	MK-30N
200006051047p	-	T-5	Auto	MK-30N

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

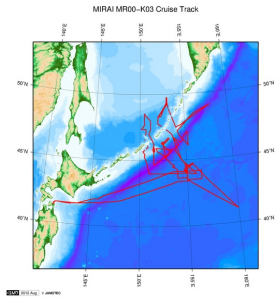
In addition, an abnormal value is identified by a visual check, and the data after visual QC is released.

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



Enlarge Image

MR00-K03
Ship Name: MIRAI
Period: 2000-05-09 - 2000-06-09
Chief Scientist: Masashi Kusakabe (JAMSTEC)
Project Name: [Station KNOT]

Update History

2019-10-04	An observation data was registerd.
2017-07-13	An observation data was registerd.
2014-07-12	An observation data was registerd.
2014-04-02	An observation data was registerd.
2012-12-25	An observation data was registerd.

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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.

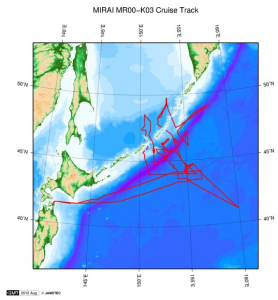
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

ex_read2.f

Related Information



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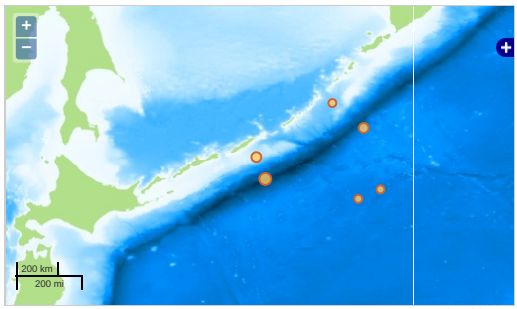
OCEANS	> OCEAN	> WATER
	TEMPERATURE	TEMPERATURE

Observation Map

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

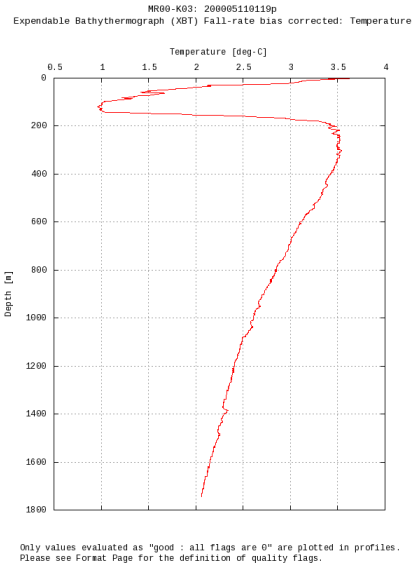


Imagery reproduced from ...

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

Figures

200005110119p



Data List

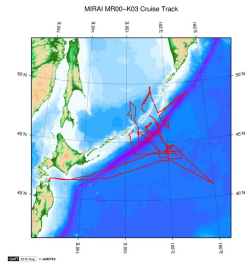
Add to Basket

File names
200005110119p.dat
200005150037p.dat
200005150632p.dat
200005151522p.dat
200005151657p.dat
200005160326p.dat
200005311639p.dat
200006031320p.dat
200006031757p.dat
200006051047p.dat
ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200005110119p	2000-05-11 01:12	43.5008	155.0031
200005150037p	2000-05-15 00:31	44.3840	150.8756
200005150632p	2000-05-15 06:23	44.7390	150.7510
200005151522p	2000-05-15 15:14	45.0508	150.6170
200005151657p	2000-05-15 16:45	45.3498	150.4793
200005160326p	2000-05-16 03:18	46.0131	150.8615
200005311639p	2000-05-31 16:31	47.7546	153.8518
200006031320p	2000-06-03 13:13	46.6466	155.2460
200006031757p	2000-06-03 17:48	46.5051	154.7731
200006051047p	2000-06-05 10:40	43.9221	155.9900

Related Information



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