KAIREI KR09-16 Expendable Bathythermograph (XBT) Fall-rate bias corrected

Last Modified: 2019-10-16

ReadMe | Observation Data | Data Format

Cruise ID: KR09-16

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/KR09-16_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:

XBT/XCTD

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

(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

Probe Type	TSK T-5 (New Coefficients of Kizu et al.)	TSK T-5 (Manufacture's Coefficients)
Coefficient b	1.8891	1.82

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

Cast name	Probe Serial No.	Probe Type	Launcher	Converter
BT-005220091030p	-	T-5	Hand	MK-130
BT-005320091031p	-	T-5	Hand	MK-130
BT-005420091101p	-	T-5	Hand	MK-130
BT-005520091103p	-	T-5	Hand	MK-130
BT-005620091103p	-	T-5	Hand	MK-130
BT-005720091105p	-	T-5	Hand	MK-130

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.

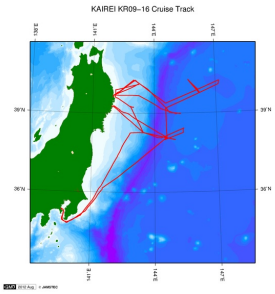
Note

(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

Cruise Data Dive Data



Enlarge Image

KR09-16
Ship Name: KAIREI
Period: 2009-10-30 - 2009-11-12
Chief Scientist: Makoto Yamano (The University of Tokyo)
Proposal Title: Studies on the thermal structure and the water distribution in the upper part of the Pacific plate subducting along the Japan Trench

Update History

2019-10-16	An observation data was registerd.
2017-07-11	An observation data was registerd.
2014-09-23	An observation data was registerd.
2014-04-05	An observation data was registerd.
2012-09-28	An observation data was registerd.

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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.

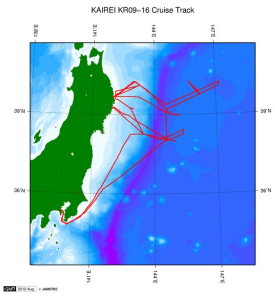
QUALITY CONTROL AND PROCESSING OF HISTORICAL OCEANOGRAPHIC TEMPERATURE, SALINITY, AND OXYGEN DATA

Sample Program

ex_read2.f

Related Information

Cruise Data Dive Data



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	TEMPERATURE	TEMPERATURE

Observation Map

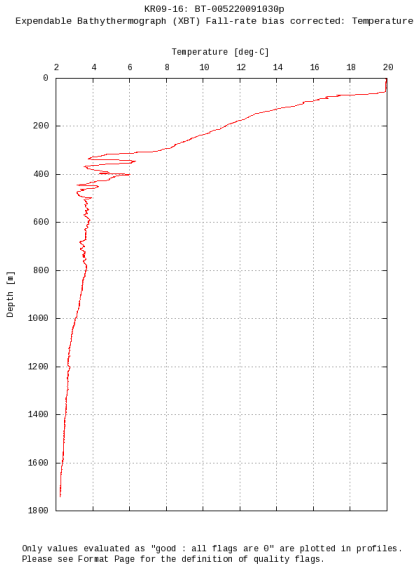
1. Clicking the icon displays a balloon with observation information.
2. Then click the observation name, figures will be displayed.

Imagery reproduced from ...

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

Figures

BT-005220091030p



Data List

Add to Basket

	File names
☐	BT-005220091030p.dat
☐	BT-005320091031p.dat
☐	BT-005420091101p.dat
☐	BT-005520091103p.dat
☐	BT-005620091103p.dat
☐	BT-005720091105p.dat
☐	ex_read2.f (Sample Program)

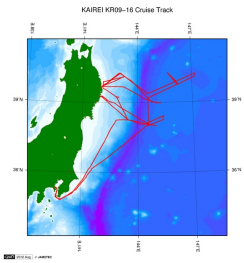
- Observation List

The list of observation is shown as follows.

Observation	Time and Date	Lat. [°]	Lon. [°]
BT-005220091030p	2009-10-30 23:33	38.2611	143.4071
BT-005320091031p	2009-10-31 03:46	38.0721	144.5523
BT-005420091101p	2009-11-01 00:18	39.2481	142.8535
BT-005520091103p	2009-11-03 04:36	40.2538	142.9921
BT-005620091103p	2009-11-03 21:54	38.9848	145.2553
BT-005720091105p	2009-11-05 22:32	40.2165	145.7123

Related Information

Cruise Data Dive Data



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