

MIRAI MR01-K03 Expendable Bathythermograph (XBT)

Last Modified: 2019-09-28

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Cruise ID: [MR01-K03](#)

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/MR01-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.

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			
Measurement 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

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

Cast name	Probe Serial No.	Probe Type	Launcher	Converter
200106260156	-	T-7	Auto	MK-30N
200106260242	-	T-7	Auto	MK-30N
200106260311	-	T-7	Auto	MK-30N
200106260604	-	T-7	Auto	MK-30N
200106260649	-	T-7	Auto	MK-30N
200106271339	-	T-7	Auto	MK-30N
200106271438	-	T-7	Auto	MK-30N
200106271518	-	T-7	Auto	MK-30N
200106271614	-	T-7	Auto	MK-30N
200106280809	-	T-7	Auto	MK-30N
200107120751	-	T-7	Auto	MK-30N
200107120833	-	T-7	Auto	MK-30N
200107120915	-	T-7	Auto	MK-30N
200107120956	-	T-7	Auto	MK-30N
200107121038	-	T-7	Auto	MK-30N
200107121123	-	T-7	Auto	MK-30N
200107121204	-	T-7	Auto	MK-30N
200107121248	-	T-7	Auto	MK-30N
200107121601	-	T-7	Auto	MK-30N
200107121803	-	T-7	Auto	MK-30N
200107131333	-	T-7	Auto	MK-30N
200107131447	-	T-7	Auto	MK-30N
200107131616	-	T-7	Auto	MK-30N
200107131700	-	T-7	Auto	MK-30N
200107131828	-	T-7	Auto	MK-30N
200107131953	-	T-7	Auto	MK-30N
200107132035	-	T-7	Auto	MK-30N
200107132116	-	T-7	Auto	MK-30N
200107132327	-	T-7	Auto	MK-30N
200107140032	-	T-7	Auto	MK-30N
200107141010	-	T-7	Auto	MK-30N
200107141102	-	T-7	Auto	MK-30N
200107141523	-	T-7	Auto	MK-30N
200107141610	-	T-7	Auto	MK-30N
200107151445	-	T-5	Auto	MK-30N
200107151533	-	T-5	Auto	MK-30N
200107160719	-	T-5	Auto	MK-30N
200107160905	-	T-5	Auto	MK-30N
200107161253	-	T-7	Auto	MK-30N
200107161347	-	T-7	Auto	MK-30N

Data processing

(1) For sensor's stability, 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](#)

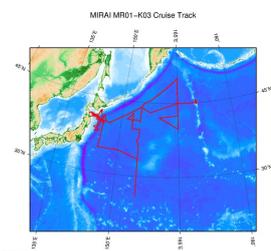
In addition, an abnormal value is identified by a visual check, and the data after visual QC is released.

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



MR01-K03

Ship Name: MIRAI
 Period: 2001-06-04 - 2001-07-18
 Chief Scientist: Shuichi Watanabe (JAMSTEC)
 Project Name: [Station K2, Station KNOT]

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Update History

2019-09-28	An observation data was registerd.
2017-06-29	An observation data was registerd.
2014-07-16	An observation data was registerd.
2014-02-20	An observation data was registerd.
2012-12-25	An observation data was registerd.

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Cruise ID: [MR01-K03](#)

Expendable Bathythermograph (XBT): Processed (DMO)-QCed

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.

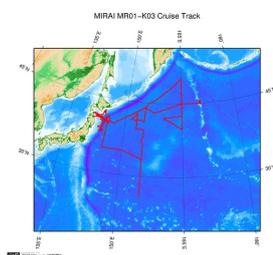
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

[QUALITY CONTROL AND PROCESSING OF HISTORICAL OCEANOGRAPHIC TEMPERATURE, SALINITY, AND OXYGEN DATA](#)

Sample Program

[ex_read2.f](#)

Related Information



MR01-K03

Ship Name: MIRAI
Period: 2001-06-04 - 2001-07-18
Chief Scientist: Shuichi Watanabe (JAMSTEC)
Project Name: [Station K2, Station KNOT]

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Update History

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KAIYO
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HAKUHO MARU

Information of the Submersibles

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SHINKAI 2000
SHINKAI 6500
DEEP TOW
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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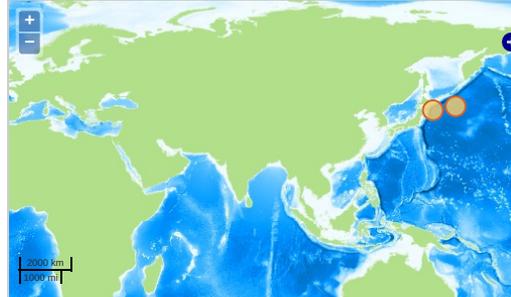
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OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE

Observation Map

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

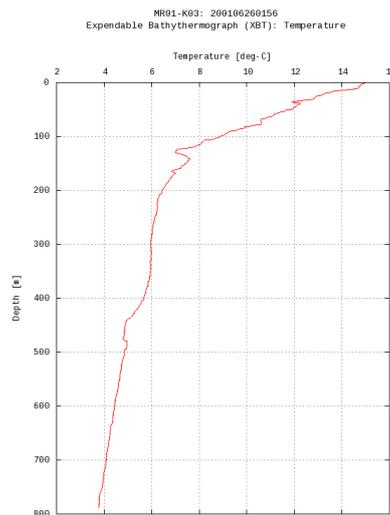


— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

Imagery reproduced from ...

Figures

200106260156



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](#)

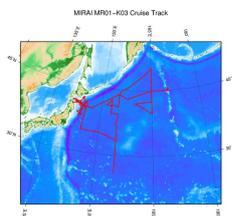
<input type="checkbox"/> File names
<input type="checkbox"/> 200106260156.dat
<input type="checkbox"/> 200106260242.dat
<input type="checkbox"/> 200106260311.dat
<input type="checkbox"/> 200106260604.dat
<input type="checkbox"/> 200106260649.dat
<input type="checkbox"/> 200106271339.dat
<input type="checkbox"/> 200106271438.dat
<input type="checkbox"/> 200106271518.dat
<input type="checkbox"/> 200106271614.dat
<input type="checkbox"/> 200106280809.dat
<input type="checkbox"/> 200107120751.dat
<input type="checkbox"/> 200107120833.dat
<input type="checkbox"/> 200107120915.dat
<input type="checkbox"/> 200107120956.dat
<input type="checkbox"/> 200107121038.dat
<input type="checkbox"/> 200107121123.dat
<input type="checkbox"/> 200107121204.dat
<input type="checkbox"/> 200107121248.dat
<input type="checkbox"/> 200107121601.dat

<input type="checkbox"/>	200107131903.dat
<input type="checkbox"/>	200107131333.dat
<input type="checkbox"/>	200107131447.dat
<input type="checkbox"/>	200107131616.dat
<input type="checkbox"/>	200107131700.dat
<input type="checkbox"/>	200107131828.dat
<input type="checkbox"/>	200107131953.dat
<input type="checkbox"/>	200107132035.dat
<input type="checkbox"/>	200107132116.dat
<input type="checkbox"/>	200107132327.dat
<input type="checkbox"/>	200107140032.dat
<input type="checkbox"/>	200107141010.dat
<input type="checkbox"/>	200107141102.dat
<input type="checkbox"/>	200107141523.dat
<input type="checkbox"/>	200107141610.dat
<input type="checkbox"/>	200107151445.dat
<input type="checkbox"/>	200107151533.dat
<input type="checkbox"/>	200107160719.dat
<input type="checkbox"/>	200107160905.dat
<input type="checkbox"/>	200107161253.dat
<input type="checkbox"/>	200107161347.dat
<input type="checkbox"/>	ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200106260156	2001-06-26 01:53	41.3345	153.4150
200106260242	2001-06-26 02:37	41.3333	153.1618
200106260311	2001-06-26 03:06	41.3331	152.9981
200106260604	2001-06-26 05:59	41.3361	152.4960
200106260649	2001-06-26 06:44	41.3336	152.2451
200106271339	2001-06-27 13:35	41.4993	153.0006
200106271438	2001-06-27 14:35	41.2496	152.9993
200106271518	2001-06-27 15:15	41.0820	152.9986
200106271614	2001-06-27 16:08	41.0828	152.7504
200106280809	2001-06-28 08:05	40.4953	153.0023
200107120751	2001-07-12 07:48	39.9521	145.3965
200107120833	2001-07-12 08:30	40.0683	145.2153
200107120915	2001-07-12 09:11	40.1845	145.0358
200107120956	2001-07-12 09:53	40.3018	144.8538
200107121038	2001-07-12 10:36	40.4185	144.6696
200107121123	2001-07-12 11:18	40.5349	144.4863
200107121204	2001-07-12 12:01	40.6500	144.3021
200107121248	2001-07-12 12:45	40.7663	144.1201
200107121601	2001-07-12 15:58	40.3380	143.9495
200107121803	2001-07-12 18:01	39.8388	143.9710
200107131333	2001-07-13 13:31	38.1673	143.8865
200107131447	2001-07-13 14:44	38.2668	144.2526
200107131616	2001-07-13 16:14	38.3850	144.6250
200107131700	2001-07-13 16:58	38.4316	144.4230
200107131828	2001-07-13 18:25	38.5676	144.0178
200107131953	2001-07-13 19:51	38.7013	143.6165
200107132035	2001-07-13 20:32	38.7665	143.4166
200107132116	2001-07-13 21:14	38.8308	143.2138
200107132327	2001-07-13 23:23	39.0010	143.3740
200107140032	2001-07-14 00:28	39.1011	143.7238
200107141010	2001-07-14 10:07	40.0921	144.5845
200107141102	2001-07-14 10:59	40.2761	144.6821
200107141523	2001-07-14 15:20	40.4590	144.7798
200107141610	2001-07-14 16:08	40.6386	144.8693
200107151445	2001-07-15 14:39	40.3731	146.0621
200107151533	2001-07-15 15:27	40.3676	145.8641
200107160719	2001-07-16 07:13	40.3671	144.2356
200107160905	2001-07-16 08:57	40.3696	143.6966
200107161253	2001-07-16 12:51	41.0550	143.7696
200107161347	2001-07-16 13:44	41.2316	143.6014

Related Information



MR01-K03
Ship Name: MIRAI
Period: 2001-06-04 - 2001-07-18
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Project Name: [Station K2, Station KNOT]

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