

MIRAI MR00-K05 Expendable Bathythermograph (XBT)

Last Modified: 2019-09-28

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Cruise ID: [MR00-K05](#)

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

Data Policy: [JAMSTEC](#)

Observation Items: Depth, Temperature

Science Keywords:

OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE

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
200007100033	-	T-7	Auto	MK-30N
200007100136	-	T-7	Auto	MK-30N
200007100237	-	T-7	Auto	MK-30N
200007100338	-	T-7	Auto	MK-30N
200007100456	-	T-7	Auto	MK-30N
200007100601	-	T-7	Auto	MK-30N
200007100709	-	T-7	Auto	MK-30N
200007100818	-	T-7	Auto	MK-30N
200007100923	-	T-7	Auto	MK-30N
200007101030	-	T-7	Auto	MK-30N
200007101139	-	T-7	Auto	MK-30N
200007101247	-	T-7	Auto	MK-30N
200007101353	-	T-7	Auto	MK-30N
200007101500	-	T-7	Auto	MK-30N
200007101605	-	T-7	Auto	MK-30N
200007101710	-	T-7	Auto	MK-30N
200007101815	-	T-7	Auto	MK-30N
200007101916	-	T-7	Auto	MK-30N
200007102015	-	T-7	Auto	MK-30N
200007102118	-	T-7	Auto	MK-30N
200007102222	-	T-7	Auto	MK-30N
200007102335	-	T-5	Auto	MK-30N
200007110819	-	T-7	Auto	MK-30N
200007110931	-	T-7	Auto	MK-30N
200007111044	-	T-7	Auto	MK-30N
200007111157	-	T-7	Auto	MK-30N
200007111310	-	T-7	Auto	MK-30N
200007111421	-	T-7	Auto	MK-30N
200007111536	-	T-7	Auto	MK-30N
200007111652	-	T-7	Auto	MK-30N
200007111803	-	T-7	Auto	MK-30N
200007111915	-	T-7	Auto	MK-30N
200007112025	-	T-7	Auto	MK-30N
200007112136	-	T-7	Auto	MK-30N
200007112248	-	T-7	Auto	MK-30N
200007120003	-	T-7	Auto	MK-30N
200007120115	-	T-7	Auto	MK-30N
200007292102	-	T-7	Auto	MK-30N
200007292206	-	T-7	Auto	MK-30N
200007292309	-	T-7	Auto	MK-30N
200007300012	-	T-7	Auto	MK-30N
200007300116	-	T-7	Auto	MK-30N
200007300218	-	T-7	Auto	MK-30N
200007300320	-	T-7	Auto	MK-30N
200007300424	-	T-7	Auto	MK-30N
200007300528	-	T-7	Auto	MK-30N
200007300633	-	T-7	Auto	MK-30N
200007300735	-	T-7	Auto	MK-30N
200007300838	-	T-7	Auto	MK-30N
200007300943	-	T-7	Auto	MK-30N
200007301046	-	T-7	Auto	MK-30N
200007301150	-	T-7	Auto	MK-30N
200007301254	-	T-7	Auto	MK-30N
200007301401	-	T-7	Auto	MK-30N
200007301507	-	T-7	Auto	MK-30N
200007301618	-	T-7	Auto	MK-30N
200007310214	-	T-7	Auto	MK-30N
200007310323	-	T-7	Auto	MK-30N
200007310451	-	T-7	Auto	MK-30N
200007310618	-	T-7	Auto	MK-30N
200007310742	-	T-7	Auto	MK-30N
200007310906	-	T-7	Auto	MK-30N
200007311032	-	T-7	Auto	MK-30N
200007311155	-	T-7	Auto	MK-30N
200007311323	-	T-7	Auto	MK-30N
200007311450	-	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

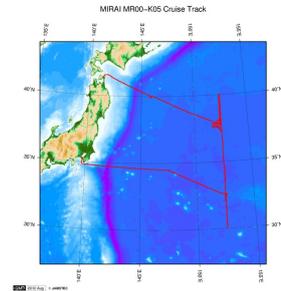
In addition, an abnormal value is identified by a visual check, and the data after visual QC is released.

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



[Enlarge Image](#)

MR00-K05

Ship Name: MIRAI

Period: 2000-07-09 - 2000-08-01

Chief Scientist: Yasushi Yoshikawa (JAMSTEC)

Update History

2019-09-28	An observation data was registerd.
2017-06-29	An observation data was registerd.
2014-07-12	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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[6K Camera DEEP TOW](#)
[6K Sonar DEEP TOW](#)
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[POWER GRAB SAMPLER \(CLOW\)](#)
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Dive ID:



MIRAI MR00-K05 Expendable Bathythermograph (XBT)

Last Modified: 2019-09-28

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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.

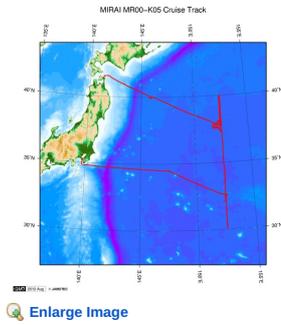
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

Sample Program

[ex_read2.f](#)

Related Information



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MR00-K05
 Ship Name: MIRAI
 Period: 2000-07-09 - 2000-08-01
 Chief Scientist: Yasushi Yoshikawa (JAMSTEC)

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MIRAI MR00-K05 Expendable Bathythermograph (XBT)

Last Modified: 2019-09-28

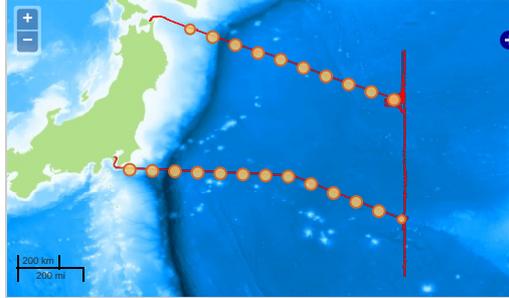
ReadMe **Observation Data** Data Format

Cruise ID: **MR00-K05**
 Expendable Bathythermograph (XBT): Processed (DMO)-QCed
 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.

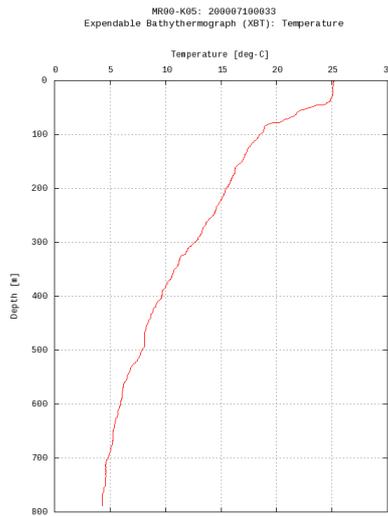


— Observation Line — Navigation ● Observation, Dive Point, Hole

Imagery reproduced from ...

Figures

200007100033



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

<input type="checkbox"/>	File names
<input type="checkbox"/>	200007100033.dat
<input type="checkbox"/>	200007100136.dat
<input type="checkbox"/>	200007100237.dat
<input type="checkbox"/>	200007100338.dat
<input type="checkbox"/>	200007100456.dat
<input type="checkbox"/>	200007100601.dat
<input type="checkbox"/>	200007100709.dat
<input type="checkbox"/>	200007100818.dat
<input type="checkbox"/>	200007100923.dat
<input type="checkbox"/>	200007101030.dat
<input type="checkbox"/>	200007101139.dat
<input type="checkbox"/>	200007101247.dat
<input type="checkbox"/>	200007101353.dat
<input type="checkbox"/>	200007101500.dat
<input type="checkbox"/>	200007101605.dat
<input type="checkbox"/>	200007101710.dat
<input type="checkbox"/>	200007101815.dat
<input type="checkbox"/>	200007101916.dat
<input type="checkbox"/>	200007102015.dat

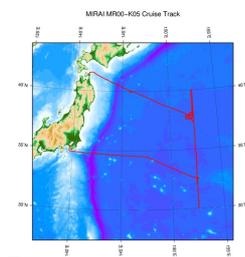
 200007100118.dat
 200007102222.dat
 200007102335.dat
 200007110819.dat
 200007110931.dat
 200007111044.dat
 200007111157.dat
 200007111310.dat
 200007111421.dat
 200007111536.dat
 200007111652.dat
 200007111803.dat
 200007111915.dat
 200007112025.dat
 200007112136.dat
 200007112248.dat
 200007120003.dat
 200007120115.dat
 200007292102.dat
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 200007300116.dat
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 200007300320.dat
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 200007301046.dat
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 200007301254.dat
 200007301401.dat
 200007301507.dat
 200007301618.dat
 200007310214.dat
 200007310323.dat
 200007310451.dat
 200007310618.dat
 200007310742.dat
 200007310906.dat
 200007311032.dat
 200007311155.dat
 200007311323.dat
 200007311450.dat
 ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
200007100033	2000-07-10 00:29	34.8031	140.3343
200007100136	2000-07-10 01:33	34.7888	140.6678
200007100237	2000-07-10 02:34	34.7740	141.0010
200007100338	2000-07-10 03:36	34.7553	141.3340
200007100456	2000-07-10 04:53	34.7423	141.6673
200007100601	2000-07-10 05:59	34.7415	141.9996
200007100709	2000-07-10 07:06	34.7343	142.3331
200007100818	2000-07-10 08:15	34.7016	142.6665
200007100923	2000-07-10 09:21	34.6890	142.9990
200007101030	2000-07-10 10:27	34.6761	143.3330
200007101139	2000-07-10 11:36	34.6588	143.6666
200007101247	2000-07-10 12:44	34.6455	143.9998
200007101353	2000-07-10 13:51	34.6358	144.3334
200007101500	2000-07-10 14:57	34.6190	144.6668
200007101605	2000-07-10 16:02	34.5991	145.0001
200007101710	2000-07-10 17:07	34.5923	145.3334
200007101815	2000-07-10 18:12	34.5735	145.6715
200007101916	2000-07-10 19:13	34.5590	145.9998
200007102015	2000-07-10 20:13	34.5465	146.3333
200007102118	2000-07-10 21:15	34.5160	146.6665
200007102222	2000-07-10 22:19	34.5086	146.9998
200007102335	2000-07-10 23:29	34.4990	147.3336
200007110819	2000-07-11 08:17	34.4311	147.6668
200007110931	2000-07-11 09:28	34.3038	147.9996
200007111044	2000-07-11 10:41	34.1686	148.3331
200007111157	2000-07-11 11:55	34.0398	148.6665
200007111310	2000-07-11 13:07	33.8986	149.0001
200007111421	2000-07-11 14:19	33.7670	149.3331
200007111536	2000-07-11 15:33	33.6318	149.6663
200007111652	2000-07-11 16:49	33.4980	150.0004
200007111803	2000-07-11 18:00	33.3706	150.3334

Observation ID	Time and Date	Lat (°N)	Long (°E)
200007112025	2000-07-11 20:23	33.0908	151.0001
200007112136	2000-07-11 21:33	32.9601	151.3331
200007112248	2000-07-11 22:46	32.8225	151.6671
200007120003	2000-07-12 00:01	32.6881	151.9996
200007120115	2000-07-12 01:12	32.6023	152.3333
200007292102	2000-07-29 20:57	37.9159	151.9990
200007292206	2000-07-29 22:02	38.0346	151.6663
200007292309	2000-07-29 23:05	38.1520	151.3328
200007300012	2000-07-30 00:09	38.2665	150.9998
200007300116	2000-07-30 01:13	38.3836	150.6668
200007300218	2000-07-30 02:15	38.4968	150.3331
200007300320	2000-07-30 03:18	38.6025	150.0004
200007300424	2000-07-30 04:21	38.7123	149.6663
200007300528	2000-07-30 05:26	38.8300	149.3334
200007300633	2000-07-30 06:30	38.9611	149.0003
200007300735	2000-07-30 07:32	39.0813	148.6666
200007300838	2000-07-30 08:35	39.2081	148.3336
200007300943	2000-07-30 09:40	39.3360	148.0001
200007301046	2000-07-30 10:44	39.4626	147.6670
200007301150	2000-07-30 11:47	39.5826	147.3333
200007301254	2000-07-30 12:52	39.6990	147.0001
200007301401	2000-07-30 13:58	39.8225	146.6666
200007301507	2000-07-30 15:05	39.9438	146.3334
200007301618	2000-07-30 16:15	40.0001	146.0006
200007310214	2000-07-31 02:12	40.1200	145.6665
200007310323	2000-07-31 03:20	40.2344	145.3338
200007310451	2000-07-31 04:48	40.3525	145.0003
200007310618	2000-07-31 06:15	40.4721	144.6670
200007310742	2000-07-31 07:39	40.5890	144.3340
200007310906	2000-07-31 09:04	40.7061	144.0004
200007311032	2000-07-31 10:29	40.8170	143.6671
200007311155	2000-07-31 11:53	40.9371	143.3338
200007311323	2000-07-31 13:20	41.0560	143.0000
200007311450	2000-07-31 14:48	41.1746	142.6673

Related Information



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Ship Name: MIRAI
 Period: 2000-07-09 - 2000-08-01
 Chief Scientist: Yasushi Yoshikawa (JAMSTEC)

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Information of the Ships

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 SHINSEI MARU
 HAKUHO MARU

Information of the Submersibles

KAIKO
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 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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Dive ID:

