

## MIRAI MR00-ENG Expendable Bathythermograph (XBT)

Last Modified: 2019-09-28

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Cruise ID: [MR00-ENG](#)

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.

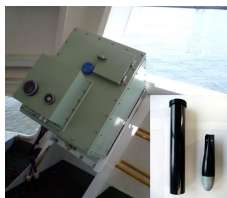
### Instrument

Instrument:

Expendable bathythermograph (XBT)  
(MR11-04 - )

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			
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.

$$Z = at + 10E^{-3} \cdot bt^2$$

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
200004282010	-	T-5	Hand	MK-30N
200004282104	-	T-7	-	MK-30N
200005011233	-	T-5	-	MK-30N
200005021406	-	T-5	-	MK-30N
200005021419	-	T-7	-	MK-30N
200005021425	-	T-7	-	MK-30N
200005021434	-	T-7	-	MK-30N
200005021616	-	T-7	-	MK-30N
200005021625	-	T-7	-	MK-30N
200005021645	-	T-7	-	MK-30N
200005021655	-	T-5	-	MK-30N
200005021723	-	T-5	-	MK-30N
200005021731	-	T-5	-	MK-30N
200005021746	-	T-7	-	MK-30N
200005021752	-	T-7	-	MK-30N
200005021848	-	T-5	-	MK-30N
200005021853	-	T-7	-	MK-30N
200005030444	-	T-5	-	MK-30N
200005030503	-	T-5	-	MK-30N
200005030522	-	T-5	-	MK-30N
200005030801	-	T-5	-	MK-30N
200005030806	-	T-7	-	MK-30N
200005030810	-	T-7	-	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

**MR00-ENG**  
Ship Name: MIRAI  
Period: 2000-04-27 - 2000-05-05

#### Update History

2019-09-28	An observation data was registered.
2018-06-30	An observation data was registered.

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HAKUHO MARU

**Information of the Submersibles**  
KAIKO  
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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Expendable Bathythermograph (XBT): Processed (DMO)-QCed

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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 : <a href="#">Definition of Quality Control Flags</a>
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

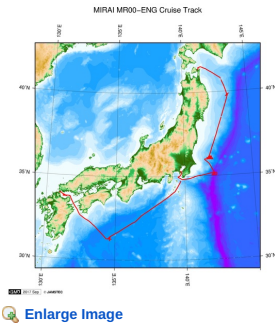
[ex\\_read2.f](#)

#### Related Information

#### MR00-ENG

Ship Name: MIRAI

Period: 2000-04-27 - 2000-05-05



#### Update History

2019-09-28	An observation data was registerd.
2018-06-30	An observation data was registerd.

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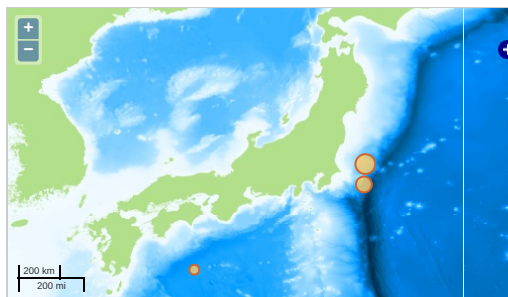
Observation Items: Depth, Temperature

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.

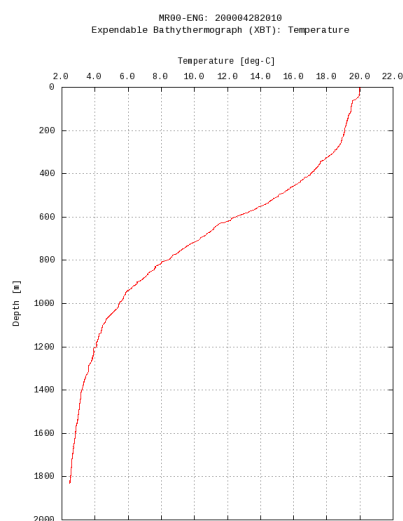


— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

Imagery reproduced from ...

### Figures

200004282010








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

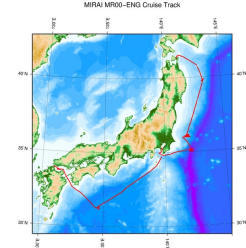
<input type="checkbox"/>	200004282010.dat
<input type="checkbox"/>	200004282104.dat
<input type="checkbox"/>	200005011233.dat
<input type="checkbox"/>	200005021406.dat
<input type="checkbox"/>	200005021419.dat
<input type="checkbox"/>	200005021425.dat
<input type="checkbox"/>	200005021434.dat
<input type="checkbox"/>	200005021616.dat
<input type="checkbox"/>	200005021625.dat
<input type="checkbox"/>	200005021645.dat
<input type="checkbox"/>	200005021655.dat
<input type="checkbox"/>	200005021723.dat
<input type="checkbox"/>	200005021731.dat
<input type="checkbox"/>	200005021746.dat
<input type="checkbox"/>	200005021752.dat
<input type="checkbox"/>	200005021848.dat
<input type="checkbox"/>	200005021853.dat
<input type="checkbox"/>	200005030444.dat
<input type="checkbox"/>	200005030503.dat

-  200005030522.dat
-  200005030801.dat
-  200005030806.dat
-  200005030810.dat
-  ex\_read2.f (Sample Program)

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


Observation	Time and Date	Lat. [°]	Lon. [°]
200004282010	2000-04-28 20:02	31.3518	134.2805
200004282104	2000-04-28 21:01	31.2513	134.4036
200005011233	2000-05-01 12:26	35.1378	141.8088
200005021406	2000-05-02 14:00	36.0000	141.7100
200005021419	2000-05-02 14:16	36.0008	141.7921
200005021425	2000-05-02 14:22	36.0015	141.8240
200005021434	2000-05-02 14:32	36.0035	141.8746
200005021616	2000-05-02 16:14	36.0428	141.8730
200005021625	2000-05-02 16:22	36.0424	141.8338
200005021645	2000-05-02 16:42	36.0418	141.7405
200005021655	2000-05-02 16:49	36.0416	141.7090
200005021723	2000-05-02 17:16	36.0838	141.7081
200005021731	2000-05-02 17:25	36.0840	141.7508
200005021746	2000-05-02 17:44	36.0850	141.8441
200005021752	2000-05-02 17:50	36.0851	141.8753
200005021848	2000-05-02 18:41	36.1250	141.9166
200005021853	2000-05-02 18:51	36.1245	141.8736
200005030444	2000-05-03 04:38	36.1068	141.7986
200005030503	2000-05-03 04:56	36.1071	141.7990
200005030522	2000-05-03 05:16	36.1078	141.7988
200005030801	2000-05-03 07:55	36.1061	141.8005
200005030806	2000-05-03 08:04	36.1053	141.7988
200005030810	2000-05-03 08:08	36.1049	141.7980

#### Related Information



MIRAI MR00-ENG Cruise Track

**MR00-ENG**  
Ship Name: MIRAI  
Period: 2000-04-27 - 2000-05-05

 [Enlarge Image](#)

#### Update History

- |            |                                    |
|------------|------------------------------------|
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