MIRAI MR99-K05 Leg1 Expendable Bathythermograph (XBT)

Last Modified: 2019-09-28

ReadMe | Observation Data | Data Format

Cruise ID: MR99-K05 Leg1
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			
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.

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
199908281458	-	T-7	-	MK-30N
199908281804	-	T-7	-	MK-30N
199908282105	-	T-7	-	MK-30N
199908290006	-	T-7	-	MK-30N
199908290307	-	T-7	-	MK-30N
199908290607	-	T-7	-	MK-30N
199908290905	-	T-7	-	MK-30N
199908291153	-	T-7	-	MK-30N
199908291440	-	T-7	-	MK-30N
199908291731	-	T-7	-	MK-30N
199908292029	-	T-7	-	MK-30N
199908292322	-	T-7	-	MK-30N
199908300218	-	T-7	-	MK-30N
199908300517	-	T-7	-	MK-30N
199908300818	-	T-7	-	MK-30N
199908301116	-	T-7	-	MK-30N
199908301411	-	T-7	-	MK-30N
199908301706	-	T-7	-	MK-30N
199908302237	-	T-7	-	MK-30N
199908310131	-	T-7	-	MK-30N
199908310422	-	T-7	-	MK-30N
199908310715	-	T-7	-	MK-30N
199908311010	-	T-7	-	MK-30N
199908311300	-	T-7	-	MK-30N
199908311544	-	T-7	-	MK-30N
199908311824	-	T-7	-	MK-30N
199908312105	-	T-7	-	MK-30N
199908312344	-	T-7	-	MK-30N
199909010225	-	T-7	-	MK-30N
199909010508	-	T-7	-	MK-30N
199909010755	-	T-7	-	MK-30N
199909011042	-	T-7	-	MK-30N
199909011327	-	T-7	-	MK-30N
199909011613	-	T-7	-	MK-30N
199909011857	-	T-7	-	MK-30N
199909012143	-	T-7	-	MK-30N
199909020022	-	T-7	-	MK-30N
199909020305	-	T-7	-	MK-30N
199909020544	-	T-7	-	MK-30N
199909020826	-	T-7	-	MK-30N
199909021106	-	T-7	-	MK-30N
199909021345	-	T-7	-	MK-30N
199909021627	-	T-7	-	MK-30N
199909021906	-	T-7	-	MK-30N
199909022146	-	T-7	-	MK-30N
199909030026	-	T-7	-	MK-30N
199909030304	-	T-7	-	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

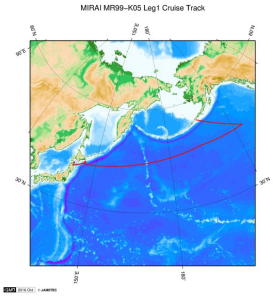
In addition, an abnormal value is identified by a visual check, and the data after visual QC is released.

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

MR99-K05 Leg1
Ship Name: MIRAI
Period: 1999-08-23 - 1999-09-10
Chief Scientist: Masao Fukasawa (JAMSTEC)
Project Name: [POST-WOCE Hydrography]

Update History

2019-09-28	An observation data was registerd.
2017-06-29	An observation data was registerd.
2016-10-17	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

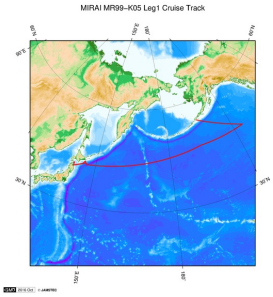
2. Observed Level Flags
- N - missing value
- 0 - accepted value
- 1 - range outlier (outside of broad range check)
- 2 - failed inversion check
- 3 - failed gradient check
- 4 - zero anomaly
- 5 - failed combined gradient and inversion checks
- 6 - failed range and inversion checks
- 7 - failed range 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



Enlarge Image

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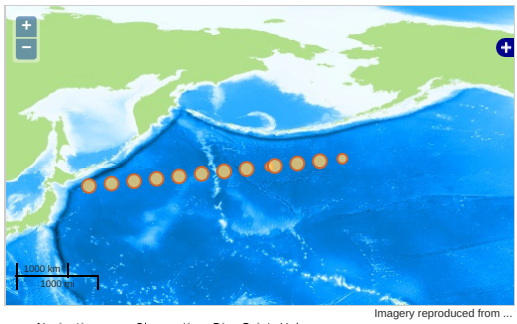
Science Keywords:

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.

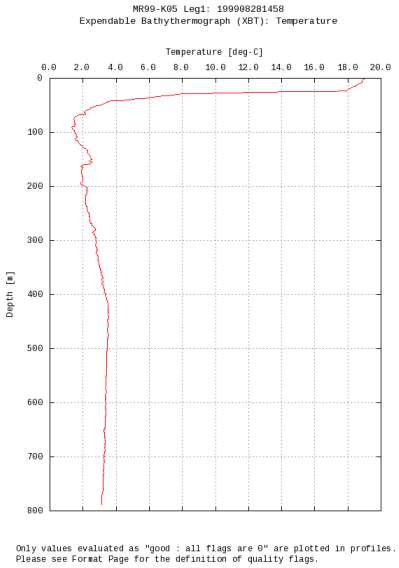


Imagery reproduced from ...

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

Figures

199908281458



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

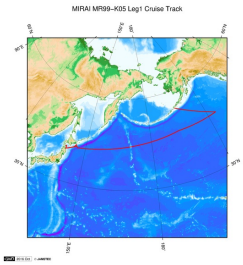
File names
199908281458.dat
199908281804.dat
199908282105.dat
199908290006.dat
199908290307.dat
199908290607.dat
199908290905.dat
199908291153.dat
199908291440.dat
199908291731.dat
199908292029.dat
199908292322.dat
199908300218.dat
199908300517.dat
199908300818.dat
199908301116.dat
199908301411.dat
199908301706.dat
199908302237.dat

File names
199908310131.dat
199908310422.dat
199908310715.dat
199908311010.dat
199908311300.dat
199908311544.dat
199908311824.dat
199908312105.dat
199908312344.dat
199909010225.dat
199909010508.dat
199909010755.dat
199909011042.dat
199909011327.dat
199909011613.dat
199909011857.dat
199909012143.dat
199909020022.dat
199909020305.dat
199909020544.dat
199909020826.dat
199909021106.dat
199909021345.dat
199909021627.dat
199909021906.dat
199909022146.dat
199909030026.dat
199909030304.dat
ex_read2.f (Sample Program)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
199908281458	1999-08-28 14:55	42.0098	147.5003
199908281804	1999-08-28 18:00	42.1025	148.5006
199908282105	1999-08-28 21:02	42.2188	149.5013
199908290006	1999-08-29 00:04	42.3286	150.5001
199908290307	1999-08-29 03:04	42.4360	151.5011
199908290607	1999-08-29 06:05	42.5606	152.5015
199908290905	1999-08-29 09:02	42.6623	153.5013
199908291153	1999-08-29 11:50	42.7565	154.5003
199908291440	1999-08-29 14:38	42.8671	155.5018
199908291731	1999-08-29 17:28	42.9671	156.5006
199908292029	1999-08-29 20:26	43.0820	157.5004
199908292322	1999-08-29 23:20	43.1861	158.5000
199908300218	1999-08-30 02:15	43.2818	159.5011
199908300517	1999-08-30 05:14	43.3945	160.5003
199908300818	1999-08-30 08:16	43.5145	161.5004
199908301116	1999-08-30 11:14	43.6218	162.5000
199908301411	1999-08-30 14:08	43.7088	163.5006
199908301706	1999-08-30 17:03	43.8343	164.5004
199908302237	1999-08-30 22:34	43.9248	165.4993
199908310131	1999-08-31 01:28	44.0473	166.4998
199908310422	1999-08-31 04:18	44.1581	167.5003
199908310715	1999-08-31 07:12	44.2653	168.5000
199908311010	1999-08-31 10:08	44.3696	169.5000
199908311300	1999-08-31 12:57	44.4753	170.5000
199908311544	1999-08-31 15:41	44.6041	171.5004
199908311824	1999-08-31 18:22	44.7005	172.5003
199908312105	1999-08-31 21:02	44.7983	173.5001
199908312344	1999-08-31 23:41	44.9118	174.5004
199909010225	1999-09-01 02:22	45.0143	175.5004
199909010508	1999-09-01 05:05	45.1210	176.4998
199909010755	1999-09-01 07:52	45.2288	177.5000
199909011042	1999-09-01 10:40	45.3333	178.5001
199909011327	1999-09-01 13:24	45.4466	179.5000
199909011613	1999-09-01 16:10	45.5541	-179.4998
199909011857	1999-09-01 18:54	45.6581	-178.5001
199909012143	1999-09-01 21:40	45.7676	-177.4680
199909020022	1999-09-02 00:18	45.8778	-176.4996
199909020305	1999-09-02 02:59	45.9931	-175.4991
199909020544	1999-09-02 05:41	46.0885	-174.4995
199909020826	1999-09-02 08:24	46.1971	-173.5001
199909021106	1999-09-02 11:03	46.2995	-172.4998
199909021345	1999-09-02 13:42	46.4045	-171.4991
199909021627	1999-09-02 16:22	46.5200	-170.4996
199909021906	1999-09-02 19:04	46.6305	-169.5000
199909022146	1999-09-02 21:44	46.7295	-168.4926
199909030026	1999-09-03 00:22	46.8435	-167.4996
199909030304	1999-09-03 03:02	46.9533	-166.4991

Related Information



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