

## MIRAI MR10-02 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

[ReadMe](#) [Observation Data](#) [Data Format](#)

Cruise ID: [MR10-02](#)

Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed

Data Policy: [JAMSTEC](#)

Observation Items: Depth, Temperature, Salinity

Science Keywords:

OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE

OCEANS > SALINITY/DENSITY > SALINITY

### Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR10-02\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR10-02_all.pdf)

#### For Using Data

##### Principal Investigator

Data Management Office

JAMSTEC / BPPT joint cruise in the Indonesian waters.

##### Use Constraints

See [Terms and Conditions](#) about constrain of use.

##### Data Citation

See [Terms and Conditions](#) about data citation.

### Instrument

Instrument:

Expendable conductivity temperature

depth measurements (XCTD) ( -

MR11-E02)



### Overview

Using XCTD (eXpendable Conductivity Temperature Depth profiler) system, the vertical distribution of water temperature and salinity are observed during free fall of its probe part in the seawater. Observed temperature and conductivity are transmitted to the data processor on board by the digital signal. The digital signal is converted to the temperature, conductivity and depth by data processor as binary data. Binary data is transmitted from data processor to PC. The PC calculates salinity from temperature, conductivity and depth, and those properties are recorded in PC as the ASCII files.

### 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 : 40 msec

#### (3) XCTD probe specifications

Probe Type	TSK XCTD-1	TSK XCTD-2	TSK XCTD-3	TSK XCTD-4
Temperature range [deg-C]	-2 to 35			
Temperature accuracy [deg-C]	+/- 0.02			
Temperature resolution [deg-C]	0.01			
Conductivity range [mS/cm]	0 to 60			
Conductivity accuracy [mS/cm]	+/- 0.03			
Conductivity resolution [mS/cm]	0.015			
Measurment depth [m]	1000	1850	1000	1850
Depth accuracy [m]	5 or +/- 2% of depth; whichever is larger			
Maximum elapsed time [sec]	300	600	200	502
Rated ship speed [knot]	12	3.5	20	6

Since XCTD 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 XCTD-1	TSK XCTD-2	TSK XCTD-3	TSK XCTD-4
Coefficient-a	3.42543	3.43898	5.07598	3.68081
Coefficient-b	-0.47	-0.31	-0.72	-0.47

\* Coefficients listed above are supplied by Sippican, Inc., in USA.

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

Cast name	Probe Serial No.	Probe Type	Launcher	Converter
201004080642	10027102	XCTD-1	Auto	MK-130
201004081020	10027103	XCTD-1	Auto	MK-130
201004081303	10027097	XCTD-1	Auto	MK-130
201004081431	10027104	XCTD-1	Auto	MK-130
201004081603	10027101	XCTD-1	Auto	MK-130
201004081738	10027100	XCTD-1	Auto	MK-130
201004081906	10027098	XCTD-1	Auto	MK-130
201004082029	10027106	XCTD-1	Auto	MK-130
201004082142	10027105	XCTD-1	Auto	MK-130
201004082303	10027108	XCTD-1	Auto	MK-130
201004090022	10027099	XCTD-1	Auto	MK-130
201004090143	10027107	XCTD-1	Auto	MK-130
201004090302	10027095	XCTD-1	Auto	MK-130
201004090421	10027110	XCTD-1	Auto	MK-130
201004090542	10027096	XCTD-1	Auto	MK-130
201004090837	10027111	XCTD-1	Auto	MK-130
201004091125	10027109	XCTD-1	Auto	MK-130
201004100415	10027112	XCTD-1	Auto	MK-130
201004150643	09116375	XCTD-1	Auto	MK-130
201004180722	09116381	XCTD-1	Auto	MK-130
201004180954	09116378	XCTD-1	Auto	MK-130
201004190737	09116376	XCTD-1	Auto	MK-130
201004191258	09116377	XCTD-1	Auto	MK-130
201004200413	09116385	XCTD-1	Auto	MK-130
201004200623	09116384	XCTD-1	Auto	MK-130
201004210638	09116389	XCTD-1	Auto	MK-130
201004211010	09116379	XCTD-1	Auto	MK-130
201004211155	09116386	XCTD-1	Auto	MK-130
201004211338	09116383	XCTD-1	Auto	MK-130
201004211519	09116382	XCTD-1	Auto	MK-130
201004212041	09116380	XCTD-1	Auto	MK-130
201004212047	09116388	XCTD-1	Auto	MK-130
201004220211	09116387	XCTD-1	Auto	MK-130
201004220945	09116391	XCTD-1	Auto	MK-130
201004221049	09116392	XCTD-1	Auto	MK-130
201004221153	09116395	XCTD-1	Auto	MK-130
201004221258	09116393	XCTD-1	Auto	MK-130
201004221401	09116394	XCTD-1	Auto	MK-130
201004221511	09116406	XCTD-1	Auto	MK-130
201004221622	09116390	XCTD-1	Auto	MK-130
201004221733	09116397	XCTD-1	Auto	MK-130
201004221843	09116398	XCTD-1	Auto	MK-130
201004221949	09116402	XCTD-1	Auto	MK-130
201004222057	09116396	XCTD-1	Auto	MK-130
201004222303	09116403	XCTD-1	Auto	MK-130
201004230106	09116408	XCTD-1	Auto	MK-130
201004230308	09116400	XCTD-1	Auto	MK-130
201004230409	09116399	XCTD-1	Auto	MK-130
201004230609	09116401	XCTD-1	Auto	MK-130
201004230726	09116404	XCTD-1	Auto	MK-130
201004230848	09116407	XCTD-1	Auto	MK-130
201004231008	09116410	XCTD-1	Auto	MK-130
201004231125	09116405	XCTD-1	Auto	MK-130
201004231233	10027018	XCTD-1	Auto	MK-130
201004231401	10027019	XCTD-1	Auto	MK-130
201004231544	10027012	XCTD-1	Auto	MK-130
201004231722	10027021	XCTD-1	Auto	MK-130
201004231903	09116409	XCTD-1	Auto	MK-130
201004232112	10027022	XCTD-1	Auto	MK-130
201004232326	10027024	XCTD-1	Auto	MK-130
201004240038	10027014	XCTD-1	Auto	MK-130
201004240154	10027013	XCTD-1	Auto	MK-130
201004240313	10027016	XCTD-1	Auto	MK-130
201004240428	10027020	XCTD-1	Auto	MK-130
201004240610	10027015	XCTD-1	Auto	MK-130

Cast name	Probe Serial No.	Probe Type	Launcher	Converter
201004240726	10027017	XCTD-1	Auto	MK-130
201004240907	10027026	XCTD-1	Auto	MK-130
201004241039	10027028	XCTD-1	Auto	MK-130
201004241215	10027025	XCTD-1	Auto	MK-130
201004241346	10027023	XCTD-1	Auto	MK-130
201004241533	10027027	XCTD-1	Auto	MK-130
201004241650	10027034	XCTD-1	Auto	MK-130
201004241805	10027035	XCTD-1	Auto	MK-130
201004242109	10027033	XCTD-1	Auto	MK-130
201004260436	10027029	XCTD-1	Auto	MK-130
201004261148	10027030	XCTD-1	Auto	MK-130
201004261642	10027031	XCTD-1	Auto	MK-130
201004262128	10027032	XCTD-1	Auto	MK-130
201004270337	10027036	XCTD-1	Auto	MK-130
201004270950	10027037	XCTD-1	Auto	MK-130
201004280413	10027038	XCTD-1	Auto	MK-130
201004280721	10027039	XCTD-1	Auto	MK-130

#### Data processing

(1) For sensor's stability, values of less than 1 m for temperature and less than 3 m for salinity 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.

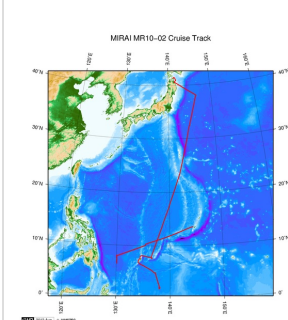
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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.

#### Related Information



[Enlarge Image](#)

#### MR10-02

Ship Name: MIRAI  
 Period: 2010-04-06 - 2010-05-02  
 Chief Scientist: Kentaro Ando (JAMSTEC)  
 Project Name: [Tropical Ocean Climate Study (TOCS), Station KEO]  
 Proposal ▶ Tropical Ocean Climate Study/Operation of TRITON Buoy  
 Title:

#### Update History

2019-08-31	An observation data was registered.
2017-06-14	An observation data was registered.
2016-04-07	An observation data was registered.
2014-08-06	An observation data was registered.
2014-02-18	An observation data was registered.
2012-09-28	An observation data was registered.

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YOKOSUKA

MIRAI

KAIREI

CHIKYU

KAIMEI

SHINSEI MARU

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

Go to a Cruise Information

Cruise ID:

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Dive ID:

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JAMSTEC

国立研究開発法人  
 海洋研究開発機構  
 JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

## MIRAI MR10-02 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

[ReadMe](#) [Observation Data](#) [Data Format](#)

Cruise ID: [MR10-02](#)

Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed

Data Policy: [JAMSTEC](#)

### XCTD DMO

#### Format Description for the Corrected Data

Provided in the Exchange Format of CCHDO (CLIVAR and Carbon Hydrographic Data Office). Please see the following link for details of Exchange Format.

[CCHDO | CLIVAR & Carbon Hydrographic Data Office](#)

Data in following cruise is not expressed with Exchange Format. Please see the site of each cruise for format.

MR02-K05 Leg1

MR04-05

#### Format Description for the QCed Data

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	XCTD
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	23 - 33	Salinity	PSU	f11.3	PSS-78
4	45 - 55	Flag	-	i11	1 - 7 : space 8 : flag of depth 9 : flag of temperature 10 : flag of salinity 11 : space * reference : <a href="#">Definition of Quality Control Flags</a>
5	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

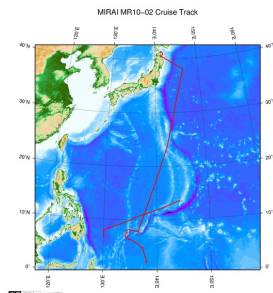
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

#### Sample Program

[ex\\_read2.f](#)

#### Related Information



[Enlarge Image](#)

#### MR10-02

Ship Name: MIRAI  
Period: 2010-04-06 - 2010-05-02  
Chief Scientist: Kentaro Ando (JAMSTEC)  
Project Name: [Tropical Ocean Climate Study (TOCS), Station KEO]  
Proposal ▶ Tropical Ocean Climate Study/Operation of TRITON Buoy  
Title:

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#### Information of the Ships

NATSUSHIMA  
KAIYO  
YOKOSUKA  
MIRAI  
KAIREI  
CHIKYU  
KAIMEI  
SHINSEI MARU  
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

#### Go to a Cruise Information

Cruise ID:

#### Go to a Dive Information

Dive ID:

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海洋研究開発機構  
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

## MIRAI MR10-02 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-08-31

[ReadMe](#) [Observation Data](#) [Data Format](#)

Cruise ID: **MR10-02**

Expendable Conductivity-Temperature-Depth Profiler (XCTD): Processed (DMO)-QCed

Data Policy: **JAMSTEC**

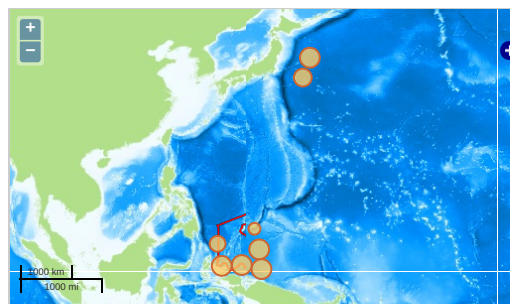
Observation Items: Depth, Temperature, Salinity

Science Keywords:

OCEANS > OCEAN > WATER  
TEMPERATURE  
OCEANS > SALINITY/DENSITY > SALINITY

### 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

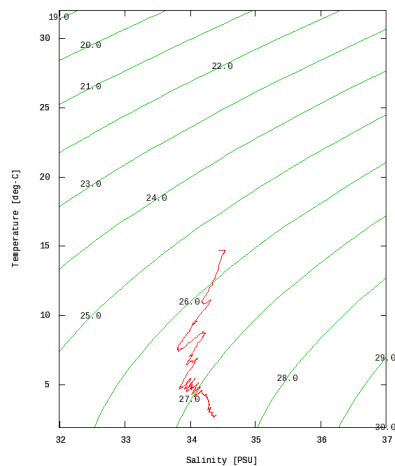
### Figures

201004080642



MR10-02: 201004080642

Expendable Conductivity-Temperature-Depth Profiler (XCTD): Salinity








































































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

☐ 201004080642.dat  
☐ 201004081020.dat  
☐ 201004081303.dat  
☐ 201004081431.dat  
☐ 201004081603.dat  
☐ 201004081738.dat  
☐ 201004081906.dat  
☐ 201004082029.dat  
☐ 201004082142.dat  
☐ 201004082303.dat  
☐ 201004090022.dat  
☐ 201004090143.dat  
☐ 201004090302.dat  
☐ 201004090421.dat

	201004090542.dat
	201004090837.dat
	201004091125.dat
	201004100415.dat
	201004150643.dat
	201004180722.dat
	201004180954.dat
	201004190737.dat
	201004191258.dat
	201004200413.dat
	201004200623.dat
	201004210638.dat
	201004211010.dat
	201004211155.dat
	201004211338.dat
	201004211519.dat
	201004212041.dat
	201004212047.dat
	201004220211.dat
	201004220945.dat
	201004221049.dat
	201004221153.dat
	201004221258.dat
	201004221401.dat
	201004221511.dat
	201004221622.dat
	201004221733.dat
	201004221843.dat
	201004221949.dat
	201004222057.dat
	201004222303.dat
	201004230106.dat
	201004230308.dat
	201004230409.dat
	201004230609.dat
	201004230726.dat
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	201004231008.dat
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	201004231233.dat
	201004231401.dat
	201004231544.dat
	201004231722.dat
	201004231903.dat
	201004232112.dat
	201004232326.dat
	201004240038.dat
	201004240154.dat
	201004240313.dat
	201004240428.dat
	201004240610.dat
	201004240726.dat
	201004240907.dat
	201004241039.dat
	201004241215.dat
	201004241346.dat
	201004241533.dat
	201004241650.dat
	201004241805.dat
	201004242109.dat
	201004260436.dat
	201004261148.dat
	201004261642.dat
	201004262128.dat
	201004270337.dat
	201004270950.dat
	201004280413.dat
	201004280721.dat
	ex_read2.f (Sample Program)

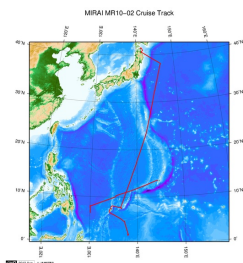
● Observation List  
The list of observation is shown as follows.

Observation	Time and Date	Lat. [°]	Lon. [°]
201004080642	2010-04-08 06:43	38.0405	146.5108
201004081020	2010-04-08 10:21	37.5065	146.2426
201004081303	2010-04-08 13:05	37.0173	146.0803
201004081431	2010-04-08 14:33	36.7600	146.0000
201004081603	2010-04-08 16:07	36.5063	145.9139
201004081738	2010-04-08 17:40	36.2533	145.8313
201004081906	2010-04-08 19:07	36.0028	145.7493
201004082029	2010-04-08 20:31	35.7533	145.6680
201004082142	2010-04-08 21:51	35.5333	145.5971
201004082303	2010-04-08 23:09	35.2683	145.5085

Observation	Time and Date	Lat (°)	Lon (°)
201004090122	2010-04-09 01:22	34.5100	145.4618
201004090143	2010-04-09 01:46	34.7603	145.3498
201004090302	2010-04-09 03:05	34.5100	145.2623
201004090421	2010-04-09 04:25	34.2666	145.1838
201004090542	2010-04-09 05:49	34.0153	145.1071
201004090837	2010-04-09 08:39	33.5026	144.9326
201004091125	2010-04-09 11:27	33.0033	144.7765
201004100415	2010-04-10 04:17	32.3448	144.5360
201004150643	2010-04-15 06:44	7.6556	136.6736
201004180722	2010-04-18 07:23	4.9515	137.2730
201004180954	2010-04-18 09:56	4.8811	137.2450
201004190737	2010-04-19 07:38	4.0026	137.5106
201004191258	2010-04-19 13:01	3.0096	137.8035
201004200413	2010-04-20 04:16	2.0083	138.0915
201004200623	2010-04-20 06:25	2.0650	138.0405
201004210638	2010-04-21 06:39	1.5016	137.9771
201004211010	2010-04-21 10:11	1.0031	137.9601
201004211155	2010-04-21 11:56	0.7603	137.9435
201004211338	2010-04-21 13:39	0.5021	137.9215
201004211519	2010-04-21 15:20	0.2488	137.8980
201004212041	2010-04-21 20:43	0.0303	137.9066
201004212047	2010-04-21 20:48	0.0300	137.9060
201004220211	2010-04-22 02:12	0.0610	138.0358
201004220945	2010-04-22 09:47	-0.2443	137.9125
201004221049	2010-04-22 10:51	-0.4950	137.9365
201004221153	2010-04-22 11:55	-0.7434	137.9588
201004221258	2010-04-22 13:00	-0.9938	137.9823
201004221401	2010-04-22 14:02	-1.2060	138.0066
201004221511	2010-04-22 15:13	-1.0028	137.8371
201004221622	2010-04-22 16:24	-0.8030	137.6661
201004221733	2010-04-22 17:34	-0.6023	137.4936
201004221843	2010-04-22 18:44	-0.4023	137.3223
201004221949	2010-04-22 19:51	-0.2023	137.1636
201004222057	2010-04-22 20:59	-0.0021	137.0025
201004222303	2010-04-22 23:06	0.0001	136.5221
201004230106	2010-04-23 01:10	0.0053	136.0113
201004230308	2010-04-23 03:13	0.0000	135.5171
201004230409	2010-04-23 04:17	0.0016	135.3381
201004230609	2010-04-23 06:12	0.2425	135.1668
201004230726	2010-04-23 07:31	0.4886	134.9880
201004230848	2010-04-23 08:49	0.7458	134.8028
201004231008	2010-04-23 10:10	0.9948	134.6205
201004231125	2010-04-23 11:27	1.2263	134.4225
201004231233	2010-04-23 12:35	1.2353	134.1633
201004231401	2010-04-23 14:05	1.0005	133.9071
201004231544	2010-04-23 15:48	0.7511	133.5778
201004231722	2010-04-23 17:23	0.5020	133.2808
201004231903	2010-04-23 19:04	0.2523	132.9725
201004232112	2010-04-23 21:13	0.0105	132.6533
201004232326	2010-04-23 23:28	-0.0033	132.2550
201004240038	2010-04-24 00:43	0.2376	132.0990
201004240154	2010-04-24 01:59	0.4860	131.9391
201004240313	2010-04-24 03:17	0.7388	131.7791
201004240428	2010-04-24 04:34	0.9835	131.6295
201004240610	2010-04-24 06:12	1.3301	131.4166
201004240726	2010-04-24 07:32	1.3301	131.1148
201004240907	2010-04-24 09:09	1.0770	130.8525
201004241039	2010-04-24 10:40	0.8290	130.6045
201004241215	2010-04-24 12:16	0.8675	130.3045
201004241346	2010-04-24 13:47	0.9153	130.0041
201004241533	2010-04-24 15:35	1.2463	129.9785
201004241650	2010-04-24 16:50	1.4973	129.9666
201004241805	2010-04-24 18:06	1.7470	129.9488
201004242109	2010-04-24 21:10	1.9323	129.9403
201004260436	2010-04-26 04:37	1.9275	130.1886
201004261148	2010-04-26 11:50	2.9955	130.1276
201004261642	2010-04-26 16:44	3.9933	130.1235
201004262128	2010-04-26 21:29	4.9965	130.1241
201004270337	2010-04-27 03:39	5.9968	130.1420
201004270950	2010-04-27 09:51	6.9968	130.1070
201004280413	2010-04-28 04:15	7.9611	130.0765
201004280721	2010-04-28 07:22	7.9898	130.0091

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#### MR10-02

Ship Name: MIRAI  
Period: 2010-04-06 - 2010-05-02  
Chief Scientist: Kentaro Ando (JAMSTEC)  
Project Name: [Tropical Ocean Climate Study (TOCS), Station KEO]  
Proposal ▶ Tropical Ocean Climate Study/Operation of TRITON Buoy  
Title:

#### Update History

2019-08-31	An observation data was registerd.
2017-06-14	An observation data was registerd.
2016-04-07	An observation data was registerd.
2014-08-06	An observation data was registerd.
2014-02-18	An observation data was registerd.
2012-09-28	An observation data was registerd.

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