

## KAIYO KY13-09 Expendable Conductivity-Temperature-Depth Profiler (XCTD)

Last Modified: 2019-09-07

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

Cruise ID: [KY13-09](#)

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/KY13-09\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/KY13-09_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.

### 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

#### (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			
Measurement 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.

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

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
XCTD-020520130629	11063972	XCTD-1	Hand	MK-130
XCTD-020620130629	11074191	XCTD-1	Hand	MK-130
XCTD-020720130630	11074194	XCTD-1	Hand	MK-130
XCTD-020820130630	11074193	XCTD-1	Hand	MK-130
XCTD-020920130630	11074192	XCTD-1	Hand	MK-130
XCTD-021020130630	11074197	XCTD-1	Hand	MK-130
XCTD-021120130630	11074196	XCTD-1	Hand	MK-130

Cast name	Probe Serial No.	Probe Type	Hand Launcher	MK-130 Converter
XCTD-021220130630	11074195	XCTD-1	Hand	MK-130
XCTD-021320130630	11074200	XCTD-1	Hand	MK-130
XCTD-021420130630	11074199	XCTD-1	Hand	MK-130
XCTD-021520130707	11074198	XCTD-1	Hand	MK-130
XCTD-021620130708	11115384	XCTD-1	Hand	MK-130
XCTD-021720130708	11115385	XCTD-1	Hand	MK-130
XCTD-021820130708	11115386	XCTD-1	Hand	MK-130
XCTD-021920130708	11115387	XCTD-1	Hand	MK-130
XCTD-022020130708	11115388	XCTD-1	Hand	MK-130
XCTD-022120130708	11115389	XCTD-1	Hand	MK-130
XCTD-022220130708	11115392	XCTD-1	Hand	MK-130
XCTD-022320130708	11063973	XCTD-1	Hand	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.

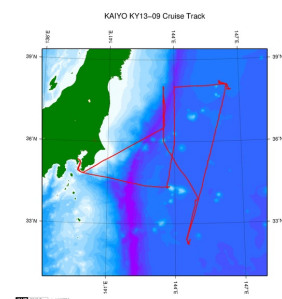
- 1) The gradient check of adjacent depth data
- 2) The density inversion check
- 3) The broad range check set up at given ocean space and depth

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



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#### KY13-09

Ship Name: KAIYO

Period: 2013-06-28 - 2013-07-12

Chief Scientist: Yoshimi Kawai (JAMSTEC)

Proposal Research on characteristics of clouds and aerosols over the Kuroshio Extension by simultaneous observations with an aircraft

Title:

#### Update History

2019-09-07	An observation data was registered.
2017-06-14	An observation data was registered.
2015-07-31	An observation data was registered.

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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

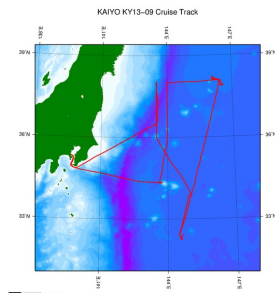
QCed data were added flag according to the NODC (National Oceanographic Data Center) quality control procedure, additionally visually checked. Please see the site of NODC of the following link for quality control procedure.

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

#### Sample Program

[ex\\_read2.f](#)

#### Related Information



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Chief Scientist: Yoshimi Kawai (JAMSTEC)

Proposal Research on characteristics of clouds and aerosols over the Kuroshio Extension by simultaneous observations with an aircraft

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2019-09-07	An observation data was registered.
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**JAMSTEC**

国立研究開発法人  
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Data Policy: **JAMSTEC**

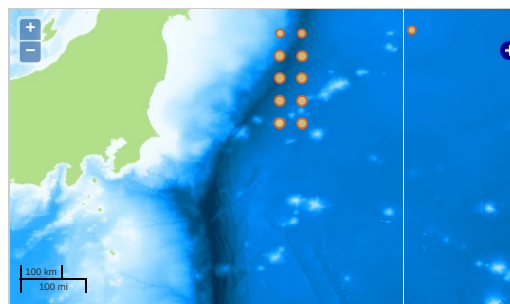
Observation Items: Depth, Temperature, Salinity

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

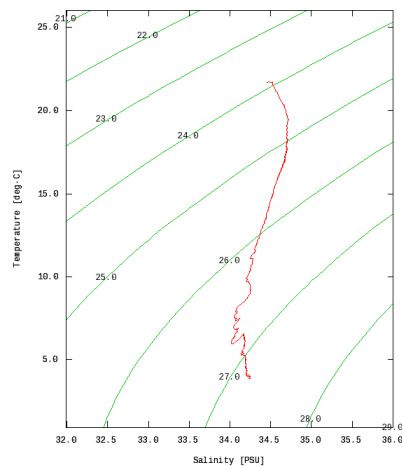
Imagery reproduced from ...

### Figures

XCTD-020520130629



KY13-09: XCTD-020520130629  
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

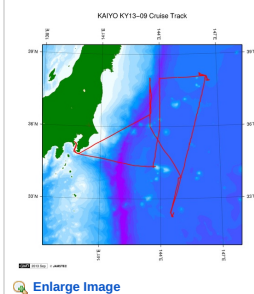
<input type="checkbox"/>	XCTD-020520130629.dat
<input type="checkbox"/>	XCTD-020620130629.dat
<input type="checkbox"/>	XCTD-020720130630.dat
<input type="checkbox"/>	XCTD-020820130630.dat
<input type="checkbox"/>	XCTD-020920130630.dat
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<input type="checkbox"/>	XCTD-021120130630.dat
<input type="checkbox"/>	XCTD-021220130630.dat
<input type="checkbox"/>	XCTD-021320130630.dat
<input type="checkbox"/>	XCTD-021420130630.dat
<input type="checkbox"/>	XCTD-021520130707.dat
<input type="checkbox"/>	XCTD-021620130708.dat
<input type="checkbox"/>	XCTD-021720130708.dat
<input type="checkbox"/>	XCTD-021820130708.dat

-  [Rider names20130708.dat](#)
-  [XCTD-022020130708.dat](#)
-  [XCTD-022120130708.dat](#)
-  [XCTD-022220130708.dat](#)
-  [XCTD-022320130708.dat](#)
-  [ex\\_read2.f \(Sample Program\)](#)

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

Observation	Time and Date	Lat. [°]	Lon. [°]
XCTD-020520130629	2013-06-29 21:12	36.0083	144.0003
XCTD-020620130629	2013-06-29 22:59	36.2588	143.9980
XCTD-020720130630	2013-06-30 00:44	36.5093	143.9971
XCTD-020820130630	2013-06-30 02:09	36.7563	144.0010
XCTD-020920130630	2013-06-30 03:38	37.0138	143.9948
XCTD-021020130630	2013-06-30 05:03	37.2616	143.9975
XCTD-021120130630	2013-06-30 06:28	37.5020	144.0021
XCTD-021220130630	2013-06-30 07:56	37.7611	143.9908
XCTD-021320130630	2013-06-30 09:25	38.0061	143.9961
XCTD-021420130630	2013-06-30 21:19	38.0791	146.4348
XCTD-021520130707	2013-07-07 23:03	36.0151	143.4998
XCTD-021620130708	2013-07-08 00:28	36.2618	143.5045
XCTD-021720130708	2013-07-08 01:54	36.5121	143.5060
XCTD-021820130708	2013-07-08 05:57	36.7650	143.5095
XCTD-021920130708	2013-07-08 07:22	37.0143	143.5071
XCTD-022020130708	2013-07-08 08:47	37.2600	143.5093
XCTD-022120130708	2013-07-08 10:15	37.5110	143.5028
XCTD-022220130708	2013-07-08 11:41	37.7576	143.5063
XCTD-022320130708	2013-07-08 13:11	38.0080	143.5120

#### Related Information



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Chief Scientist: Yoshimi Kawai (JAMSTEC)  
Proposal Research on characteristics of clouds and aerosols over the Kuroshio Extension by  
Title: simultaneous observations with an aircraft

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