CTD and XCTD data

- File Name

1. CTD data (`xxnnnn_1.ctd`)
2. XCTD data (`xxnnnn.xct`)

where, `xx`: Hydrographic Code [listed in Table1]
`nnnn`: Station number (4 digits)

CTD and XCTD data files consist of ASCII records of variable length. Each element is separated by the character ',' (comma, ASCII code `2Ch`).

1 CTD data

CTD data files consist of header part (first 10 records) and data part. The following elements are separated by comma in each record. An example of CTD data file is shown in page 4.
The column of the element that was not observed is filled with '-999'.

(a) Header part

Record information

Record No.	Element
Rec-1	Ship name (listed in Table 1), cruise number and format code. Cruise number is identified with the year and consecutive number. Format code is 'R3.x'.
Rec-2	Station number and cast number. Station number is given by the hydrographic code (listed in Table 1) suffixed with four digits.
Rec-3	The number of data records.
Rec-4	Comment.
Rec-5	Date (year/month/day) and time at the bottom of the hydrographic cast in the Japan Standard Time (JST), which is nine hours ahead of the Coordinated Universal Time (UTC).
Rec-6	Latitude and longitude at the bottom of the hydrographic cast with degrees, '-', minutes, '.', hundredth part of minutes.
Rec-7	Water depth at the bottom of the hydrographic cast and sounding flag (listed in Table 2).
Rec-8	Corresponding station number of the subsurface current data and sub-station number.
Rec-9	Headers for data columns.
Rec-10	Units for data columns.

(b) Data part

Data are described at every 1×10^4 Pa. The meaning of attached flags is shown in Table 3.

Record information

Record No.	Elements
below Rec-10	Pressure, Temperature, Salinity, Dissolved oxygen with each flag (listed in Table 3) and the number of data used for averaging.

2 XCTD data

XCTD data files consist of header part (first 14 records) and data part. The following elements are separated by comma in each record. An example of XCTD data file is shown in page 5.
The column of the element that was not observed is filled with '-9'.

(a) Header part

Record information

Record No.	Element
Rec-1	Ship name (listed in Table 1), cruise number and format code. Cruise number is identified with the year and consecutive number. Format code is 'X2.x'.
Rec-2	Station number. Station number is given by the hydrographic code (listed in Table 1) suffixed with four-digits consecutive numbers.
Rec-3	The number of data records.
Rec-4	Date (year/month/day) and time at the beginning of the expendable CTD observation in the Japan Standard Time (JST), which is nine hours ahead of the coordinated Universal Time (UTC).
Rec-5	Latitude and longitude at the beginning of the expendable CTD observation with degrees, '-', minutes, '.', hundredth part of minutes.
Rec-6	Water depth at the beginning of the expendable CTD observation and sounding flag (listed in Table 2).
Rec-7	Corresponding station number of the subsurface current data and sub-station number.
Rec-8	Sea surface temperature and salinity.
Rec-9	Probe type, serial number, code and instrument type, code.
Rec-10	Coefficients of the depth-time equation.
Rec-11	Correction coefficient of water temperature sensor.
Rec-12	Correction coefficient of electric conductivity sensor.
Rec-13, Rec-14	Headers for data columns.

(b) Data part

Data are described at every 1 meter. The meaning of attached flags is shown in Table 3.

Record information

Record No.	Elements
below Rec-15	Depth, Temperature, flag of temperature, Salinity and flag of salinity (listed in Table 3).

Table 1: Ship codes.

Ship Name	Hydrographic	BT	Subsurface current
Ryofu Maru III	RF	TF	AF
Ryofu Maru IV	RD	TD	AD
Keifu Maru	KS	TS	AS

Table 2: Sounding flag of water depth in CTD, XCTD and BT data.

Flag No.	Definition
1	Sounding by echo-sounder (not corrected)
2	Sounding by echo-sounder (corrected)
5	Water depth measured by CTD and altimeter
6	Water depth measured by BT or XCTD submersible
9	No sounding

Table 3: Data flag in CTD, XCTD and BT data.

Flag No.	Definition
2	Acceptable measurement.
3	Questionable measurement.
4	Bad measurement.
6	Interpolated over $> 2 \times 10^4$Pa interval.
7	Despiked.
9	Not sampled.

Data sample

CTD data

```
Ship, R/V Ryofu Maru, Cruise number, 10-01, Format, R3.1
Station, RF-5678,       CastNo   , 1
No.of Records, 2027
Comment,
Date   , 2010/01/15,    Time(JST), 1407
Lat.   , 13-59.69 N,    Lon.     , 136-58.80 E
Depth  , 5121 Meters,   Depth Flg, 1
ACMstn., AF-022,        Substn.  ,  PT-12
   CTDPRS,F,    CTDTMP,F,    CTDSAL,F,    CTDOXY,F,  NUMBER
     DBAR, ,    ITS-90, ,    PSS-78, ,   UMOL/KG, ,    OBS.
      1.0,2,   27.7524,4,   34.0386,4,     294.3,4,      78
      2.0,2,   25.7524,2,   36.0386,2,     274.3,2,      80
      3.0,2,   25.7424,2,   36.0486,2,     275.1,2,      63
      4.0,2,   25.7224,2,   36.0586,2,     274.9,2,      30
      5.0,2,   25.7123,2,   36.0598,2,     274.7,2,      20
      6.0,2,   25.7092,2,   36.0602,2,     274.3,2,      15
      7.0,2,   25.6902,2,   36.0615,2,     274.0,2,      72
```

Ship, R/V Ryofu Maru, Cruise number, 10-01, Format, X2.1
Station, RF-3564
No.of Records, 246
Date , 2010/02/01, Time(JST), 0143
Lat. , 31-00.06 N, Lon. , 135-30.05 E
Depth , 4083 Meters, Depth Flg, 1
ACMstn., AF-055, Substn. , PT-10
SurfT , 20.5 DEG-C, SurfS , 34.685
Probe , TSK XCTD, S/N, 09023028, (WMO Code: 741), Recorder , TSK MK-130 Comp.,(WMO Code: 46)
DCoef. , a= 0.0000000E+00, b= 3.4254320E+00, c=-4.7026040E-04, d= 0.0000000E+00
TCoef. , a=-4.0093700E-02, b= 9.9527100E-01, c= 0.0000000E+00, d= 0.0000000E+00
CCoef. , a=-1.9725200E-01, b= 1.0337300E+00, c= 0.0000000E+00, d= 0.0000000E+00

DEPTH, METERS,	TEMP,F, DEG-C, ,	SALNTY,F PSS-78,
0,	29.460,2,	33.630,4
1,	27.457,2,	34.630,4
2,	27.440,2,	34.621,4
3,	27.416,2,	34.602,4
4,	27.400,2,	34.598,2
5,	27.395,2,	34.590,2