

Water sampling data

File Name

xxnnnn_e4.WAT (e.g. : RF5678_e4.WAT)

where, xx: Hydrographic Code [listed in Table1]

nnnn: Station number (4 digits)

Record Definition

1. Header Part

- 1st record: Ship, Cruise number, Format

```
10 20 30 40 50
|-----|-----|-----|-----|
| Ship, R/V Ryofu Maru, Cruise number, 10-01, Format, E4.1 |
```

- 2nd record: Station, Total casts

```
10 20 30
|-----|-----|
| Station, RF-5678, Total casts, 1 |
```

- 3rd record: No.of Records

```
10
|-----|
| No.of Records, 25 |
```

- 4th record (variable length): Comment

```
10 20
|-----|-----|
| Comment, |
```

- From 5th to (4+n)th record: CastNo, Date, Time(JST), Lat, Lon, Depth, Depth flg. (listed in Table2) at the bottom of the hydrographic cast and Layer

```
10 20 30 40 50 60
|-----|-----|-----|-----|-----|
| CastNo, 1, Date, 2010/01/16, Time(JST), 1629, Lat., 33-59.68 N,
70 80 90 100 110 120
|-----|-----|-----|-----|-----|
| Lon., 137-00.53 E, Depth, 1186M, Depth Flg, 1, Layer, 25 |
```

- (5+n)th record (variable length): Parameters (listed in Table3)

```
10 20
|-----|-----|
| Parameters, 0,1,2,3,5,6,9,10,11,12,16,17 |
```

- From (6+n)th to (7+n)th record (variable length)
 Format of 'Data Part'. Field type and units follow Table3.

10	20	30	40	50	60
STNNBR, CSTNO, POS,	BTLSER, F, TIME,	CTDPRS, CTDDEP,	CTDTMP		
70	80	90	100	110	
, CTDSAL,	THETA,	SIGHT, F,	DOSTMP, F,	CTDOXY, F,	
120	130	140	150	160	170
SALNTY, F,	OXYGEN, F,	PHSPHT, F,	NO2+NO3, F,	NITRIT, F,	
180	190	200	210	220	230
, SILCAT, F,	PH, F,	PH_TMP, PH_SCL,	CHLORA, F,	PP	
240	250	260			
TYTN, F,	TCARB, F,	ALKALI, F,			

10	20	30	40	50	60
, , ,	JST,	DBAR, METERS,	ITS-90		
70	80	90	100	110	
, PSS-78,	ITS-90,	KG/M3,	ITS-90, ,	UMOL/KG, ,	
120	130	140	150	160	170
PSS-78, ,	UMOL/KG, ,	UMOL/KG, ,	UMOL/KG, ,	UMOL/KG, ,	
180	190	200	210	220	230
, UMOL/KG, ,	, ,	DEG_C,	, ,	UG/L, ,	
240	250	260			
UG/L, ,	UMOL/KG, ,	UMOL/KG, ,			

2. Data Part

Data of each bottle are documented in one record in order of parameter number (variable length). Flag of bottle follows Table4 and flag of each data follows Table5. The column of the element that was not observed is filled with ' -999 '. The definitions of fields are as follows.

- STNNBR: Station number
- CSTNO: Cast number
- POS: Sample number
- BTLSER: Bottle serial number
- F: Flag of bottle
- TIME JST: Time of trigger (JST)
- CTDPRS: Pressure in CTD measurement
- CTDDEP: Depth in CTD measurement
- CTDTMP: Temperature in CTD measurement
- CTDSAL: Salinity in CTD measurement
- THETA: Potential temperature
- SIGTHT: Potential density
- DOSTTMP: Deep ocean standards thermometer temperature
- F: Flag of deep ocean standards thermometer temperature

Measured values and quality flags for parameters in (5+n)th record are documented as follows.

- CTDOXY: Dissolved oxygen(DO) by DO sensor
- F: Flag of CTD oxygen
- SALNTY: Salinity
- F: Flag of salinity
- OXYGEN: Dissolved oxygen
- F: Flag of dissolved oxygen
- :

RF- 0335,	1,	24,	02-12830,	2,	0551,	5.2,	5,	15.4071	
, 34.6334,	15.4063,	25.5995,	15.4106,	2,	-999.0,	4,	-9		
99.0000,	9,	246.91,	2,	-999.000,	9,	8.11,	2,	0.32,	2
, 14.09,	2,	8.0912,	2,	25.09,	TS,	0.32,	2,		
0.15,	2,	2046.1,	2,	2016.5,	2,				

Table 1: Ship codes.

Ship Name	Hydrographic	BT	Subsurface current
Ryofu Maru	RF	TF	AF
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: Parameter Number/Mnemonic/Field Type

Parameter Number	Parameter	Mnemonic	Units Scientific	Mnemonic	Field Type	Flag
	Station number	STNNBR			A8	
	Cast number	CSTNO			I2	
	Sample number	POS			I3	
	Bottle serial number	BTLSER			A9	I1
	Sampling time(JST)	TIME	JST	JST	I4	
	CTD pressure	CTDPRS	10 ⁴ Pa	DBAR	F9.1	
	CTD depth	CTDDEP	meters	METERS	I6	
	CTD temperature	CTDTMP	deg C	ITS-90	F9.4	
	CTD salinity	CTDSAL	PSS-78	PSS-78	F9.4	
	Potential temperature	THETA	deg C	ITS-90	F9.4	
	Potential density	SIGTHT	kg/m ³	KG/M3	F9.4	
	Deep ocean standards thermometer temperature	DOSTTMP	deg C	ITS-90	F9.4	I1
0	CTD oxygen	CTDOXY	$\mu\text{mol/kg}$	UMOL/KG	F9.1	I1
1	Salinity	SALNTY	PSS-78	PSS-78	F9.4	I1
2	Dissolved oxygen	OXYGEN	$\mu\text{mol/kg}$	UMOL/KG	F9.2	I1
3	Phosphate	PHSPHT	$\mu\text{mol/kg}$	UMOL/KG	F9.3	I1
4	Nitrate	NITRAT	$\mu\text{mol/kg}$	UMOL/KG	F9.2	I1
5	Nitrite+Nitrate	NO2+NO3	$\mu\text{mol/kg}$	UMOL/KG	F9.2	I1
6	Nitrite	NITRIT	$\mu\text{mol/kg}$	UMOL/KG	F9.2	I1
9	Silicate	SILCAT	$\mu\text{mol/kg}$	UMOL/KG	F9.2	I1
10	pH(25)	PH			F9.4	I1
	pH temperature	PH_TMP	deg C	DEG_C	I7	
	pH scale	PH_SCL	total scale"TS" or seawater scale"SWS"		A6(I6)	
11	Chlorophyll a	CHLORA	$\mu\text{g/l}$	UG/L	F9.2	I1
12	Phaeophytin	PPHYTN	$\mu\text{g/l}$	UG/L	F9.2	I1
16	Dissolved inorganic carbon	TCARBN	$\mu\text{mol/kg}$	UMOL/KG	F9.1	I1
17	Total alkalinity A _T	ALKALI	$\mu\text{mol/kg}$	UMOL/KG	F9.1	I1
18	Dissolved organic carbon	DOC	$\mu\text{mol/kg}$	UMOL/KG	F9.2	I1
19	Dissolved organic nitrogen	DON	$\mu\text{mol/kg}$	UMOL/KG	F9.2	I1
20	Methane	CH4	nmol/kg	NMOL/KG	F9.2	I1
21	Nitrous oxide	N2O	nmol/kg	NMOL/KG	F9.2	I1
22	Freon-11	CFC-11	pmol/kg	PMOL/KG	F9.3	I1
23	Freon-12	CFC-12	pmol/kg	PMOL/KG	F9.3	I1
24	Freon-113	CFC-113	pmol/kg	PMOL/KG	F9.3	I1

Table 4: Quality flag definitions for sampling bottles

Flag value	Definition
0	Samples taken by bucket.
1	Bottle information unavailable.
2	No problem noted.
3	Leaking.
4	Did not trip correctly.
5	Not reported.
9	Samples not drawn from this bottle.

#The flags are based on a definition in WOCE.

Table 5: Quality flag definitions for sampling water data

Flag value	Definition
1	Sample for this measurement was drawn from water bottle but analysis not received.†
2	Acceptable measurement.
3	Questionable measurement.
4	Bad measurement.
5	Not reported.
6	Mean of replicate measurements.
7	Manual chromatographic peak measurement.
8	Irregular digital chromatographic peak integration.
9	Sample not drawn for this measurement from this bottle.

†Note that if water is drawn for any measurement from a water bottle, the quality flag for that parameter must be set equal to 1 initially to ensure that all water samples are accounted for.

#The flags are based on a definition in WOCE.