

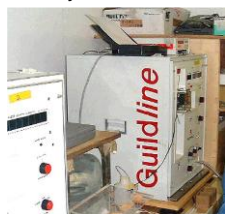
## For Using Data

Data Policy	JAMSTEC
Principal Investigator	See "Quality information"
Use Constraints	See Terms and Conditions about constrain of use.
Data Citation	See Terms and Conditions about data citation.

**Quality** DMO-Processed

**Instrument**

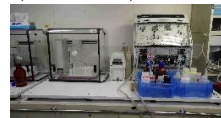
Salinity measurement system



Titration for DO Dissolved oxygen titration equipment (MR11-06 - )



Nutrient analyzer (MR21-04 - )



Total dissolved inorganic carbon measurement system (MR11-05 - )



Titration for total alkalinity (MR14-03 - )



Fluorometer (TURNER DESIGNS)

**Information on CTD data**

## Pressure sensor

Manufacturer :	Sea-Bird Scientific
Type :	SBE9plus
Measurement range :	0 to 10500 m
Accuracy :	+/-0.015% F.S.
Resolution :	0.001% F.S.

## Temperature sensor

Manufacturer :	Sea-Bird Scientific
Type :	SBE3
Measurement range :	-5 to +35 deg-C
Accuracy :	+/-0.001 deg-C
Resolution :	0.0003 deg-C

## Deep Ocean Standards Thermometer

Manufacturer :	Sea-Bird Scientific
Type :	SBE35
Measurement range :	-5 to +35 deg-C
Accuracy :	+/-0.001 deg-C
Resolution :	0.000025 deg-C

## Salinity sensor

Manufacturer :	Sea-Bird Scientific
Type :	SBE4
Measurement range :	0.0 to 7.0 S/m
Accuracy :	+/-0.0003 S/m
Resolution :	0.00004 S/m

## DO sensor (primary)

Manufacturer :	JFE Advantech Co. Ltd.
Type :	RINKO III
Measurement range :	0 to 200 %
Accuracy :	+/-2 % F.S. non linearity
Resolution :	0.01%

## DO sensor (secondary)

Manufacturer :	Sea-Bird Scientific
Type :	SBE43
Measurement range :	120% of surface saturation
Accuracy :	2% of saturation
Transmissometer	
Manufacturer :	Sea-Bird Scientific (former WET Labs)
Type :	C-Star
Linearity :	99% R <sup>2</sup>
Fluorometer	
Manufacturer :	Seapoint Sensors, Inc.
Type :	Seapoint Chlorophyll Fluorometer
Measurement range :	0 to 5 $\mu\text{g/l}$ at Gain 30 $\times$
Resolution :	0.02 $\mu\text{g/l}$
PAR sensor	
Manufacturer :	Sea-Bird Scientific (former Satlantic Inc)
Type :	PAR-Log ICSW
Measurement range :	0 to 5000 $\mu\text{mol photons m}^{-2} \text{ s}^{-1}$
CDOM sensor	
Manufacturer :	Seapoint Sensors, Inc.
Type :	The Seapoint Ultraviolet Fluorometer (SUVF)
Measurement range :	0 to 50 QSU
Resolution :	0.02 QSU
UV Nitrate Sensor	
Manufacturer :	Sea-Bird Scientific (former Satlantic Inc)
Type :	Deep SUNA
Measurement range :	-5 to 50 $\mu\text{mol/l}$

#### Information on Chemical and Biological data

Salinity	
Manufacturer :	Guildline Instruments Ltd.
Type :	Autosal salinometer model 8400B
Precision :	Standard deviation 0.0036(for pressure<700dbar, 72 pairs of replicate samples) and 0.0004(for pressure $\geq$ 700dbar, 11 pairs of replicate samples)
Reference Material/Calibration :	IAPSO Standard Sea Water P166 (Ocean Scientific International Ltd.) Multiparametric Standard Seawater (KANSO Co., Ltd. )
Dissolved Oxygen	
Burette :	
Manufacturer :	Kyoto Electronic Co. Ltd.
Type :	APB-510/APB-610/APB-620
Detector and Software :	
Manufacturer :	Kimoto Electronic Co. Ltd
Type :	Automatic photometric titrator DOT-15X
Methods :	Winkler method/photometric methods
Precision :	0.47 $\mu\text{mol kg}^{-1}$ (57 pairs of replicate samples)
Reference Material/Calibration :	The standard potassium iodate (FUJIFILM Wako Pure Chemical Industries Ltd.)
Silicate	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 39-J
Methods :	Molybdenum blue method
Precision :	C.V. 0.11% (standard solution)
Reference Material/Calibration :	KANSO CRMs (KANSO Co., Ltd.) and Silicon standard solution SiO <sub>2</sub> (KANSO Co., Ltd.)
Nitrate	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 39-J
Methods :	Diazotization method (reduced to nitrite by Cd - Cu tube)
Precision :	C.V. 0.09% (standard solution)
Reference Material/Calibration :	KANSO CRMs (KANSO Co., Ltd.) and potassium nitrate 99.995 suprapur® (Merck KGaA)
Nitrite	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 39-J

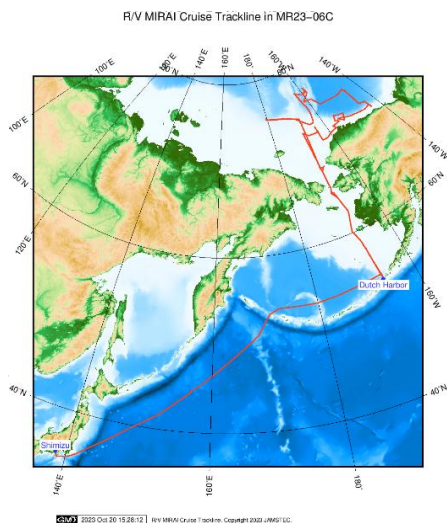
Methods :	Diazotization method
Precision :	C.V. 0.14% (standard solution)
Reference Material/Calibration :	KANSO CRMs (KANSO Co., Ltd.) and nitrite ion standard solution (FUJIFILM Wako Pure Chemical Industries Ltd.)
Phosphate	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 39-J
Methods :	Molybdenum blue method
Precision :	C.V. 0.10% (standard solution)
Reference Material/Calibration :	KANSO CRMs (KANSO Co., Ltd.) and potassium dihydrogen phosphate anhydrous 99.995 suprapur® (Merck KGaA)
Ammonia	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 39-J
Methods :	Indophenol method
Precision :	C.V. 0.38% (standard solution)
Reference Material/Calibration :	KANSO CRMs (KANSO Co., Ltd.) and Ammonium Chloride (NMIJ)
Dissolved inorganic carbon	
Manufacturer :	Nihon ANS, Inc.
Type :	TCO <sub>2</sub> measuring system equipped with coulometer Model 3000
Methods :	Coulometry
Precision :	Average of the differences 1.0 $\mu\text{mol kg}^{-1}$ , standard deviation of the differences 1.1 $\mu\text{mol kg}^{-1}$ (54 pairs of replicate samples)
Reference Material/Calibration :	Certified Reference Material for TCO <sub>2</sub> analysis provided by Dr A. G. Dickson (batch 209), DIC RM (KANSO CO., LTD) and JAMSTEC DIC reference material
Total alkalinity	
Manufacturer :	Nihon ANS, Inc.
Type :	Spectrophotometric system
Methods :	Single step acid additional procedure/spectrophotometry
Precision :	Average of the differences 1.5 $\mu\text{mol kg}^{-1}$ , standard deviation of the differences 1.3 $\mu\text{mol kg}^{-1}$ (52 pairs of replicate samples)
Reference Material/Calibration :	Certified Reference Material for TCO <sub>2</sub> analysis provided by Dr A. G. Dickson (batch 209) and JAMSTEC DIC reference material
Chlorophyll a	
Manufacturer :	Turner Designs, Inc
Type :	Fluorophotometer model 10-AU-005
Methods :	Extract in N, N-dimethylformamide /fluorometric determination (Welschmeyer non-acidification method)
Reference Material/Calibration :	Pure chlorophyll a (Sigma-Aldrich Co., LLC)

#### Quality information

Quality control was carried out by ;

DATA_ID	Name
CTD/O2	Amane Fujiwara (JAMSTEC)
SBE35, XMISS, FLUOR, PAR, CDOM, CTDNRA	Amane Fujiwara (JAMSTEC)
SALNTY	Hiroshi Uchida (JAMSTEC)
OXYGEN	Amane Fujiwara (JAMSTEC)
Nutrients	Mariko Hatta (JAMSTEC)
TCARBON, ALKALI	Akihiko Murata (JAMSTEC)
Chlorophyll a	Amane Fujiwara (JAMSTEC)

## Related Information



### MR23-06C

Ship Name: MIRAI  
Period: 2023/08/25 - 2023/10/04  
Chief Scientist: Amane Fujiwara (JAMSTEC)  
Proposal: Arctic Expedition for Environmental Studies

Observational study of the Arctic environmental changes: Pacific-Arctic interaction, biogeochemical transport, mixing and marine ecosystem

Research and development of under-ice observation technology

Quantification of the microplastic inventory in the waters of the western Arctic Ocean and microplastic influx from the Pacific Ocean

Changes in clouds and aerosols over the ice-free Arctic Ocean

Possibility of the expanding distribution in plankton and fishes associated with sea ice reduction in the Pacific sector of the Arctic Ocean

Observation of air-sea-wave-ice interaction over the Pacific Arctic region

Investigating the physical and ecophysiological basis of fall phytoplankton blooms in the Chukchi and Beaufort seas

Nitrogen Fixation in a Changing Arctic Ocean An Overlooked Source of Nitrogen

Exploring microplankton interactions and their functional roles in a changing Arctic

Determining the contribution of siphonophores to mesopelagic backscatter in the Arctic

Better understanding of climate-driven changes of biogeochemical dynamics in the western Arctic Ocean via R/V Mirai 2023 Cruise A perspective of stable carbon isotope

Temporal variations of the carbonate chemical components the Arctic Ocean within summertime

Observation of water vapor isotopic ratios

Observation of atmospheric greenhouse gases and related species in the North Pacific region

## Bottle Sampling Water Chemical Analysis (Exchange Format)

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

\* <https://cchdo.ucsd.edu/formats>

### Exchange Format

No.	Content	Format	Unit	Remarks
1	EXPCODE		A14	ExpoCode
2	SECT_ID		A6	Section ID
3	STNNBR		A6	Station Number
4	STATION		A15	Station Name
5	TYPE		A4	Type
6	CASTNO		I3	Cast Number
7	SAMPNO		A7	Sample Number
8	BTLNBR		A7	Bottle Number (S/N fixed to the sampling device)
9	BTLNBR_FLAG_W		I1	Bottle quality flags
10	BOTTLE		A7	bottle
11	DATE		I8	Cast date
12	TIME	UTC	A4	Cast time
13	LATITUDE	DEG	F8.4	Latitude
14	LONGITUDE	DEG	F9.4	Longitude
15	DEPTH	METERS	I5	Bottom depth
16	CTDDPT	METERS	F9.1	Depth
17	CTDDPT_FLAG_W		I1	Quality flags for CTD data
18	CTDPRS	DBAR	F9.1	Pressure
19	CTDPRS_FLAG_W		I1	Quality flags for CTD data
20	CTDTMP	ITS-90	F9.4	Temperature (primary sensor)
21	CTDTMP_FLAG_W		I1	Quality flags for CTD data
22	CTDTMP_1	ITS-90	F9.4	Temperature (secondary sensor)
23	CTDTMP_1_FLAG_W		I1	Quality flags for CTD data
24	SBE35	ITS-90	F10.5	Temperature from Deep Ocean Standards Thermometer
25	SBE35_FLAG_W		I1	Quality flags for CTD data
26	CTDSAL	PSS-78	F9.4	Salinity (primary sensor)
27	CTDSAL_FLAG_W		I1	Quality flags for CTD data
28	CTDSAL_1	PSS-78	F9.4	Salinity (secondary sensor)
29	CTDSAL_1_FLAG_W		I1	Quality flags for CTD data
30	CTDCND	S/M	F11.6	Conductivity (primary sensor)
31	CTDCND_FLAG_W		I1	Quality flags for CTD data
32	CTDCND_1	S/M	F11.6	Conductivity (secondary sensor)
33	CTDCND_1_FLAG_W		I1	Quality flags for CTD data
34	CTDOXY	UMOL/KG	F9.2	CTD-oxygen (primary sensor)
35	CTDOXY_FLAG_W		I1	Quality flags for CTD data
36	CTDOXY_s	UMOL/KG	F9.2	CTD-oxygen (primary sensor using secondary T and S)
37	CTDOXY_s_FLAG_W		I1	Quality flags for CTD data
38	CTDOXY_3	UMOL/KG	F9.2	CTD-oxygen (secondary sensor)
39	CTDOXY_3_FLAG_W		I1	Quality flags for CTD data
40	CTDOXV	V	F9.4	CTD-oxygen voltage (primary sensor)
41	CTDOXV_FLAG_W		I1	Quality flags for CTD data
42	CTDOXV_3	V	F9.4	CTD-oxygen voltage (secondary sensor)
43	CTDOXV_3_FLAG_W		I1	Quality flags for CTD data
44	THETA	DEG C	F9.4	Potential temperature (primary sensor)
45	THETA_FLAG_W		I1	Quality flags for CTD data
46	THETA_1	DEG C	F9.4	Potential temperature (secondary sensor)
47	THETA_1_FLAG_W		I1	Quality flags for CTD data
48	SIG0	KG/CUM	F9.4	Density (primary sensor)
49	SIG0_FLAG_W		I1	Quality flags for CTD data
50	SIG0_1	KG/CUM	F9.4	Density (secondary sensor)
51	SIG0_1_FLAG_W		I1	Quality flags for CTD data
52	XMISS	%TRANS	F9.3	Transmissometer

53	XMISS_FLAG_W		I1	Quality flags for CTD data
54	XMISSCP	/METER	F9.4	Beam attenuation coefficient
55	XMISSCP_FLAG_W		I1	Quality flags for CTD data
56	XMISSV	V	F9.4	Transmissometer voltage
57	XMISSV_FLAG_W		I1	Quality flags for CTD data
58	FLUOR	MG/CUM	F9.3	Fluorescence
59	FLUOR_FLAG_W		I1	Quality flags for CTD data
60	PAR	UMOL/M^2/ SEC	F9.3	downwelling photosynthetic photon flux in sea water
61	PAR_FLAG_W		I1	Quality flags for CTD data
62	CTDCDOM	QSU	F9.3	CDOM sensor
63	CTDCDOM_FLAG_W		I1	Quality flags for water samples
64	CTDNRA	UMOL/KG	F9.2	Nitrate sensor
65	CTDNRA_FLAG_W		I1	Quality flags for CTD data
66	CTDNRAV	V	F9.2	Nitrate sensor voltage
67	CTDNRAV_FLAG_W		I1	Quality flags for CTD data
68	SALNTY	PSS-78	F9.4	Bottle Salinity
69	SALNTY_FLAG_W		I1	Quality flags for water samples
70	SALNTY_1	PSS-78	F9.4	Bottle Salinity (replicate)
71	SALNTY_1_FLAG_W		I1	Quality flags for water samples
72	OXYGEN	UMOL/KG	F9.2	Bottle Oxygen
73	OXYGEN_FLAG_W		I1	Quality flags for water samples
74	OXYGEN_1	UMOL/KG	F9.2	Bottle Oxygen (replicate)
75	OXYGEN_1_FLAG_W		I1	Quality flags for water samples
76	SILCAT	UMOL/KG	F9.2	Silicate (final)
77	SILCAT_FLAG_W		I1	Quality flags for water samples
78	SILUNC	UMOL/KG	F9.2	Uncertainty of Silicate data
79	SILCAT1	UMOL/KG	F9.2	Silicate
80	SILCAT1_FLAG_W		I1	Quality flags for water samples
81	SILCAT2	UMOL/KG	F9.2	Silicate (replicate)
82	SILCAT2_FLAG_W		I1	Quality flags for water samples
83	NITRAT	UMOL/KG	F9.2	Nitrate (final)
84	NITRAT_FLAG_W		I1	Quality flags for water samples
85	NRAUNC	UMOL/KG	F9.2	Uncertainty of Nitrate data
86	NITRAT1	UMOL/KG	F9.2	Nitrate
87	NITRAT1_FLAG_W		I1	Quality flags for water samples
88	NITRAT2	UMOL/KG	F9.2	Nitrate (replicate)
89	NITRAT2_FLAG_W		I1	Quality flags for water samples
90	NITRIT	UMOL/KG	F9.2	Nitrite (final)
91	NITRIT_FLAG_W		I1	Quality flags for water samples
92	NRIUNC	UMOL/KG	F9.2	Uncertainty of Nitrite data
93	NITRIT1	UMOL/KG	F9.2	Nitrite
94	NITRIT1_FLAG_W		I1	Quality flags for water samples
95	NITRIT2	UMOL/KG	F9.2	Nitrite (replicate)
96	NITRIT2_FLAG_W		I1	Quality flags for water samples
97	PHSPHT	UMOL/KG	F9.3	Phosphate (final)
98	PHSPHT_FLAG_W		I1	Quality flags for water samples
99	PHPUNC	UMOL/KG	F9.3	Uncertainty of Phosphate data
100	PHSPHT1	UMOL/KG	F9.3	Phosphate
101	PHSPHT1_FLAG_W		I1	Quality flags for water samples
102	PHSPHT2	UMOL/KG	F9.3	Phosphate (replicate)
103	PHSPHT2_FLAG_W		I1	Quality flags for water samples
104	NH4	UMOL/KG	F9.2	Ammonium (final)
105	NH4_FLAG_W		I1	Quality flags for water samples
106	NH4UNC	UMOL/KG	F9.2	Uncertainty of Ammonium data
107	NH41	UMOL/KG	F9.2	Ammonium
108	NH41_FLAG_W		I1	Quality flags for water samples
109	NH42	UMOL/KG	F9.2	Ammonium (replicate)
110	NH42_FLAG_W		I1	Quality flags for water samples
111	TCARBN	UMOL/KG	F9.1	Total Carbon CT
112	TCARBN_FLAG_W		I1	Quality flags for water samples

113	TCARB_N_1	UMOL/KG	F9.1	Total Carbon CT (replicate)
114	TCARB_N_1_FLAG_W		I1	Quality flags for water samples
115	ALKALI	UMOL/KG	F9.1	Total alkalinity
116	ALKALI_FLAG_W		I1	Quality flags for water samples
117	ALKALI_1	UMOL/KG	F9.1	Total alkalinity (replicate)
118	ALKALI_1_FLAG_W		I1	Quality flags for water samples
119	CHLWEL	UG/L	F9.3	Chlorophyll a
120	CHLWEL_FLAG_W		I1	Quality flags for water samples
121	SIZECHL>20um	UG/L	F9.3	Chlorophyll a > 20um
122	SIZECHL>20um_FLAG_W		I1	Quality flags for water samples
123	SIZECHL<2um	UG/L	F9.3	Chlorophyll a < 2um
124	SIZECHL<2um_FLAG_W		I1	Quality flags for water samples
125	SIZECHL2-20um	UG/L	F9.3	Chlorophyll a 2-20um
126	SIZECHL2-20um_FLAG_W		I1	Quality flags for water samples

## Bottle Sampling Water Chemical Analysis (Ocean Data View format)

Please see the following url for details of ODV Format and ODV Software.

\* <https://odv.awi.de/>

### ODV Format

No.	Content	Remarks
1	EXPCODE	Cruise Label
2	Cruise	Cruise
3	Station No	Station number_Cast number
4	Station	Station Name
5	Type	Station type
6	Bottle	bottle
7	mon/day/yr	Cast date
8	hh:mm	Cast time
9	Latitude[degrees_north]	Latitude
10	Longitude[degrees_east]	Longitude
11	Bot. Depth[METERS]	Bottom depth
12	CTDDPT[METERS]	Depth
13	QF	Quality flags for CTD data
14	CTDPRS[DBAR]	Pressure
15	QF	Quality flags for CTD data
16	CTDTMP[ITS-90]	Temperature (primary sensor)
17	QF	Quality flags for CTD data
18	CTDTMP_1[ITS-90]	Temperature (secondary sensor)
19	QF	Quality flags for CTD data
20	SBE35[ITS-90]	Temperature from Deep Ocean Standards Thermometer
21	QF	Quality flags for CTD data
22	CTDSAL[PSS-78]	Salinity (primary sensor)
23	QF	Quality flags for CTD data
24	CTDSAL_1[PSS-78]	Salinity (secondary sensor)
25	QF	Quality flags for CTD data
26	CTDCND[S/M]	Conductivity (primary sensor)
27	QF	Quality flags for CTD data
28	CTDCND_1[S/M]	Conductivity (secondary sensor)
29	QF	Quality flags for CTD data
30	CTDOXY[UMOL/KG]	CTD-oxygen (primary sensor)
31	QF	Quality flags for CTD data
32	CTDOXY_s[UMOL/KG]	CTD-oxygen (primary sensor using secondary T and S)
33	QF	Quality flags for CTD data
34	CTDOXY_3[UMOL/KG]	CTD-oxygen (secondary sensor)
35	QF	Quality flags for CTD data
36	CTDOXV[V]	CTD-oxygen voltage (primary sensor)
37	QF	Quality flags for CTD data
38	CTDOXV_3[V]	CTD-oxygen voltage (secondary sensor)
39	QF	Quality flags for CTD data
40	THETA[DEG C]	Potential temperature (primary sensor)
41	QF	Quality flags for CTD data
42	THETA_1[DEG C]	Potential temperature (secondary sensor)
43	QF	Quality flags for CTD data
44	SIG0[KG/CUM]	Density (primary sensor)
45	QF	Quality flags for CTD data
46	SIG0_1[KG/CUM]	Density (secondary sensor)
47	QF	Quality flags for CTD data
48	XMISS[%TRANS]	Transmissometer
49	QF	Quality flags for CTD data
50	XMISSCP[/METER]	Beam attenuation coefficient
51	QF	Quality flags for CTD data
52	XMISSV[V]	Transmissometer voltage
53	QF	Quality flags for CTD data



54	FLUOR[MG/CUM]	Fluorescence
55	QF	Quality flags for CTD data
56	PAR[UMOL/M^2/SEC]	downwelling photosynthetic photon flux in sea water
57	QF	Quality flags for CTD data
58	CTDCDOM[QSU]	CDOM sensor
59	QF	Quality flags for water samples
60	CTDNRA[UMOL/KG]	Nitrate sensor
61	QF	Quality flags for CTD data
62	CTDNRAV[V]	CTD_Nitrate voltage
63	QF	Quality flags for CTD data
64	SALNTY[PSS-78]	Bottle Salinity
65	QF	Quality flags for water samples
66	SALNTY_1[PSS-78]	Bottle Salinity (replicate)
67	QF	Quality flags for water samples
68	OXYGEN[UMOL/KG]	Bottle Oxygen
69	QF	Quality flags for water samples
70	OXYGEN_1[UMOL/KG]	Bottle Oxygen (replicate)
71	QF	Quality flags for water samples
72	SILCAT[UMOL/KG]	Silicate (final)
73	QF	Quality flags for water samples
74	SILUNC	Uncertainty of Silicate data
75	QF	Quality flags for water samples
76	SILCAT1[UMOL/KG]	Silicate
77	QF	Quality flags for water samples
78	SILCAT2[UMOL/KG]	Silicate (replicate)
79	QF	Quality flags for water samples
80	NITRAT[UMOL/KG]	Nitrate (final)
81	QF	Quality flags for water samples
82	NRAUNC	Uncertainty of Nitrate data
83	QF	Quality flags for water samples
84	NITRAT1[UMOL/KG]	Nitrate
85	QF	Quality flags for water samples
86	NITRAT2[UMOL/KG]	Nitrate (replicate)
87	QF	Quality flags for water samples
88	NITRIT[UMOL/KG]	Nitrite (final)
89	QF	Quality flags for water samples
90	NRIUNC	Uncertainty of Nitrite data
91	QF	Quality flags for water samples
92	NITRIT1[UMOL/KG]	Nitrite
93	QF	Quality flags for water samples
94	NITRIT2[UMOL/KG]	Nitrite (replicate)
95	QF	Quality flags for water samples
96	PHSPHT[UMOL/KG]	Phosphate (final)
97	QF	Quality flags for water samples
98	PHPUNC	Uncertainty of Phosphate data
99	QF	Quality flags for water samples
100	PHSPHT1[UMOL/KG]	Phosphate
101	QF	Quality flags for water samples
102	PHSPHT2[UMOL/KG]	Phosphate (replicate)
103	QF	Quality flags for water samples
104	NH4[UMOL/KG]	Ammonium (final)
105	QF	Quality flags for water samples
106	NH4UNC	Uncertainty of Ammonium data
107	QF	Quality flags for water samples
108	NH41[UMOL/KG]	Ammonium
109	QF	Quality flags for water samples
110	NH42[UMOL/KG]	Ammonium (replicate)
111	QF	Quality flags for water samples
112	TCARBN[UMOL/KG]	Total Carbon CT
113	QF	Quality flags for water samples
114	TCARBN_1[UMOL/KG]	Total Carbon CT (replicate)

115	QF	Quality flags for water samples
116	ALKALI[UMOL/KG]	Total alkalinity
117	QF	Quality flags for water samples
118	ALKALI_1[UMOL/KG]	Total alkalinity (replicate)
119	QF	Quality flags for water samples
120	CHLWEL[UG/L]	Chlorophyll a
121	QF	Quality flags for water samples
122	SIZECHL>20um[UG/L]	Chlorophyll a > 20um
123	QF	Quality flags for water samples
124	SIZECHL<2um[UG/L]	Chlorophyll a < 2um
125	QF	Quality flags for water samples
126	SIZECHL2-20um[UG/L]	Chlorophyll a 2-20um
127	QF	Quality flags for water samples
128	SAMPNO	Sample Number
129	QF	Bottle quality flags

## Definition of Quality Control Flags for Bottle Data

For Bottle data, ODV format is converted based on Exchange format, and the ODV flag corresponding to the Exchange format flag is given.

ODV flagging schemes Version 1.0 : MIRAI Bottle data until MR14-06 Leg3, KAIYO Bottle data.

ODV flagging schemes Version 1.4 : MIRAI Bottle data since MR15-02, Bottle data since July 2015.

### 1. Bottle quality flags

Exchange	ODV Version: 1.0	ODV Version: 1.4
1 = Bottle information unavailable.	1 : unknown	1 : unknown quality
2 = No problems noted.	0 : good	0 : good quality
3 = Leaking.	4 : questionable	4 : questionable quality
4 = Did not trip correctly.	8 : bad	8 : bad quality
5 = Not reported.	8 : bad	1 : unknown quality
7 = Unknown problem.	1 : unknown	4 : questionable quality
9 = Samples not drawn from this bottle.	no data	1 : unknown quality

### 2. Quality flags for water samples

Exchange	ODV Version: 1.0	ODV Version: 1.4
1 = Sample for this measurement was drawn from water bottle but analysis not received.	1 : unknown	1 : unknown quality
2 = Acceptable measurement.	0 : good	0 : good quality
3 = Questionable measurement.	4 : questionable	4 : questionable quality
4 = Bad measurement.	8 : bad	8 : bad quality
5 = Not reported.	8 : bad	1 : unknown quality
6 = Mean of replicate measurements.	0 : good	1 : unknown quality
9 = Sample not drawn for this measurement from this bottle.	no data	1 : unknown quality

### 3. Quality flags definitions for CTD data

Exchange	ODV Version: 1.0	ODV Version: 1.4
1 = Not calibrated.	1 : unknown	1 : unknown quality
2 = Acceptable measurement.	0 : good	0 : good quality
3 = Questionable measurement.	4 : questionable	4 : questionable quality
4 = Bad measurement.	8 : bad	8 : bad quality
5 = Not reported.	8 : bad	1 : unknown quality
6 = Interpolated over >1 dbar interval.	1 : unknown	
6 = Interpolated over >2 dbar interval.		1 : unknown quality
7 = Despiked.	1 : unknown	1 : unknown quality
9 = Not sampled.	no data	1 : unknown quality