

For Using Data

Data Policy	JAMSTEC
Principal Investigator	JAMSTEC / BPPT joint cruise in the Indonesian waters. In addition, please 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


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

 Nutrient analyzer(5ch)
 (MR09-02 -)


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

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

Manufacturer :	Sea-Bird Scientific
Type :	SBE43
Measurement range :	120% of surface saturation
Accuracy :	2% of saturation

Fluorometer	
Manufacturer :	Seapoint Sensors, Inc.
Type :	Seapoint Chlorophyll Fluorometer
Measurement range :	0 to 15 $\mu\text{g/l}$ at Gain $10\times$
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 $\mu\text{mol photons m}^{-2}\text{ s}^{-1}$
Information on Chemical and Biological data	
Salinity	
Manufacturer :	Guildline Instruments Ltd.
Type :	Autosal salinometer model 8400B
Precision :	Average of absolute difference 0.00032 , standard deviation of absolute difference 0.00026 (39 pairs of replicate samples)
Reference Material/Calibration :	IAPSO Standard Sea Water P160 (Ocean Scientific International Ltd.)
Dissolved Oxygen	
Burette :	
Manufacturer :	Kyoto Electronic Co. Ltd.
Type :	APB-510/APB-620
Detector :	
Manufacturer :	Kimoto Electronic Co. Ltd
Type :	Automatic photometric titrator DOT-01X
Methods :	Winkler method/photometric methods
Precision :	0.13 $\mu\text{mol kg}^{-1}$ (113 pairs of replicate samples)
Reference Material/Calibration :	The standard potassium iodate (NMIJ CRM 3006-a No.058)
Silicate	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 2-HR
Methods :	Molybdenum blue method
Precision :	C.V. 0.12%
Reference Material/Calibration :	Silicon standard solution SiO_2 in NaOH 0.5 mol/L CertiPUR® (Merck KGaA)
Nitrate	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 2-HR
Methods :	Diazotization method (reduced to nitrite by Cd - Cu tube)
Precision :	C.V. 0.17%
Reference Material/Calibration :	Potassium nitrate 99.995 suprapur® (Merck KGaA)
Nitrite	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 2-HR
Methods :	Diazotization method
Precision :	C.V. 0.21%
Reference Material/Calibration :	Nitrite ion standard solution (Wako Pure Chemical Industries, Ltd.)
Phosphate	
Manufacturer :	BL TEC K.K.
Type :	QuAAtro 2-HR
Methods :	Molybdenum blue method
Precision :	C.V. 0.16% (standard solution)
Reference Material/Calibration :	potassium dihydrogen phosphate anhydrous 99.995 suprapur® (Merck KGaA)

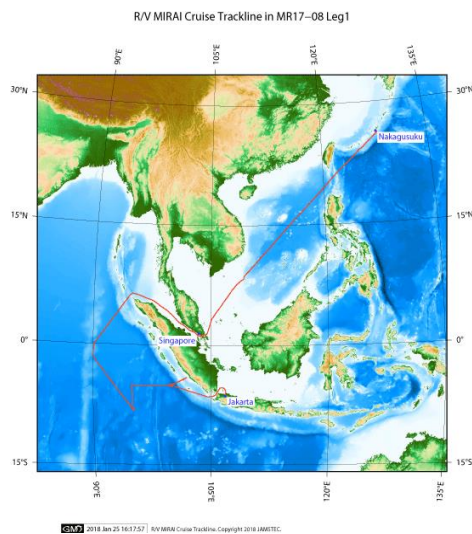
Chlorophyll a	
Manufacturer :	Turner Designs, Inc
Type :	Fluorophotometer model 10-AU-005
Methods :	Extract in N, N-dimethylformamide /fluorometric determination (Welschmeyer non-acidification method)
Precision :	The relative error was 3% (116 pairs of replicate samples)
Reference Material/Calibration :	Pure chlorophyll a (Sigma-Aldrich Co., LLC)

Quality information

Quality control was carried out by ;

DATA_ID	Name
CTD/O2, FLUOR, PAR	Satoru Yokoi (JAMSTEC)
SALNTY, OXYGEN	Satoru Yokoi (JAMSTEC)
Nutrients	Satoru Yokoi (JAMSTEC)
Chlorophyll	Kazuhiko Matsumoto (JAMSTEC)

Related Information



MR17-08 Leg1

Ship Name: MIRAI
Period: 2017/11/11 -2018/01/04
Chief Scientist: Satoru Yokoi (JAMSTEC)
Proposal: Study on air-sea interaction over upwelling region in the eastern Indian Ocean

The monitoring of ocean climate change from surface to deep layer in the Indian Ocean by using Argo-type floats

Aerosol optical characteristics measured by ship-borne sky radiometer

Observational study on clouds and mixed layer depths over the tropical ocean

On variations of precipitation and vapor isotope ratio associated with Madden Julian Oscillation

Researches on the organized precipitating systems and their accompanying cold pools in the maritime continents region

A study on the mechanisms for convective clustering from thermally induced local circulations over the Maritime Continent

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	TYPE	A4		Type
5	CASTNO	I3		Cast Number
6	SAMPNO	A7		Sample Number
7	BTLNBR	A7		Bottle Number (S/N fixed to the sampling device)
8	BTLNBR_FLAG_W	I1		Bottle quality flags
9	DATE	I8		Cast date
10	TIME	A4	UTC	Cast time
11	LATITUDE	F8.4	DEG	Latitude
12	LONGITUDE	F9.4	DEG	Longitude
13	DEPTH	I5	METERS	Bottom depth
14	CTDDPT	F9.1	METERS	Depth
15	CTDDPT_FLAG_W	I1		Quality flags for CTD data
16	CTDPRS	F9.1	DBAR	Pressure
17	CTDPRS_FLAG_W	I1		Quality flags for CTD data
18	CTDTMP	F9.4	ITS-90	Temperature (primary sensor)
19	CTDTMP_FLAG_W	I1		Quality flags for CTD data
20	CTDTMP_1	F9.4	ITS-90	Temperature (secondary sensor)
21	CTDTMP_1_FLAG_W	I1		Quality flags for CTD data
22	CTDSAL	F9.4	PSS-78	Salinity (primary sensor)
23	CTDSAL_FLAG_W	I1		Quality flags for CTD data
24	CTDSAL_1	F9.4	PSS-78	Salinity (secondary sensor)
25	CTDSAL_1_FLAG_W	I1		Quality flags for CTD data
26	CTDCND	F11.6	S/M	Conductivity (primary sensor)
27	CTDCND_FLAG_W	I1		Quality flags for CTD data
28	CTDCND_1	F11.6	S/M	Conductivity (secondary sensor)
29	CTDCND_1_FLAG_W	I1		Quality flags for CTD data
30	CTDOXY_2	F9.2	UMOL/KG	CTD-oxygen (primary sensor)
31	CTDOXY_2_FLAG_W	I1		Quality flags for CTD data
32	CTDOXY_3	F9.2	UMOL/KG	CTD-oxygen (secondary sensor)
33	CTDOXY_3_FLAG_W	I1		Quality flags for CTD data
34	CTDOXV_2	F9.4	V	CTD-oxygen voltage (primary sensor)
35	CTDOXV_2_FLAG_W	I1		Quality flags for CTD data
36	CTDOXV_3	F9.4	V	CTD-oxygen voltage (secondary sensor)
37	CTDOXV_3_FLAG_W	I1		Quality flags for CTD data
38	THETA	F9.4	DEG C	Potential temperature (primary sensor)
39	THETA_FLAG_W	I1		Quality flags for CTD data
40	THETA_1	F9.4	DEG C	Potential temperature (secondary sensor)
41	THETA_1_FLAG_W	I1		Quality flags for CTD data
42	SIG0	F9.4	KG/CUM	Density (primary sensor)
43	SIG0_FLAG_W	I1		Quality flags for CTD data
44	SIG0_1	F9.4	KG/CUM	Density (secondary sensor)
45	SIG0_1_FLAG_W	I1		Quality flags for CTD data
46	FLUOR	F9.3	MG/CUM	Fluorescence

47	FLUOR_FLAG_W	I1		Quality flags for CTD data
48	PAR	F9.3	UMOL/M^2/SEC	downwelling photosynthetic photon flux in sea water
49	PAR_FLAG_W	I1		Quality flags for CTD data
50	SALNTY	F9.4	PSS-78	Bottle Salinity
51	SALNTY_FLAG_W	I1		Quality flags for water samples
52	SALNTY_1	F9.4	PSS-78	Bottle Salinity (replicate)
53	SALNTY_1_FLAG_W	I1		Quality flags for water samples
54	OXYGEN	F9.2	UMOL/KG	Bottle Oxygen
55	OXYGEN_FLAG_W	I1		Quality flags for water samples
56	OXYGEN_1	F9.2	UMOL/KG	Bottle Oxygen (replicate)
57	OXYGEN_1_FLAG_W	I1		Quality flags for water samples
58	SILCAT	F9.2	UMOL/KG	Silicate (final)
59	SILCAT_FLAG_W	I1		Quality flags for water samples
60	SILUNC	F9.2	UMOL/KG	Uncertainty of Silicate data
61	SILCAT1	F9.2	UMOL/KG	Silicate
62	SILCAT1_FLAG_W	I1		Quality flags for water samples
63	SILCAT2	F9.2	UMOL/KG	Silicate (replicate)
64	SILCAT2_FLAG_W	I1		Quality flags for water samples
65	NITRAT	F9.2	UMOL/KG	Nitrate (final)
66	NITRAT_FLAG_W	I1		Quality flags for water samples
67	NRAUNC	F9.2	UMOL/KG	Uncertainty of Nitrate data
68	NITRAT1	F9.2	UMOL/KG	Nitrate
69	NITRAT1_FLAG_W	I1		Quality flags for water samples
70	NITRAT2	F9.2	UMOL/KG	Nitrate (replicate)
71	NITRAT2_FLAG_W	I1		Quality flags for water samples
72	NITRIT	F9.2	UMOL/KG	Nitrite (final)
73	NITRIT_FLAG_W	I1		Quality flags for water samples
74	NRIUNC	F9.2	UMOL/KG	Uncertainty of Nitrite data
75	NITRIT1	F9.2	UMOL/KG	Nitrite
76	NITRIT1_FLAG_W	I1		Quality flags for water samples
77	NITRIT2	F9.2	UMOL/KG	Nitrite (replicate)
78	NITRIT2_FLAG_W	I1		Quality flags for water samples
79	PHSPHT	F9.3	UMOL/KG	Phosphate (final)
80	PHSPHT_FLAG_W	I1		Quality flags for water samples
81	PHPUNC	F9.3	UMOL/KG	Uncertainty of Phosphate data
82	PHSPHT1	F9.3	UMOL/KG	Phosphate
83	PHSPHT1_FLAG_W	I1		Quality flags for water samples
84	PHSPHT2	F9.3	UMOL/KG	Phosphate (replicate)
85	PHSPHT2_FLAG_W	I1		Quality flags for water samples
86	CHLWEL	F9.2	MG/CUM	Chlorophyll a
87	CHLWEL_FLAG_W	I1		Quality flags for water samples
88	CHLWEL_1	F9.2	MG/CUM	Chlorophyll a (replicate)
89	CHLWEL_1_FLAG_W	I1		Quality flags for water samples
90	SIZECHL>10um	F9.2	MG/CUM	Chlorophyll a > 10um
91	SIZECHL>10um_FLAG_W	I1		Quality flags for water samples
92	SIZECHL3-10um	F9.2	MG/CUM	Chlorophyll a 3-10um
93	SIZECHL3-10um_FLAG_W	I1		Quality flags for water samples
94	SIZECHL1-3um	F9.2	MG/CUM	Chlorophyll a 1-3um
95	SIZECHL1-3um_FLAG_W	I1		Quality flags for water samples
96	SIZECHL<1um	F9.2	MG/CUM	Chlorophyll a < 1um
97	SIZECHL<1um_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	EXPOCODE	Cruise Label
2	Cruise	Cruise
3	Station	Station number_Cast number
4	Type	Station type
5	mon/day/yr	Cast date
6	hh:mm	Cast time
7	Latitude[degrees_north]	Latitude
8	Longitude[degrees_east]	Longitude
9	Bot. Depth[METERS]	Bottom depth
10	CTDDPT[METERS]	Depth
11	QF	Quality flags for CTD data
12	CTDPRS[DBAR]	Pressure
13	QF	Quality flags for CTD data
14	CTDTMP[ITS-90]	Temperature (primary sensor)
15	QF	Quality flags for CTD data
16	CTDTMP_1[ITS-90]	Temperature (secondary sensor)
17	QF	Quality flags for CTD data
18	CTDSAL[PSS-78]	Salinity (primary sensor)
19	QF	Quality flags for CTD data
20	CTDSAL_1[PSS-78]	Salinity (secondary sensor)
21	QF	Quality flags for CTD data
22	CTDCND[S/M]	Conductivity (primary sensor)
23	QF	Quality flags for CTD data
24	CTDCND_1[S/M]	Conductivity (secondary sensor)
25	QF	Quality flags for CTD data
26	CTDOXY_2[UMOL/KG]	CTD-oxygen (primary sensor)
27	QF	Quality flags for CTD data
28	CTDOXY_3[UMOL/KG]	CTD-oxygen (secondary sensor)
29	QF	Quality flags for CTD data
30	CTDOXV_2[V]	CTD-oxygen voltage (primary sensor)
31	QF	Quality flags for CTD data
32	CTDOXV_3[V]	CTD-oxygen voltage (secondary sensor)
33	QF	Quality flags for CTD data
34	THETA[DEG C]	Potential temperature (primary sensor)
35	QF	Quality flags for CTD data
36	THETA_1[DEG C]	Potential temperature (secondary sensor)
37	QF	Quality flags for CTD data
38	SIG0[KG/CUM]	Density (primary sensor)
39	QF	Quality flags for CTD data
40	SIG0_1[KG/CUM]	Density (secondary sensor)
41	QF	Quality flags for CTD data
42	FLUOR[MG/CUM]	Fluorescence
43	QF	Quality flags for CTD data
44	PAR[UMOL/M^2/SEC]	downwelling photosynthetic photon flux in sea water
45	QF	Quality flags for CTD data
46	SALNTY[PSS-78]	Bottle Salinity
47	QF	Quality flags for water samples

48	SALNTY_1[PSS-78]	Bottle Salinity (replicate)
49	QF	Quality flags for water samples
50	OXYGEN[UMOL/KG]	Bottle Oxygen
51	QF	Quality flags for water samples
52	OXYGEN_1[UMOL/KG]	Bottle Oxygen (replicate)
53	QF	Quality flags for water samples
54	SILCAT[UMOL/KG]	Silicate (final)
55	QF	Quality flags for water samples
56	SILUNC	Uncertainty of Silicate data
57	QF	Quality flags for water samples
58	SILCAT1[UMOL/KG]	Silicate
59	QF	Quality flags for water samples
60	SILCAT2[UMOL/KG]	Silicate (replicate)
61	QF	Quality flags for water samples
62	NITRAT[UMOL/KG]	Nitrate (final)
63	QF	Quality flags for water samples
64	NRAUNC	Uncertainty of Nitrate data
65	QF	Quality flags for water samples
66	NITRAT1[UMOL/KG]	Nitrate
67	QF	Quality flags for water samples
68	NITRAT2[UMOL/KG]	Nitrate (replicate)
69	QF	Quality flags for water samples
70	NITRIT[UMOL/KG]	Nitrite (final)
71	QF	Quality flags for water samples
72	NRIUNC	Uncertainty of Nitrite data
73	QF	Quality flags for water samples
74	NITRIT1[UMOL/KG]	Nitrite
75	QF	Quality flags for water samples
76	NITRIT2[UMOL/KG]	Nitrite (replicate)
77	QF	Quality flags for water samples
78	PHSPHT[UMOL/KG]	Phosphate (final)
79	QF	Quality flags for water samples
80	PHPUNC	Uncertainty of Phosphate data
81	QF	Quality flags for water samples
82	PHSPHT1[UMOL/KG]	Phosphate
83	QF	Quality flags for water samples
84	PHSPHT2[UMOL/KG]	Phosphate (replicate)
85	QF	Quality flags for water samples
86	CHLWEL[MG/CUM]	Chlorophyll a
87	QF	Quality flags for water samples
88	CHLWEL_1[MG/CUM]	Chlorophyll a (replicate)
89	QF	Quality flags for water samples
90	SIZECHL>10um[MG/CUM]	Chlorophyll a > 10um
91	QF	Quality flags for water samples
92	SIZECHL3-10um[MG/CUM]	Chlorophyll a 3-10um
93	QF	Quality flags for water samples
94	SIZECHL1-3um[MG/CUM]	Chlorophyll a 1-3um
95	QF	Quality flags for water samples
96	SIZECHL<1um[MG/CUM]	Chlorophyll a < 1um
97	QF	Quality flags for water samples
98	SAMPNO	Sample Number
99	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