

For Using Data

Data Policy	JAMSTEC
Principal Investigator	Satoru Yokoi (JAMSTEC)
Use Constraints	See Terms and Conditions about constrain of use.
Data Citation	See Terms and Conditions about data citation.

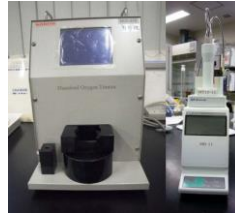
Quality level Processed (PI)

Instrument

Salinity measurement system



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



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 (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

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 μ mol photons m ⁻² s ⁻¹

Information on Chemical and Biological data

Salinity	
Manufacturer :	Guildline Instruments Ltd.
Type :	Autosal salinometer model 8400B
Precision :	Average of absolute difference 0.00060 , standard deviation of absolute difference 0.00059 (33 pairs of replicate samples)
Reference Material/Calibration :	IAPSO Standard Sea Water P163 (Ocean Scientific International Ltd.)

Dissolved Oxygen

Burette :

Manufacturer : Kyoto Electronic Co. Ltd.

Type : APB-620

Detector and Software :

Manufacturer : Kimoto Electronic Co. Ltd

Type : Automatic photometric titrator DOT-15X

Methods : Winkler method/photometric methods

Precision : 0.10 μ mol kg⁻¹ (58 pairs of replicate samples)

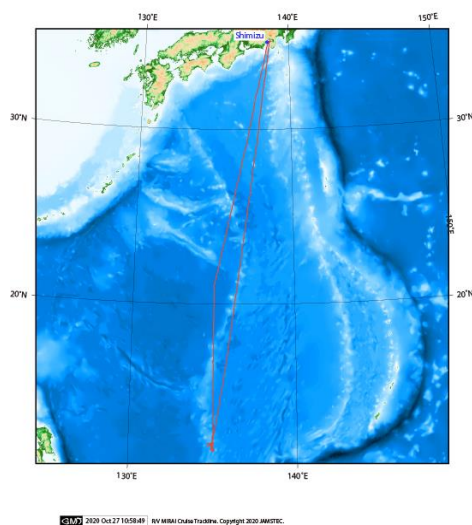
Reference Material/Calibration :

The standard potassium iodate (NMIJ CRM 3006-a No.074)

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 :	Standard deviation of the differences 0.01 μ g L ⁻¹ (28 pairs of replicate samples)
Reference Material/Calibration :	Pure chlorophyll a (Sigma-Aldrich Co., LLC)

Related Information

R/V MIRAI Cruise Trackline in MR20-E01



MR20-E01

Ship Name: MIRAI
Period: 2020/08/01 - 2020/09/13
Chief Scientist: Satoru Yokoi (JAMSTEC)
Proposal: Study on air-sea interaction associated with the northward-propagating boreal summer intraseasonal oscillation

Observational study on variation of precipitation and vapor isotope ratio associated with MJO

Observational study for upper-ocean stratification: Case of tropical western Pacific

Observation of aerosol optical characteristics over the ocean

Measurement of column-integrated CO₂ density in the atmosphere

Continuous observation of precipitable water vapor using microwave radiometer

Study on impacts of aerosols on precipitation and lightning

Study on mechanisms for convective clustering associated with northward-propagating intraseasonal oscillation

Analysis of fine vertical structure of oceanographic parameters over the tropical western Pacific

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	F9.2	UMOL/KG	CTD-oxygen (RINKO III sensor using primary T and S)
31	CTDOXY_FLAG_W	I1		Quality flags for CTD data
32	CTDOXY_s	F9.2	UMOL/KG	CTD-oxygen (RINKO III sensor using secondary T and S)
33	CTDOXY_s_FLAG_W	I1		Quality flags for CTD data
34	CTDOXY_3	F9.2	UMOL/KG	CTD-oxygen (SBE43)
35	CTDOXY_3_FLAG_W	I1		Quality flags for CTD data
36	CTDOXY_4	F9.2	UMOL/KG	CTD-oxygen (SBE43)
37	CTDOXY_4_FLAG_W	I1		Quality flags for CTD data
38	CTDOXV	F9.4	V	CTD-oxygen voltage (RINKO III)
39	CTDOXV_FLAG_W	I1		Quality flags for CTD data
40	CTDOXV_3	F9.4	V	CTD-oxygen voltage (SBE43)
41	CTDOXV_3_FLAG_W	I1		Quality flags for CTD data
42	CTDOXV_4	F9.4	V	CTD-oxygen voltage (SBE43)
43	CTDOXV_4_FLAG_W	I1		Quality flags for CTD data
44	THETA	F9.4	DEG C	Potential temperature (primary sensor)
45	THETA_FLAG_W	I1		Quality flags for CTD data
46	THETA_1	F9.4	DEG C	Potential temperature (secondary sensor)

47	THETA_1_FLAG_W	I1		Quality flags for CTD data
48	SIG0	F9.4	KG/CUM	Density (primary sensor)
49	SIG0_FLAG_W	I1		Quality flags for CTD data
50	SIG0_1	F9.4	KG/CUM	Density (secondary sensor)
51	SIG0_1_FLAG_W	I1		Quality flags for CTD data
52	FLUOR	F9.3	MG/CUM	Fluorescence
53	FLUOR_FLAG_W	I1		Quality flags for CTD data
54	PAR	F9.3	UE/SQM/S	PAR
55	PAR_FLAG_W	I1		Quality flags for CTD data
56	SALNTY	F9.4	PSS-78	Bottle Salinity
57	SALNTY_FLAG_W	I1		Quality flags for water samples
58	SALNTY_1	F9.4	PSS-78	Bottle Salinity (replicate)
59	SALNTY_1_FLAG_W	I1		Quality flags for water samples
60	OXYGEN	F9.2	UMOL/KG	Bottle Oxygen
61	OXYGEN_FLAG_W	I1		Quality flags for water samples
62	OXYGEN_1	F9.2	UMOL/KG	Bottle Oxygen (replicate)
63	OXYGEN_1_FLAG_W	I1		Quality flags for water samples
64	CHLWEL	F9.2	MG/CUM	Chlorophyll a
65	CHLWEL_FLAG_W	I1		Quality flags for water samples
66	CHLWEL_1	F9.2	MG/CUM	Chlorophyll a (replicate)
67	CHLWEL_1_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	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[UMOL/KG]	CTD-oxygen (RINKO III sensor using primary T and S)
27	QF	Quality flags for CTD data
28	CTDOXY_s[UMOL/KG]	CTD-oxygen (RINKO III sensor using secondary T and S)
29	QF	Quality flags for CTD data
30	CTDOXY_3[UMOL/KG]	CTD-oxygen (SBE43)
31	QF	Quality flags for CTD data
32	CTDOXY_4[UMOL/KG]	CTD-oxygen (SBE43)
33	QF	Quality flags for CTD data
34	CTDOXV[V]	CTD-oxygen voltage (RINKO III)
35	QF	Quality flags for CTD data
36	CTDOXV_3[V]	CTD-oxygen voltage (SBE43)
37	QF	Quality flags for CTD data
38	CTDOXV_4[V]	CTD-oxygen voltage (SBE43)
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	FLUOR[MG/CUM]	Fluorescence
49	QF	Quality flags for CTD data
50	PAR[UE/SQM/S]	PAR
51	QF	Quality flags for CTD data
52	SALNTY[PSS-78]	Bottle Salinity
53	QF	Quality flags for water samples
54	SALNTY_1[PSS-78]	Bottle Salinity (replicate)
55	QF	Quality flags for water samples
56	OXYGEN[UMOL/KG]	Bottle Oxygen
57	QF	Quality flags for water samples
58	OXYGEN_1[UMOL/KG]	Bottle Oxygen (replicate)
59	QF	Quality flags for water samples
60	CHLWEL[MG/CUM]	Chlorophyll a
61	QF	Quality flags for water samples
62	CHLWEL_1[MG/CUM]	Chlorophyll a (replicate)
63	QF	Quality flags for water samples
64	SAMPNO	Sample Number
65	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