

The Results of Oceanographic Observations
in areas under national jurisdiction
of the Commonwealth of Northern Mariana
Islands
by the Cruise of R/V Keifu Maru

March 2017

Japan Meteorological Agency

DATA EXPLANATION

Hydrographic Observation

<i>STA-NO</i>	:Station number given by the ship code ("KS" is Keifu maru, "RF" is Ryofu maru) suffixed with four digits consecutive number.
<i>LOCATION</i>	:Latitude and longitude in degrees, minutes and tenth of minutes (if given) with the hemisphere indicated by 'N'/'S' and 'E'/'W'.
<i>DATE/TIME</i>	:Month, day and time of beginning and end of a hydrographic cast in the Japan Standard Time (JST), which is nine hours ahead of the Coordinated Universal Time (UTC).
<i>DEPTH</i>	:Water depth to the bottom in meters measured using a single beam echo sounder.

Standard Depth (Standard)

<i>DEPTH</i>	:Standard depths in meters.
<i>TEMPERATURE</i>	:Temperature in "the International Temperature Scale of 1990 (ITS-90)".
<i>SALINITY</i>	:Salinity in "the Practical Salinity Scale, 1978 (PSS-78)".
<i>O₂</i>	:Dissolved oxygen in micro mole per kilogram measured using a dissolved oxygen sensor.

Standard Depth (Calculated)

<i>Δst</i>	:Thermosteric anomaly in $10^{-8} \text{ m}^3\text{kg}^{-1}$
<i>ΔD</i>	:Geopotential anomaly in $10 \text{ m}^2\text{sec}^{-2}$

Observed

<i>DEPTH</i>	:CTD depth of sampling in meters.
<i>TEMPERATURE</i>	:CTD temperature in ITS-90.
<i>SALINITY</i>	:CTD salinity in PSS-78.
<i>O₂</i>	:Dissolved oxygen in micro mole per kilogram as determined titrimetrically by means of the Winkler Method.
<i>PO₄-P</i>	:Inorganic phosphate-phosphorus in micro mole per kilogram as determined colorimetrically by means of the reduction method using ascorbic acid (Strickland and Parsons, 1965).
<i>NO₃-N</i>	:(Nitrate+nitrite)-nitrogen in micro mole per kilogram as determined colorimetrically by means of the Muellin-Riley method using copper-cadmium reduction column (Wood, Armstrong and Richard, 1967).
<i>NO₂-N</i>	:Nitrite-nitrogen in micro mole per kilogram as determined colorimetrically by means of the Bendschneider and Robinson method (Strickland and Parsons, 1965).
<i>SiO₂</i>	:Silicate-silicon in micro mole per kilogram as determined colorimetrically by means of the reduction method using ascorbic acid (Grasshoff et al, 1983).
<i>PH</i>	:Hydrogen-ion concentration at 25 degree-C as determined by means of the spectrophotometric technique using the indicator dye <i>m</i> -cresol purple (Clayton and Byrne, 1993).
<i>CHL</i>	:Chlorophyll-a in micrograms per liter as determined by means of the fluorometric technique.
<i>PHA</i>	:Phaeopigments in micrograms per liter as determined by means of the fluorometric technique.

Note: Missing value is indicated by a mark “-”.

DATA EXPLANATION

Current Observation

<i>CRUISE NO</i>	:Cruise number identified with the year and consecutive number in the year.
<i>DATE</i>	:Date of beginning and end of the subsurface current observations.
<i>OCEAN AREA</i>	:Observation area.
<i>SHIP</i>	:Ship Code. "KS" is Keifu maru, "RF" is Ryofu maru.

Observed

<i>STA-NO</i>	:Station number given by the ship code suffixed with three digits consecutive number.
<i>DATE/TIME</i>	:Month, day and time of an observation in JST.
<i>LOCATION</i>	:North latitude and east longitude in degrees, minutes and tenth of minutes (if given) with the hemisphere. Negative latitude means the south latitude.
<i>WATER DEPTH</i>	:Water depth to the bottom in meters.
<i>DEPTH(1)</i>	:Depth of the 1st (4th) layer in meters.
<i>DIR/SPEED(1)</i>	:True direction (in degrees) toward which current is flowing and speed given in tenths of knots of the subsurface current for the 1st (4th) layer determined with Acoustic Doppler Current Meter (ACM). When the speed is given as zero, the direction is also given as zero.
<i>DEPTH(2)</i>	:Same as above but for the 2nd (5th) layer.
<i>DIR/SPEED(2)</i>	:idem
<i>DEPTH(3)</i>	:Same as above but for the 3rd (6th) layer.
<i>DIR/SPEED(3)</i>	:idem
<i>TEMPERATURE</i>	:Surface temperature in "the International Temperature Scale of 1990 (ITS-90)".
<i>SALINITY</i>	:Surface salinity in "the Practical Salinity Scale, 1978 (PSS-78)".
<i>CTD STN-NO</i>	:Corresponding station number of hydrographic data.
<i>BT STN-NO</i>	:Corresponding station number of subsurface temperature data.

Note: Missing value is indicated by a mark "-".

Hydrographic Observation

No. 1 -1

STA-NO	LOCATION(Lat.)	LOCATION(Long.)	DATE/TIME(START) (JST)	DATE/TIME(END) (JST)	DEPTH				CRUISE.NO	SUB.NO
K S-5 0 1 2	1 6-0 0 N	1 4 9-2 0 E	2 m 1 2 d 1 2 h 1 2 m	2 m 1 2 d 1 6 h 2 8 m	5 2 9 5 m				1 7-0 1	-
Rem	CTD									

TIME JST	DEPTH m	TEMPERATURE	SALINITY (psu)	O ₂ mol/kg	PO ₄ -P mol/kg	NO ₃ -N mol/kg	NO ₂ -N mol/kg	SiO ₂ mol/kg	pH	CHL g/l	PHA g/l	DEPTH m	TEMPERATURE	SALINITY (psu)	O ₂ mol/kg	σ _t 10 ⁻⁸ m ³ /kg	σ _θ 10 ⁻⁶ m ² /sec ²
1 6 0 7	0	2 7.6 9 2	3 4.5 3 2	2 0 0.6	0 0.5	0 0.0	0 0.0	1.1	.	.	.	0	2 7.5 5 8	3 4.5 0 0	2 0 0.2	5 6 6	0 0 0 0
1 6 2 7	1 1	2 7.6 0 4	3 4.5 8 5	2 0 0.5	0 0.5	0 0.0	0 0.0	1.1	.	.	.	1 0	2 7.4 5 7	3 4.5 5 3	2 0 0.2	5 5 9	0 0 5 7
1 6 2 6	2 5	2 7.3 5 7	3 4.7 7 6	2 0 1.5	0 0.5	0 0.0	0 0.0	1.1	.	.	.	2 0	2 7.4 6 2	3 4.7 2 1	2 0 0.5	5 4 7	0 1 1 2
1 6 2 4	5 0	2 7.3 2 3	3 4.7 7 7	2 0 1.6	0 0.5	0 0.0	0 0.0	1.1	.	.	.	3 0	2 7.4 0 6	3 4.7 6 6	2 0 0.7	5 4 2	0 1 6 7
1 6 2 3	7 5	2 7.2 8 8	3 4.7 8 5	2 0 1.3	0 0.5	0 0.0	0 0.0	1.1	.	.	.	5 0	2 7.3 3 8	3 4.7 7 6	2 0 0.9	5 3 9	0 2 7 6
1 6 2 0	1 0 0	2 6.2 1 8	3 5.0 2 7	2 0 7.9	0 0.7	0 0.1	0 0.0	1.2	.	.	.	7 5	2 7.3 1 7	3 4.7 8 1	2 0 0.9	5 3 8	0 4 1 2
1 6 1 9	1 2 8	2 4.7 4 0	3 5.2 1 5	2 0 1.1	0 0.9	0 0.1	0 0.0	1.3	.	.	.	1 0 0	2 6.9 4 1	3 4.8 8 8	2 0 5.7	5 1 9	0 5 4 7
1 6 1 8	1 5 2	2 3.1 0 1	3 5.2 2 1	1 8 9.4	0 1.7	0 5.6	0 1.4	1.8	.	.	.	1 2 5	2 5.2 8 6	3 5.1 6 0	2 0 3.4	4 5 0	0 6 7 0
1 6 1 6	1 9 9	1 9.1 7 3	3 4.9 3 5	1 8 0.5	0 3.8	4 0.9	0 0.1	3.8	.	.	.	1 5 0	2 3.0 9 8	3 5.2 2 2	1 9 0.2	3 8 3	0 7 7 7
1 6 1 4	2 5 0	1 6.4 2 9	3 4.6 8 3	1 9 8.7	0 4.4	6 0.5	0 0.0	5.3	.	.	.	2 0 0	1 8.1 6 4	3 4.8 5 2	1 8 6.8	2 8 4	0 9 4 6
1 6 1 3	3 0 0	1 3.6 9 8	3 4.4 2 4	1 6 8.7	0 9.6	1 2.8 8	0 0.0	1 2.5	.	.	.	2 5 0	1 5.6 6 7	3 4.6 0 6	1 9 6.8	2 4 5	1 0 8 0
1 6 1 1	3 5 2	1 1.0 0 3	3 4.2 5 3	1 5 7.9	1 3.6	1 8.5 4	0 0.0	2 1.8	.	.	.	3 0 0	1 2.3 4 7	3 4.3 2 2	1 6 5.6	2 0 0	1 1 9 5
1 6 1 0	4 0 1	9.2 8 2	3 4.1 9 2	1 2 9.8	1 7.9	2 4.3 5	0 0.0	3 3.3	.	.	.	4 0 0	9.3 9 6	3 4.1 9 0	1 3 4.9	1 6 0	1 3 8 2
1 6 0 8	4 5 0	7.6 7 1	3 4.1 7 9	9 7.6	2 2.1	3 0.3 0	0 0.0	4 8.6	.	.	.	5 0 0	7.2 7 5	3 4.2 5 6	7 2.4	1 2 4	1 5 3 2
1 6 0 7	5 0 1	6.9 5 2	3 4.2 6 5	6 8.6	2 5.2	3 4.4 1	0 0.0	5 8.5	.	.	.	6 0 0	6.0 8 4	3 4.3 4 3	5 9.0	1 0 3	1 6 5 3
1 6 0 4	6 0 1	6.0 8 8	3 4.3 6 4	5 6.0	2 7.3	3 7.4 7	0 0.0	7 1.4	.	.	.	7 0 0	5.6 3 0	3 4.4 3 9	5 4.8	9 0	1 7 5 8
1 6 0 1	7 0 1	5.5 1 0	3 4.4 5 3	5 6.6	2 8.1	3 8.7 6	0 0.0	7 9.4	.	.	.	8 0 0	5.0 8 8	3 4.4 7 7	6 0.3	8 1	1 8 5 4
1 5 5 9	8 0 1	5.0 1 0	3 4.4 8 8	6 2.6	2 8.3	3 9.1 8	0 0.0	8 7.8	.	.	.	9 0 0	4.6 1 2	3 4.5 1 3	6 5.8	7 3	1 9 4 0
1 5 5 6	9 0 3	4.6 7 9	3 4.5 1 0	6 6.3	2 8.4	3 9.2 6	0 0.0	9 2.5	.	.	.	1 0 0 0	4.2 3 5	3 4.5 2 9	6 8.6	6 8	2 0 2 1
1 5 5 3	1 0 0 4	4.4 0 7	3 4.5 2 3	6 7.3	2 8.6	3 9.7 8	0 0.0	9 8.0	.	.	.	1 2 0 0	3.5 1 7	3 4.5 5 3	8 0.5	5 9	2 1 6 9
1 5 4 7	1 2 0 3	3.7 8 2	3 4.5 4 4	7 6.9	2 8.4	3 9.4 7	0 0.0	1 1 0.5	.	.	.	1 5 0 0	2.8 0 3	3 4.5 8 8	9 3.2	5 0	2 3 6 2
1 5 4 2	1 4 0 3	3.0 7 2	3 4.5 7 4	8 7.5	2 8.0	3 9.2 7	0 0.0	1 2 4.3	.	.	.	2 0 0 0	2.1 3 7	3 4.6 2 3	1 0 7.0	4 2	2 6 4 3
1 5 3 6	1 6 0 2	2.6 9 4	3 4.5 9 2	9 4.1	2 7.8	3 9.2 3	0 0.0	1 3 2.2	.	.	.	2 5 0 0	1.7 8 9	3 4.6 5 1	1 2 1.7	3 8	2 8 9 3
1 5 3 1	1 8 0 2	2.3 6 7	3 4.6 0 8	1 0 0.2	2 7.6	3 9.0 1	0 0.0	1 3 8.7	.	.	.	3 0 0 0	1.6 0 9	3 4.6 6 8	1 3 4.6	3 5	3 1 2 9
1 5 2 6	2 0 0 2	2.1 3 9	3 4.6 2 3	1 0 6.6	2 7.3	3 8.7 5	0 0.0	1 4 2.5	.	.	.	3 5 0 0	1.5 3 4	3 4.6 7 7	1 4 5.2	3 4	3 3 6 0

