R/V Shumpu Maru Cruise SU9209

1 Cruise Narrative

1.1 Highlights

Expedition Designation
Shumpu Maru Cruise SU9209

Chief Scientists
Leg 2:Ichiro TERASHIMA, Kobe Marine Observatory(KMO)

Ship
R/V Shumpu Maru

Ports of Call
Leg 2:Komatsushima to Hososhima

Cruise Dates
Leg 2:September 26 to October 3, 1992

1.2 Cruise Summary

The cruise track and station locations of leg 2 are shown in Figure 1.
The ship departed Komatsushima on September 26, 1992, and made 6 CTD/rosette stations of a section PR17. 4 XBT stations were made between CTD/rosette stations. To the first CTD/rosette station the ship reached at 1802 UTC on September 30, from the last station departed at 2200 UTC on October 1.

The CTD is EG&G NBIS Mark III B(6500 db type,no oxygen sensor). Water samples were collected from 1.7 liter Niskin bottles mounted on the General Oceanics Rosette multisampler. However, surface water samples were collected by a bucket.

1.3 List of Principal Investigators

The principal investigators for all the parameters measured on the cruise are listed in Table 1.

Table 1: Principal Investigators for All Measurements

Name	Responsibility	Affiliation
Ichiro TERASHIMA	Oxygen, Nutrients, PH	KMO
Ryohei OKADA	CTD, Salinity	KMO

1.4 List of Cruise Participants

The cruise participants for leg 2 are listed in Table 2.

Table 2: Cruise Participants for leg 2

Name	Responsibility	Affiliation
Ichiro TERASHIMA	Chief Scientist Oxygen, Nutrients, PH	KMO
Ryohei OKADA	CTD Hardware	KMO
Yasushi TAKATSUKI	CTD Software, Salinity	KMO
Sukeyoshi TAKATANI	Oxygen, Nutrients, PH	KMO
Nobuo SATO	Oxygen, Nutrients, PH	KMO
Hiroki SUZUKI	Oxygen, Nutrients, PH	KMO
Shunta NAITO	Watch Stander	KMO
Keiichi SATO	Watch Stander	KMO
Jun OBATA	Watch Stander	KMO

2 Measurement Techniques and Calibrations

2.1 CTD

The CTD is EG&G NBIS Mark III B(6500 db type, no oxygen sensor).
A HP 9000 Series 300 model 330(Hewlett Packard) with a 4 MByte of memory was used as the primary data collection device.

The temperature and pressure sensor were calibrated at the calibration facility of S¥E¥A CO., LTD before the cruise. The results are shown in Table 3.
Temprature and pressure(increasing) calibration values are used to correct CTD data, by linear interpolation inside the calibrated regime. CTD data outside of the regime is corrected by the calibration values on the boundary, at the each side.

Notice that the upcast pressure data is corrected by Pressure(increasing), not Pressure(decreasing) in Table 3.

Table 3: The temperature and pressure sensor calibration values

Temperature(Caliblated on June 24, pre-cruise)

Standard Temperature	CTD Temperature	Difference
0.9824	1.0009	-0.0185
1.9850	2.0002	-0.0152
2.9856	3.0001	-0.0145
3.9859	4.0003	-0.0145
5.0805	5.0951	-0.0146
7.5588	7.5737	-0.0149
10.6450	10.6601	-0.0151
13.1956	13.2111	-0.0156
15.0509	15.0672	-0.0163
17.4654	17.4825	-0.0171
20.1529	20.1707	-0.0178
25.2091	25.2273	-0.0182
30.1118	30.1305	-0.0188

Pressure(increasing, Caliblated on June 30, pre-cruise)

Standard Pressure	CTD Pressure	Difference
0.0	5.1	-5.1
98.0	102.5	-4.5
293.9	298.3	-4.4
489.9	494.6	-4.7
979.7	986.6	-6.9
1959.5	1967.1	-7.7
2939.2	2944.7	-5.5
3918.9	3922.0	-3.1
4898.6	4900.4	-1.8
5878.4	5880.3	-2.0

Pressure(decreasing, calibiated on June 30, pre-cruise)

Standard Pressure	CTD Pressure	Difference
0.0	5.8	-5.8
98.0	104.8	-6.8
293.9	302.9	-8.9
489.9	500.4	-10.5
979.7	992.1	-12.4
1959.5	1969.7	-10.3
2939.2	2945.6	-6.4
3918.9	3922.1	-3.1
4898.6	4900.3	-1.6
5878.4	5880.3	-2.0

The conductivity sensor were calibrated at sea using data from the analysis

of salinity collected at 5 stations. The salinometer is AUTO-LAB model 1601 for the analyses of salinity of the water samples. The results are shown in Table 4. The calibration constant is determined assuming that the bias 0.

Table 4: The conductivity sensor calibration constants

Bias	Slope
0	1.00009

The temperature of "SU9209.SEA" and "SU????_?.CTD" files are described with the international temperature scale of 1990, ITS-90.

2.2 Oxygen Measurements

The determination of dissolved oxygen was done by the modified version of the Winkler method described in "Kaiyo Kansoku Shishin (Manual of Oceanographic Observation)" published by the Oceanographical Society of Japan(1970).
No estimation of accuracy and precision and reagent blank has been done.

2.3 Nutrients Analyses

The nutrients analyses were done by the Technicon Auto Analyzer II described in "Kaiyo Kansoku Shishin (Manual of Oceanographic Observation)" published by the Oceanographical Society of Japan(1970). No estimation of accuracy and precision has been done.

2.4 PH measurements

The PH measurements were done by the PH meter(Denki Kagaku keiki co.,ltd) described in "Kaiyo Kansoku Shishin (Manual of Oceanographic Observation)" published by the Oceanographical Society of Japan(1970).
No estimation of accuracy and precision has been done.
Notice that the order of measurements is 0.01.

2.5 Notes for the SU9209.SUM, SU9209.SEA and SU????_?.CTD files

The first 2 characters of the file name of *.SUM, *.SEA and *.CTD files are SU for R/V Shumpu maru of Kobe Marine Observatory. These characters are followd by the last two digits of the year and the month for the *.SUM and *.SEA files. For the *.CTD files, the characters SU are followed by the unique station number and the cast number given by the Japan Meteorological Agency.

In "SU9209.SUM", we leave some position column blank(when bucket was used) because not recorded.

In "SU9209.SEA", we leave "sample number (SAMPNO)" column of the surface layer blank, because of using bucket.

All water sample quality flags during this cruise were "3"(or "4","5","9"), because no estimation of accuracy and precision has been made.

In "SU????_?.CTD", we gived the value -9 to "NUMBER OBS.", because we lost the CTD raw data and data number of the observation stations
when the earthquake was occurred in Kobe, Japan, on January 17, 1995.
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