R/V Shumpu Maru Cruise SU9202

1 Cruise Narrative

1.1 Highlights

Expedition Designation
Shumpu Maru Cruise SU9202

Chief Scientists
Leg 4:Nobuo SATO, Kobe Marine Observatory(KMO)

Ship
R/V Shumpu Maru

Ports of Call
Leg 4:Kobe to Kochi

Cruise Dates
Leg 4:February 25 to February 29, 1992

1.2 Cruise Summary

The cruise track and station locations of leg 4 are shown in Figure 1.
The ship departed Kobe on February 25, 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 1030 UTC on February 26, from the last station departed at 1214 UTC on February 27.

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
Sukeyoshi TAKATANI	Oxygen, Nutrients, PH	KMO
Ryohei OKADA	CTD, Salinity	KMO

1.4 List of Cruise Participants

The cruise participants for leg 4 are listed in Table 2.

Table 2: Cruise Participants for leg 4

Name	Responsibility	Affiliation
Nobuo SATO	Chief Scientist Oxygen, Nutrients, PH	KMO
Ryohei OKADA	CTD Hardware CTD Software	KMO
Sukeyoshi TAKATANI	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
Akiyoshi AWANO	Watch Stander	KMO
Yasuji HATA	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 January 31, pre-cruise)

Standard Temperature	CTD Temperature	Difference
1.9726	1.9872	-0.0146
3.5818	3.5966	-0.0148
5.2368	5.2514	-0.0146
7.4751	7.4903	-0.0152
10.2274	10.2434	-0.0160
12.5938	12.6111	-0.0173
15.0394	15.0582	-0.0188
20.1280	20.1500	-0.0220
25.1896	25.2145	-0.0248
30.1553	30.1818	-0.0265

Pressure(increasing, Caliblated on January 31, pre-cruise)

Standard Pressure	CTD Pressure	Difference
0.0	4.5	-4.5
98.0	102.1	-4.1
293.9	297.8	-3.8
489.9	494.3	-4.3
979.8	986.2	-6.3
1959.6	1966.6	-7.0
2939.5	2944.1	-4.6
3919.3	3921.3	-2.1
4899.1	4899.8	-0.7
5878.9	5879.7	-0.8

Pressure(decreasing, calibiated on January 31, pre-cruise)

Standard Pressure	CTD Pressure	Difference
0.0	5.1	-5.1
98.0	104.1	-6.1
293.9	302.0	-8.1
489.9	499.6	-9.7
979.8	991.4	-11.6
1959.6	1969.0	-9.3
2939.5	2944.8	-5.4
3919.3	3921.4	-2.1
4899.1	4899.7	-0.6
5878.9	5879.7	-0.8

We collectted water samples at 5 stations to decide the conductivity sensor calibration constants, and done salinity analyses by using the salinometer,

AUTO-LAB model 1601. But the measured salinity value of the water samples were too low to decide the calibration constants, for example, 34.634(pss) for the sample collectted at the depth of 3782 decibar in pressure.

In the result, we assume the conductivity sensor calibration constants in Table 4, not using the measured salinity value of the water samples.

Table 4: The conductivity sensor calibration constants

Bias	Slope
0	1.00000

The temperature of "SU9202.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 SU9202.SUM, SU9202.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 "SU9202.SUM", we leave some position column blank(when bucket was used) because not recorded.

In "SU9202.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.