5.18 Chlorophyll *a* of sampled water

(1) Personal (*: Leg-1, **: Leg-2, ***: Leg-1+2)

Kunio Yoneyama*	(JAMSTEC)	- Principal Investigator (Leg-1)
Masaki Katsumata***	(JAMSTEC)	- Principal Investigator (Leg-2)
Masahiro Orui*	(MWJ)	- Operation leader (Leg-1)
Hironori Sato*	(MWJ)	
Kanako Yoshida*	(MWJ)	
Satoshi Ozawa*	(MWJ)	
Shinsuke Toyoda*	(MWJ)	
Shungo Oshitani*	(MWJ)	
Yuuki Miyajima*	(MWJ)	
Miyo Ikeda**	(MWJ)	- Operation leader (Leg-2)
Shinichiro Yokogawa**	(MWJ)	

(2) Objectives

We measured total chlorophyll *a* in seawater by using the fluorometric method.

(3) Instruments and Methods

(a) Reagents

Standard; chlorophyll *a* standard (SIGMA-ALDRICH Japan K.K.)

Extraction and dilution solutions; N,N-dimethylformamide
(Wako Pure chemical Industries, Ltd.)

Acidification reagent; 1.0 M HCl (Wako Pure chemical Industries, Ltd.)

(b) Instruments

Spectorophotometer: UV-2400PC, manufactured by SHIMADZU CORPORATION

Fluorometer : 10-AU-005 manufactured by Turner Designs

Analytical condition was listed in table 5.18-1.

(c) Method

Acidification method (Holm-Hansen *et al.*, 1965)

(4) Sampling

Following procedure is based on “Fluorometric determination of chlorophyll” (Holm-Hansen *et al.*, 1965). We collected samples from 10 - 12 depths between the surface and 500 m with bucket and Niskin bottles attached to the CTD-system.

Water samples were transferred to shading Nalgene bottles (ca. 500 cm^3) from bucket and Niskin bottles. After sampling, water samples were vacuum-filtrated (<0.02MPa) through 25mm-diameter Whatman GF/F filter. Phytoplankton pigments retained on the filters were immediately extracted in a polypropylene tube with 7 ml of N,N-dimethylformamide. The tubes were stored at –20°C under the dark condition to extract chlorophyll *a* for 24 hours or more.

(5) Standardization

The fluorometer was calibrated with a chlorophyll *a* standard in each cruise. The chlorophyll *a* standard concentration was determined by spectorophotometer. We prepared 9 dilutions from the chlorophyll *a* standard. Dilutions measuring with the fluorometer were taken before (F_o) and after acidification (F_a) with 2 drops 1.0 M HCl. We calculated linear calibration factor (K_x) and the acidification coefficient (F_m) from dilutions measurement data. The blank of DMF also measured with the fluorometer. The Blank value was subtracted from F_o and F_a.

(6) Sample measurement

Following extraction, samples were removed from freezer in the dark room and the fluorometer was allowed to warm up and stabilize for 1 hour prior to measure. We measured Working Standard solution (ca. 20-30 ug/L) and DMF blank each 10 - 15 samples. Working Standard solution was measured for corrected K_x and F_m. All samples were measured on board.

(7) Repeatability of sample measurement

During this cruise we measured Total chlorophyll *a* concentration in 2415 seawater samples at 211 casts. Replicate samples were taken at every CTD casts. The relative standard deviation of the replicate measurement was shown the table 5.18-2.

(8) Preliminary Results

The result of total chlorophyll *a* was shown as the vertical distribution (Figure 5-18).

(9) Data archive

All data will be submitted to JAMSTEC Data Management Office (DMO).

(10) Reference

(1) Holm-Hansen, O., Lorenzen, C. J., Holmes, R.W., J. D. H. Strickland 1965.Fluorometric determination of chlorophyll. *J. Cons. Cons. Int. Explor. Mer.* 30, 3-15.

(2) SHIMADZU CORPORATION 1996. UV-2400PC Instruction manual

(3) TURNER Designs 1992. MODEL 10-AU-005 LABORATORY FIELD FLUOROMETER USER'S MANUAL

Table 5.18-1: Analytical conditions of “Acidification method” for chlorophyll *a* with Turner Designs fluorometer (10-AU-005)

	Acidification method
Excitation filter (nm)	340-500
Emission filter (nm)	>665
Lamp	Daylight White

Table 5.18-2: Repeatability of sample measurement

Leg	Leg1	Leg2
Number of replicate samples	97	114
R.S.D. (%)	4.8	3.2

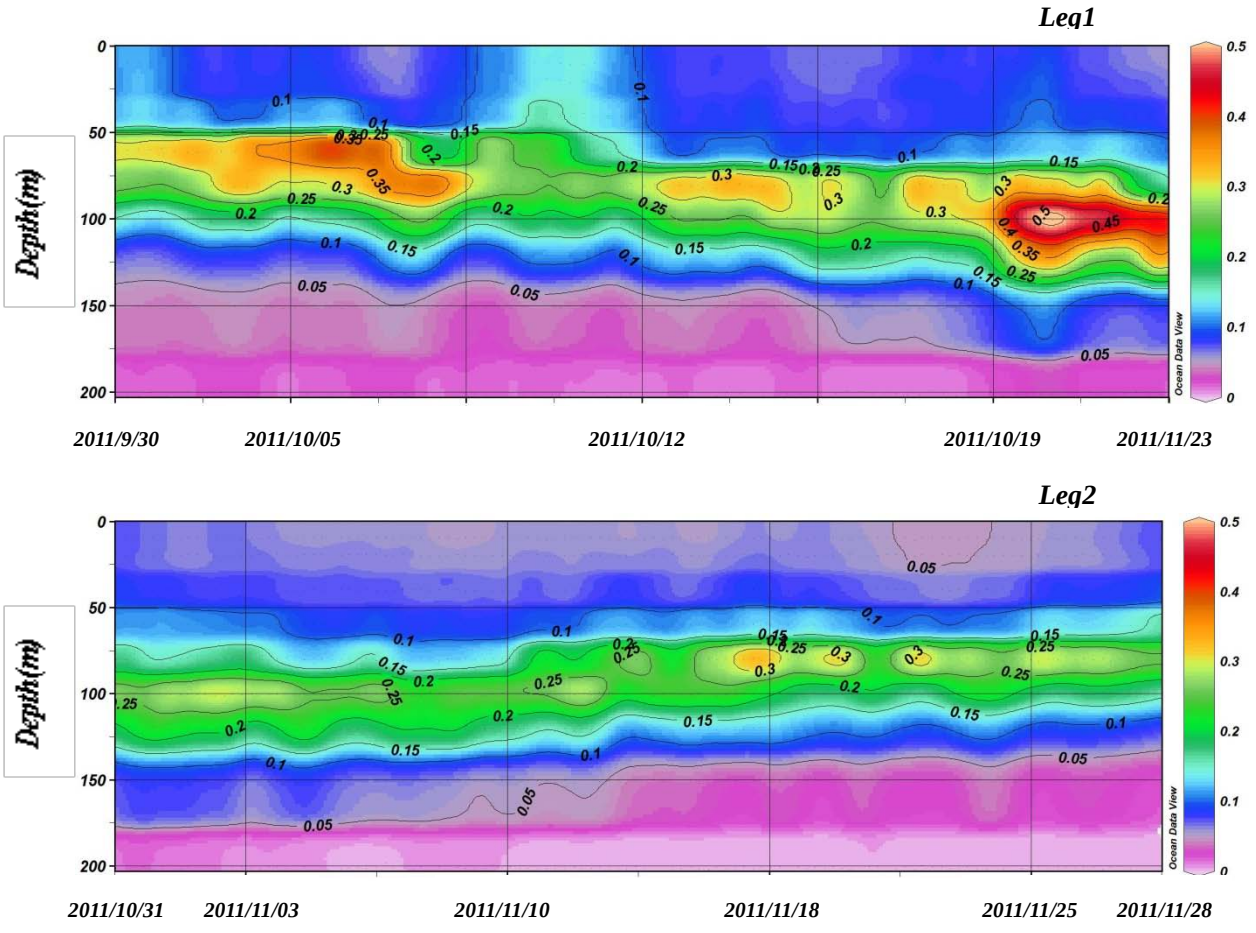

Figure 5.18-1: Vertical distribution of chlorophyll *a* concentration (μg/L) at Stn.8S in this cruise.