

5.13 Continuous monitoring of surface seawater

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(2) Objective

Our purpose is to obtain salinity, temperature, dissolved oxygen, and fluorescence data continuously in near-sea surface water.

(3) Instruments and Methods

The Continuous Sea Surface Water Monitoring System (Marine Works Japan Co. Ltd.) has four sensors and automatically measures salinity, temperature, dissolved oxygen and fluorescence in near-sea surface water every one minute. This system is located in the “*sea surface monitoring laboratory*” and connected to shipboard LAN-system. Measured data, time, and location of the ship were stored in a data management PC. The near-surface water was continuously pumped up to the laboratory from about 4 m water depth and flowed into the system through a vinyl-chloride pipe. The flow rate of the surface seawater was adjusted to be $4.5 \text{ dm}^3 \text{ min}^{-1}$. Specifications of the each sensor in this system are listed below.

a. Instruments

Software

Seamoni-kun Ver.1.20

Sensors

Specifications of the each sensor in this system are listed below.

Temperature and Conductivity sensor

Model: SBE-45, SEA-BIRD ELECTRONICS, INC.

Serial number: 4563325-0362

Measurement range: Temperature -5 to +35 °C

Conductivity 0 to 7 S m⁻¹

Initial accuracy: Temperature 0.002 °C

Conductivity 0.0003 S m⁻¹

Typical stability (per month): Temperature 0.0002 °C

Conductivity 0.0003 S m⁻¹

Resolution: Temperatures 0.0001 °C

Conductivity 0.00001 S m⁻¹

Bottom of ship thermometer

Model: SBE 38, SEA-BIRD ELECTRONICS, INC.

Serial number: 3857820-0540
 Measurement range: -5 to +35 °C
 Initial accuracy: ±0.001 °C
 Typical stability (per 6 month): 0.001 °C
 Resolution: 0.00025 °C

Dissolved oxygen sensor

Model: OPTODE 3835, AANDERAA Instruments.
 Serial number: 1519
 Measuring range: 0 - 500 $\mu\text{mol dm}^{-3}$
 Resolution: <1 $\mu\text{mol dm}^{-3}$
 Accuracy: <8 $\mu\text{mol dm}^{-3}$ or 5% whichever is greater
 Settling time: <25 s

Fluorometer

Model: C3, TURNER DESIGNS
 Serial number: 2300123

(4) Preliminary Result

We took the surface water samples to compare sensor data with bottle data of salinity and dissolved oxygen and fluorescence. Periods of measurement, maintenance, and problems during MR11-07 are listed in Table 5.13-1.

Table 5.13-1 Events list of the surface seawater monitoring during MR11-07

System Date [UTC]	System Time [UTC]	Events	Remarks
2011/09/25	12:00	All the measurements started and data was available.	Leg 1 start.
2011/10/14	16:38-16:41	Fluorescence measurements was stopped for C3 maintenance	
2011/10/26	00:00	All the measurements stopped.	Leg 1 end.
2011/10/29	00:00	All the measurements started and data was available.	Leg 2 start.
2011/12/1	03:00	All the measurements stopped.	Leg 2 end.

The results are shown in Fig.5.13-1~3. All the salinity samples were analyzed by the Guideline 8400B "AUTOSAL", and dissolve oxygen samples were analyzed by Winkler method, and fluorescence were analyzed by 10-AU.

(5) Data archive

These data obtained in this cruise will be submitted to the Data Management Office (DMO) of JAMSTEC, and will be opened to the public via "R/V Mirai Data Web Page" in JAMSTEC home page.

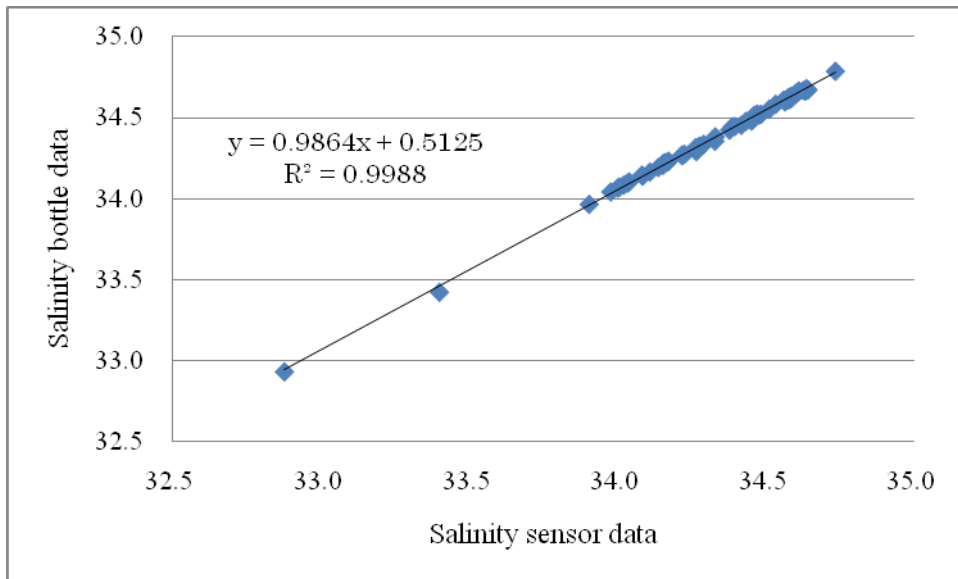


Fig.5.13-1 Correlation of salinity between sensor data and bottle data.

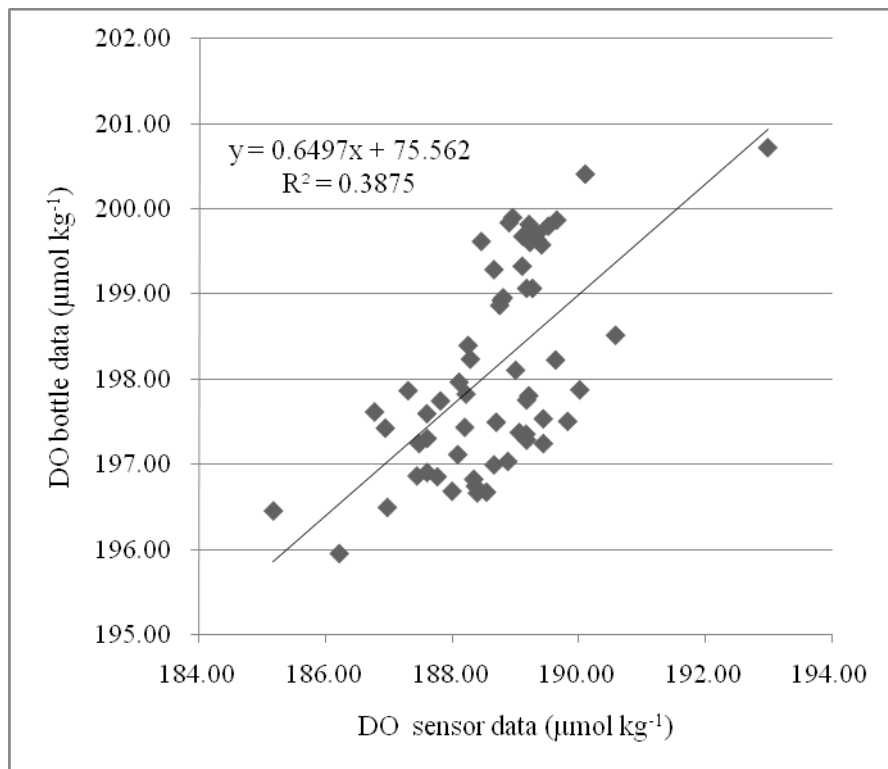


Fig.5.13-2 Correlation of dissolved oxygen between sensor data and bottle data.

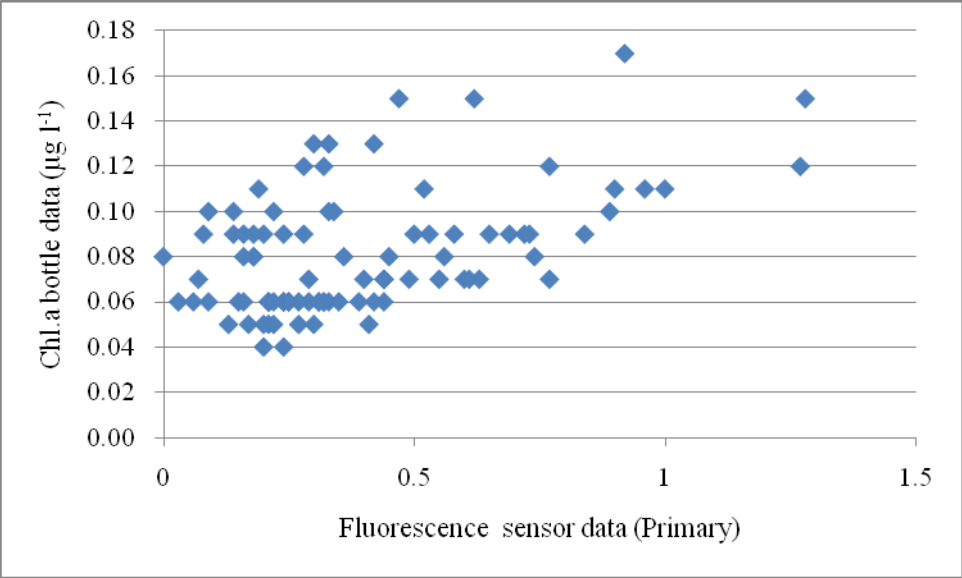


Fig.5.13-3 Correlation of fluorescence between sensor data and bottle data.