***5. Underway chlorophyll-a***

*31 March 2023*

**(1) Personnel**

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**(2) Method**

The Continuous Sea Surface Water Monitoring System of fluorescence (Nippon Kaiyo, Japan) automatically had been continuously measured seawater which is pumped from a depth of about 4.5 m below the maximum load line to the laboratory. The flow rate of the surface seawater was controlled by several valves and adjusted to about 0.6 L min−1. The sensor in this system is a fluorometer 10-AU (S/N: 1100411 (RF22-05) and S/N 7063 (RF22-06 and RF22-07), Turner Designs, United States).

**(3) Observation log**

The chlorophyll-*a* continuous measurements were conducted during the entire cruise; from 27 Jul. to 19 Aug., 2022 in RF22-05, 24 Aug. to 15 Sep., 2022 in RF22-06, and from 29 Sep. to 17 Oct., 2022 in RF22-07.

**(4) Water sampling**

Surface seawater was corrected from outlet of water line of the system at nominally 1 day intervals. The seawater sample was measured in the same procedure as hydrographic samples of chlorophyll-*a* (see Chapter C9 “Phytopigments”).

**(5) Calibration**

At the beginning and the end of legs, a raw fluorescence value of sensor was adjusted in sensitivity of the sensor using deionized water and a rhodamine 0.1ppm solution measured.

After the cruise, the fluorescence value was converted to chlorophyll-*a* concentration by programs in the system based on nearby water sampling data (chlorophyll-*a* concentration and distance from location of sensor data).

**(6) Data**

Underway fluorescence and chlorophyll-*a* data is distributed in JMA format in “49UP20220727\_P09\_underway\_chl.csv”. The record structure of the format is as follows;

Column1 DATE: Date (YYYYMMDD) [JST]

Column2 TIME: Time (HHMM) [JST] (= UTC + 9h)

Column3 LATITUDE: Latitude

Column4 LONGITUDE: Longitude

Column5 FLUOR: Fluorescence value (RFU)

Column6 CHLORA: Chlorophyll-*a* concentration (g L−1)

Column7 BTLCHL: Chlorophyll-*a* concentration of water sampling (g L−1).

**(7) Problems**

On RF22-05, raw fluorescence values of sensor drifted over time. We determined that there was a problem with the quality of the observation data.

The fluorometer was replaced from RF22-06, and no problems occurred on RF22-06 and RF22-07.