

Minicosm Optics Data Processing

Nils Haëntjens Oct 25, 2017

Measurements

The angular scatterance (BETA, scattering angle of 124 deg and a wavelength of 470, 532, 650, and 700 nm), chlorophyll a fluorescence (FCHL), and fluorescent dissolved organic matter (FDOM) of the minicosm was measured by a WetLabs ECO-BB3 and ECO-FLBBCD2K (serial number 1093 and 4701 respectively). They were operated one after the other, facing down in the minicosm (~1 cm from the surface) with the propeller and light of the Minicosm off.

No measurements are recorded for the first minicosm experiment TYR. In the table of data for the ION experiment, C1 minicosm at T-12, the measurements are from the in-line system of the boat as that correspond to the time at which the minicosm are filled with seawater.

Instruments calibration

WetLabs ECO-FLBBCD2K serial number 4701 was new and operated for the first time during the PEACETIME expedition. The calibration coefficients (from April 4, 2017) were provided by the manufacturer.

Channel	Slope factor	Dark count
FCHL	0.0073	45
BETA(124,700)	1.639e-6	45
FDOM	0.0909	44

WetLabs ECO-BB3 serial number 1093 was calibrated by James Sullivan on Feb. 11, 2015 using .1 um beads. The dark values correspond to the median of the value measured during a dark profile to 200 m (no significant variability was observed with depth). The dark profile, realized during the PEACETIME expedition, was done by taping the face of the sensor with black electrical tape.

Channel	Slope factor	Dark count
BETA(124,470)	5.99e-6	50
BETA(124,532)	3.88e-6	16
BETA(124,650)	1.89e-6	29

Processing

The median of approximately 1 minute of measurement at 1 Hz is computed and converted from counts to scientific units using the equation below:

$$su = \text{slope_factor} \times (\text{count} - \text{dark_count})$$

With su being BETA, FCHL, or FDOM depending on the slope factor and dark count used. The *counts* correspond to the values output by the instrument.

Note: The serial number of the ECO-BB3 is not 349 but 1093 this was due to a mistake in serial numbers when sensor were sent for calibration. The BB3-349 is the one from Toby Westberry used during the 4 NAAMES cruises. The sensors 349 and 1093 were used separately on the Tara Polar Circle. The mistake may be due to a scraped off sticker on the LOV sensor

(1093). Based on email from Emmanuel Boss to James Sullivan on Fri, Dec 25, 2015 at 10:02 PM.