Dataset: Profiling float surface dates, times and locations from the Sargasso Sea from 2013 to 2014.

Project(s): Rapid, Autonomous Particle Flux Observations in the Oligotrophic Ocean (RapAutParticleFlux)

Abstract: Optical proxy measurements of sinking particle flux and water-column bio-optical profiles were obtained from profiling floats in the Sargasso Sea to expand the number of particle flux observations in the critical and under-sampled “twilight zone”. A typical float cycle consisted of the descent to the target park depth, a park phase at the target depth which cycled among depths ranging 150-1000 m, a descent to 1000 m, an ascent to the surface during which measurements are made, and a surface telemetry phase, during which a GPS fix is obtained. Dates, times, and locations obtained during the surface telemetry phase are provided. For a complete list of measurements, refer to the supplemental document 'Field_names.pdf', and a full dataset description is included in the supplemental file 'Dataset_description.pdf'. The most current version of this dataset is available at: http://www.bco-dmo.org/dataset/728359

Description: Profiling float surface dates, times and locations from the Sargasso Sea from 2013 to 2014

Profiling float surface dates, times and locations from the Sargasso Sea from 2013 to 2014.

Acquisition Description: Profiling float surface dates, times and locations from the Sargasso Sea.

Related References:

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Processing Description: **BCO-DMO Data Processing Description:**
-Reformatted column names to comply with BCO-DMO standards.
-Added ISO_DateTime_UTC column.
-Data were originally organized into multiples files and have been consolidated for display here.

Project Information

Rapid, Autonomous Particle Flux Observations in the Oligotrophic Ocean

Particles settling into the deep ocean remove carbon and biologically-important trace elements from sunlit, productive surface waters and from contact with the atmosphere over short timescales. A shifting balance among physical, chemical, and biological processes determines the ultimate fate of most particles at depths between 100 and 1,000 m, where fluxes are hardest to measure. Our challenge is to expand the number of particle flux observations in the critical "twilight zone", something that has proven elusive with ship-based “snapshots” that have lengths of, at most, a few weeks. Here, we propose an optical, transmissometer-based method

to make particle flux observations from autonomous, biogeochemical profiling floats. Novel developments in data interpretation, sensor operation, and platform control now allow flux measurements at hourly resolution and give us observational access to the water-column processes driving particle flux over short timescales. The sensors and float platforms that we propose to use are simple, robust, and commercially-available, making them immediately compatible with community-scale efforts to implement other float-based biogeochemical measurements. We have two main goals: First, we will quantify particulate organic carbon (POC) flux using float-based optical measurements by validating our observations against fluxes measured directly with neutrally-buoyant, drifting sediment traps. Second, we will evaluate the contribution of rapid export events to total POC fluxes in the oligotrophic ocean by using a biogeochemical profiling float to collect nearly-continuous, depth-resolved flux measurements and coupled, water-column bio-optical profiles. To achieve these goals, we will implement a work plan consisting of 1) a set of laboratory-based sensor calibration experiments to determine detection limits and evaluate sensitivity to particle size; 2) a series of four sediment trap and biogeochemical float co-deployments during which we will collect POC flux and field calibration data; and 3) a long-term sampling and analysis period (approximately 1 year) during which data will be returned by satellite from the biogeochemical float. We will conduct calibration fieldwork in conjunction with monthly Bermuda Atlantic Time-series Study (BATS) cruises, taking advantage of the timeseries measurements and the context provided by the 25-year record of POC flux at that site. The data returned by the float will comprise the first quantitative particle flux observations made at high-enough temporal resolution to interpret in the context of short-term, upper-ocean production events.

Deployment Information

Deployment description for R/V Atlantic Explorer AE1315

BATS cruise

Deployment description for R/V Atlantic Explorer AE1318

BATS cruise

Deployment description for R/V Atlantic Explorer AE1320

BATS cruise

Deployment description for R/V Atlantic Explorer AE1323

BATs cruise

Deployment description for R/V Atlantic Explorer AE1402

BATS cruise
