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

**Website**: https://www.bco-dmo.org/dataset/728359
**Data Type**: Cruise Results
**Version**: 1
**Version Date**: 2018-04-17

**Project**
» Rapid, Autonomous Particle Flux Observations in the Oligotrophic Ocean (RapAutParticleFlux)

**Program**
» Ocean Carbon and Biogeochemistry (OCB)

| Contributors | Affiliation | Role |
|---|---|---|
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**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.

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## Coverage

**Spatial Extent**: **N**:34.7787 **E**:-61.1357 **S**:28.3441 **W**:-69.1118
**Temporal Extent**: 2013-07-06 - 2014-11-24

## Dataset Description

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

### Methods & Sampling

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

### Data 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.

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## Data Files

| File |
|---|
| **metadata.csv** (Comma Separated Values (.csv), 13.92 KB) MD5:e267cedc401c52e2aee9a39714632632<br>Primary data file for dataset ID 728359 |

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## Related Publications

Benson, B. B., & Krause, D. (1984). The concentration and isotopic fractionation of oxygen dissolved in freshwater and seawater in equilibrium with the atmosphere1. Limnology and Oceanography, 29(3), 620–632. doi:10.4319/lo.1984.29.3.0620
*General*

Bittig, H. C., Fiedler, B., Fietzek, P., & Körtzinger, A. (2015). Pressure Response of Aanderaa and Sea-Bird Oxygen Optodes. Journal of Atmospheric and Oceanic Technology, 32(12), 2305–2317. doi:10.1175/jtech-d-15-0108.1 https://doi.org/10.1175/JTECH-D-15-0108.1
*General*

Boss, E., & Pegau, W. S. (2001). Relationship of light scattering at an angle in the backward direction to the backscattering coefficient. Applied Optics, 40(30), 5503. doi:10.1364/ao.40.005503 https://doi.org/10.1364/AO.40.005503
*General*

Briggs, N., Perry, M. J., Cetinić, I., Lee, C., D'Asaro, E., Gray, A. M., & Rehm, E. (2011). High-resolution observations of aggregate flux during a sub-polar North Atlantic spring bloom. Deep Sea Research Part I: Oceanographic Research Papers, 58(10), 1031–1039. doi:10.1016/j.dsr.2011.07.007
*Methods*

Estapa, M. L., Buesseler, K., Boss, E., & Gerbi, G. (2013). Autonomous, high-resolution observations of particle flux in the oligotrophic ocean. Biogeosciences, 10(8), 5517–5531. doi:10.5194/bg-10-5517-2013
*Results*

Garcia, H. E., & Gordon, L. I. (1992). Oxygen solubility in seawater: Better fitting equations. Limnology and Oceanography, 37(6), 1307–1312. doi:10.4319/lo.1992.37.6.1307
*General*

Morgan, P.P., Pender, L., (1993) SEAWATER. MATLAB Central File Exchange. Retrieved August 8, 2017. https://www.mathworks.com/matlabcentral/fileexchange/47595-mixing--mx--oceanographic-toolbox-for-em-apex-float-data
*Software*

Thierry, V., Bittig, H., Gilbert, D., Kobayashi, T., Kanako, S., & Schmid, C. (2016). Processing Argo oxygen data at the DAC level cookbook (Version 2.2). Ifremer. https://doi.org/10.13155/39795
*General*

Weiss, R. F., & Price, B. A. (1980). Nitrous oxide solubility in water and seawater. Marine Chemistry, 8(4), 347–359. doi:10.1016/0304-4203(80)90024-9

*General*

Xing, X., Claustre, H., Boss, E., Roesler, C., Organelli, E., Poteau, A., … D'Ortenzio, F. (2016). Correction of profiles of in-situ chlorophyll fluorometry for the contribution of fluorescence originating from non-algal matter. Limnology and Oceanography: Methods, 15(1), 80–93. doi:10.1002/lom3.10144
*General*

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## Parameters

| Parameter | Description | Units |
|---|---|---|
| deployment | Deployment numbers for two Sea-Bird Scientific Navis BGCi floats. For short-term deployments (1.5-3 days), the BATS cruise number from which the float was deployed. For long-term deployments, the serial number of the float (F033 or F034). | unitless |
| date | Date of surface GPS fix; yyyy/mm/dd. | unitless |
| time | Time of surface GPS fix. | unitless |
| lat | Latitude | decimal degrees |
| lon | Longitude | decimal degrees |
| ISO_DateTime_UTC | DateTime; ISO UTC formatted | unitless |

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## Deployments

**Estapa_2013**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/682684 |
| **Platform** | shoreside SargassoSea |
| **Start Date** | 2013-11-19 |
| **End Date** | 2014-11-24 |

**AE1315**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/729072 |
| **Platform** | R/V Atlantic Explorer |
| **Report** | http://ezid.cdlib.org/id/doi:10.7284/903354 |
| **Start Date** | 2013-07-06 |
| **End Date** | 2013-07-12 |
| **Description** | BATS cruise |

**AE1318**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/729047 |
| **Platform** | R/V Atlantic Explorer |
| **Report** | http://ezid.cdlib.org/id/doi:10.7284/903360 |
| **Start Date** | 2013-08-01 |
| **End Date** | 2013-08-10 |
| **Description** | BATS cruise |

**AE1320**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/729045 |
| **Platform** | R/V Atlantic Explorer |
| **Report** | http://ezid.cdlib.org/id/doi:10.7284/903281 |
| **Start Date** | 2013-09-15 |
| **End Date** | 2013-09-21 |
| **Description** | BATS cruise |

**AE1323**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/729043 |
| **Platform** | R/V Atlantic Explorer |
| **Report** | http://ezid.cdlib.org/id/doi:10.7284/903370 |
| **Start Date** | 2013-10-18 |
| **End Date** | 2013-10-23 |
| **Description** | BATs cruise |

**AE1402**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/729041 |
| **Platform** | R/V Atlantic Explorer |
| **Report** | http://ezid.cdlib.org/id/doi:10.7284/903364 |
| **Start Date** | 2014-03-04 |
| **End Date** | 2014-03-08 |
| **Description** | BATS cruise |

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## Project Information

**Rapid, Autonomous Particle Flux Observations in the Oligotrophic Ocean (RapAutParticleFlux)**

**Coverage**: Sargasso Sea

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.

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## Program Information

**Ocean Carbon and Biogeochemistry (OCB)**

**Website**: http://us-ocb.org/

**Coverage**: Global

The Ocean Carbon and Biogeochemistry (OCB) program focuses on the ocean's role as a component of the global Earth system, bringing together research in geochemistry, ocean physics, and ecology that inform on and advance our understanding of ocean biogeochemistry. The overall program goals are to promote, plan, and coordinate collaborative, multidisciplinary research opportunities within the U.S. research community and with international partners. Important OCB-related activities currently include: the Ocean Carbon and Climate Change (OCCC) and the North American Carbon Program (NACP); U.S. contributions to IMBER, SOLAS, CARBOOCEAN; and numerous U.S. single-investigator and medium-size research projects funded by U.S. federal agencies including NASA, NOAA, and NSF.

The scientific mission of OCB is to study the evolving role of the ocean in the global carbon cycle, in the face of environmental variability and change through studies of marine biogeochemical cycles and associated ecosystems.

The overarching OCB science themes include improved understanding and prediction of: 1) oceanic uptake and release of atmospheric CO2 and other greenhouse gases and 2) environmental sensitivities of biogeochemical cycles, marine ecosystems, and interactions between the two.

The OCB Research Priorities (updated January 2012) include: ocean acidification; terrestrial/coastal carbon fluxes and exchanges; climate sensitivities of and change in ecosystem structure and associated impacts on biogeochemical cycles; mesopelagic ecological and biogeochemical interactions; benthic-pelagic feedbacks on

biogeochemical cycles; ocean carbon uptake and storage; and expanding low-oxygen conditions in the coastal and open oceans.

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## Funding


| Funding Source | Award |
| --- | --- |
| NSF Division of Ocean Sciences (NSF OCE) | OCE-1406552 |


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