

# Photosynthetically available radiation (PAR) profiles from a LI-COR 192-SA sensor on Biofloat 48 in the subpolar North Atlantic and Iceland Basin in 2008 (NAB 2008 project)

Website: <https://www.bco-dmo.org/dataset/3428>

Version: 08 March 2011

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## Project

» [North Atlantic Bloom Experiment 2008](#) (NAB 2008)

## Program

» [Ocean Carbon and Biogeochemistry](#) (OCB)

Contributors	Affiliation	Role
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## Dataset Description

Calibrated PAR (photosynthetically available radiation) profiles acquire by LI-COR 192-SA downwelling Plane Irradiance sensor

## Data Processing Description

In situ photosynthetically active radiation (PAR; parameter name PAR): Using factory-supplied calibration factors, the LI-COR 192SA PAR sensor has a stated NIST-traceable accuracy of +/- 5% in air, stability of less than +/- 2%. Reported values for in situ PAR from the float 48 LI-COR 192-SA sensor do not match those computed by spectral integration from the TriOS hyperspectral downwelling irradiance (ACC) sensor (parameter name acc.par); a systematic bias exists between the two PAR values. Further, using matchups when the float was at the surface, neither LI-COR PAR or TriOS PAR match PAR values computed from various R/V Knorr 193-03 PAR sensors. Shading of the LI-COR sensor is possible by the top-mounted CTD, GPS/Argos antennas, and float ring supports; effects of this shading has not been quantified. The effects of self-shading due to the 1 m square drogue deployed during drift mode have not yet been quantified. For more details, see Radiometry\_and\_PAR\_Calibration-NAB08.pdf.

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## Data Files

File
<b>Biofloat_48_licor.csv</b> (Comma Separated Values (.csv), 3.85 MB) MD5:94f507c97cb7de34c637a1d5b30e3c46
Primary data file for dataset ID 3428

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## Parameters

Parameter	Description	Units
Cruise_ID	Cruise identifier	dimensionless
float_cycle	index counting float cycles	dimensionless
mode	0 = down profile 1 = settle 2 = up profile 3 = drift_iso 5 = drift_ml	dimensionless
julian_day_yr0	time when sample was taken in decimal days since Jan-0-0000 (Matlab)	dimensionless
latitude	latitude	decimal degrees
longitude	longitude	decimal degrees
start_date	date sampling begins	YYYYMMDD
start_time	time sampling begins	HHMM
end_date	date sampling ends	YYYYMMDD
end_time	time sampling ends	HHMM
press	water pressure at measurement	decibars
depth	depth at which sample was taken	meters
temp	Temperature	degrees Celsius
potemp	Potential Temperature	degrees Celsius
sal	Salinity	dimensionless
sigma_0	water potential density minus 1000	kilograms/meter <sup>3</sup>
PAR	Calibrated photosynthetically available radiation (PAR)	micromol photons per meter squared per second
yrday	Yearday 2008. Yearday 1 is 2008-01-01:00:00:00Z	dimensionless

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## Instruments

<b>Dataset-specific Instrument Name</b>	Lagrangian Float
<b>Generic Instrument Name</b>	Lagrangian Float
<b>Dataset-specific Description</b>	The 2008 North Atlantic Bloom Experiment (NAB08) employed a "Lagrangian float", custom built at the University of Washington Applied Physics Laboratory. (D'Asaro, 2003, Performance of Lagrangian Floats, Journal of Atmospheric and Oceanic Technology, Vol. 20, 896-911).
<b>Generic Instrument Description</b>	Built at the University of Washington Applied Physics Laboratory, the Lagrangian Float is not an ARGO float. It is primarily designed to accurately follow the three-dimensional motion of water parcels within the mixed layer, through a combination of neutral buoyancy and high drag provided by a one meter diameter black drogue. Typical buoyancies of a few grams result in vertical velocities relative to the water of a few mm/s, small compared to the cm/s turbulent velocities in the mixed layer. The float's motion within the mixed layer thus closely imitates that of a planktonic organism. The float can also profile vertically. It sends data and receives commands using the Iridium satellite system. The float is designed to accommodate a wide variety of sensors.

<b>Dataset-specific Instrument Name</b>	LI-COR Biospherical PAR Sensor
<b>Generic Instrument Name</b>	LI-COR Biospherical PAR Sensor
<b>Generic Instrument Description</b>	The LI-COR Biospherical PAR Sensor is used to measure Photosynthetically Available Radiation (PAR) in the water column. This instrument designation is used when specific make and model are not known.

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## Deployments

### Biofloat 48

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58147">https://www.bco-dmo.org/deployment/58147</a>
<b>Platform</b>	Biofloat 48
<b>Start Date</b>	2008-04-04
<b>End Date</b>	2008-05-25
<b>Description</b>	See document NAB08Float48SamplingMethodologyV1.pdf for complete information on Biofloat 48's modes, cycles, and sampling intervals for each sensor. BioFloat 48 was a Lagrangian float deployed during cruise B4-2008 of the vessel R/S Bjarni Saemundsson.

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## Project Information

### North Atlantic Bloom Experiment 2008 (NAB 2008)

**Coverage:** North Atlantic, 60 &deg; North

NAB2008 was a process experiment designed to study an important component of the oceanic carbon system - the North Atlantic spring bloom. The phytoplankton bloom occurring each spring in the North Atlantic, drives the uptake of carbon dioxide and is an important component of the biological pump (Bagniewski et al., 2010). Previous studies in this region have shown the importance of small temporal and spatial scales, i.e. ecosystem patchiness, during the bloom, but were restricted by the limitations of ship-based sampling. Recent advances in autonomous platforms and sensors presented an opportunity to study this important event in a new way. In addition to deployment of a diverse suite of *in situ* sampling devices, NAB2008 was also a test-bed for developing the strategies and knowledge needed to successfully use new methods to drive the next generation of ocean observations.

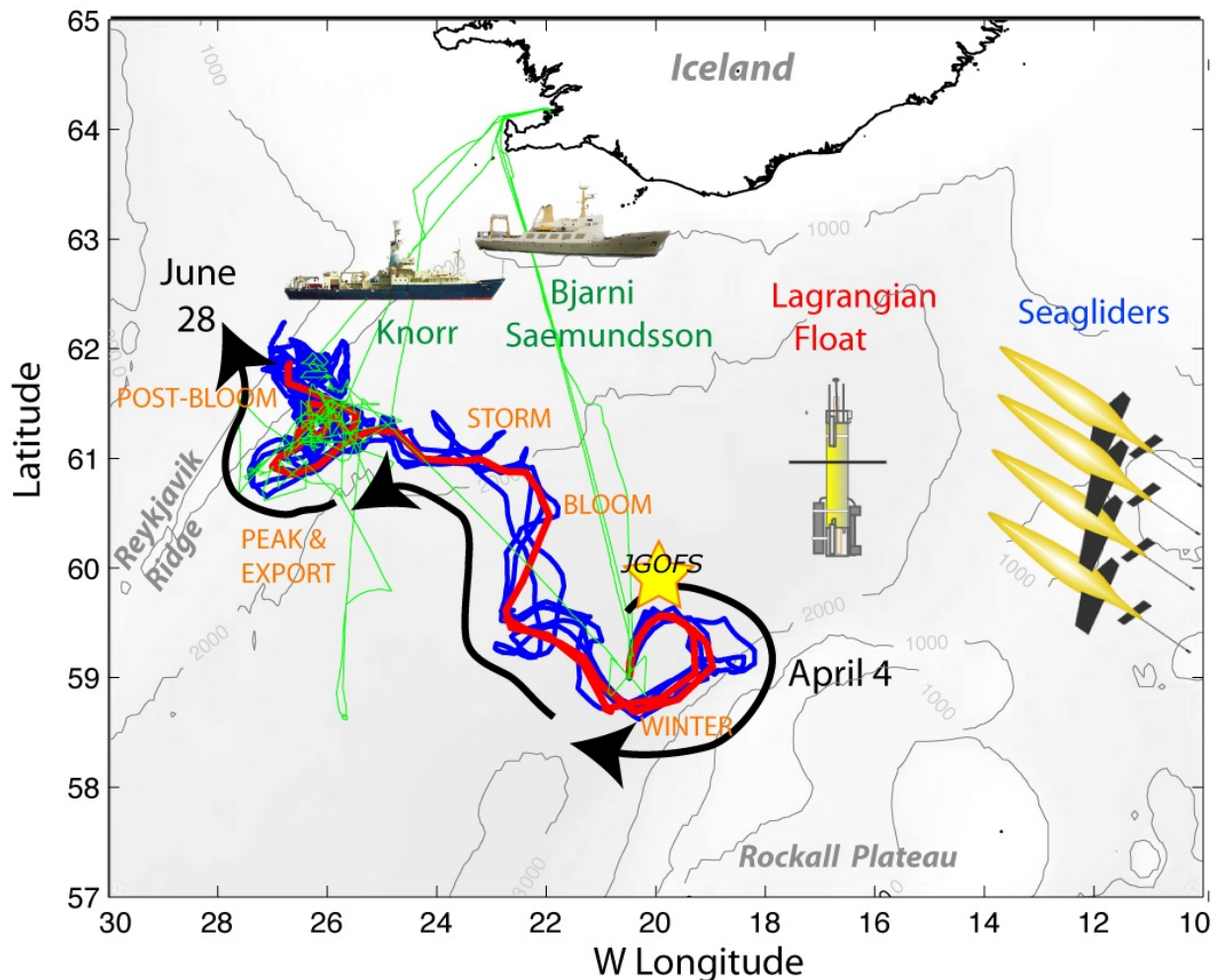
In 2008, a coordinated deployment of 1 float, 4 Seagliders and 2 research vessels sampled the evolution of the North Atlantic spring bloom along and surrounding the nearly Lagrangian path followed by the float. The autonomous measurements were continuous through the experimental period, and included CTD, chlorophyll fluorescence, optical backscatter, and oxygen on all platforms; and nitrate, optical attenuation, and various radiance measurements on the float. Velocities were determined from the vehicle motion, with the float extending to a depth of 230 meters and gliders to 1,000 meters. The autonomous vehicles were deployed, rescued, and recovered on three cruises of the Icelandic vessel Bjarni Saemundsson. A 21-day cruise of the R/V Knorr conducted more detailed measurements during the peak of the bloom in May. The R/V Knorr sampling program included optical profiles, ADCP data and analysis of water samples for nutrients, particulate organic carbon, pigments, micro-plankton composition, complemented by guest investigator analyses. Data from both ships were used to calibrate and validate the autonomous measurements.

**References:**

Bagniewski, W., Fennel, K., Perry, M. J., and D'Asaro, E. A. (2010) Optimizing models of the North Atlantic spring bloom using physical, chemical and bio-optical observations from a Lagrangian float, *Biogeosciences Discuss.*, 7, pp. 8477-8520, doi:10.5194/bgd-7-8477-2010

[NAB08 preprints](#)

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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 CO<sub>2</sub> 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
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0628107</a>
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0628379</a>

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