Mixed-layer depths at the Ocean Observatories Initiative's Irminger Sea Array from 2014 to 2022

Website: https://www.bco-dmo.org/dataset/998890
Data Type: Other Field Results
Version: 1
Version Date: 2026-05-19

Project
» CAREER: Constraining the high-latitude ocean carbon cycle: Leveraging the Ocean Observatories Initiative (OOI) Global Arrays as marine biogeochemical time series (OOI Global BGC time series)

Contributors	Affiliation	Role
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Abstract
This dataset contains a mixed-layer depth (MLD) time series for the Ocean Observations Initiative (OOI) Global Irminger Sea Array (59.97°N, 39.51°W) from September 2014 to July 2022. Mixed-layer depths are determined for this site using a combination of OOI wire-following profiler, glider, and fixed depth mooring data, with Argo data used to fill late summer gaps. For full details see Text S9 in Yoder et al. (2024).

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Coverage

Location: Subpolar North Atlantic (60° N, 39.5° W)
Spatial Extent: **N**:59.975 **E**:-39.482 **S**:59.969 **W**:-39.531
Temporal Extent: 2015-01-02 - 2022-08-31

Methods & Sampling

The data presented here were collected by the OOI Global Irminger Sea Array Apex Surface Mooring (SUMO), Apex Wire Following Profiler Mooring (WFP), Flanking Mooring A (DOI: 10.58046/OOI-GI03FLMA), Flanking Mooring B(DOI: 10.58046/OOI-GI03FLMA) and Mobile Assets (gliders). Unprocessed data are available at the OOI THREDDS Data Server and OOI Raw Data Archive. Links and DOIs of the instruments and servers can be found under the related datasets section below.

The Argo data used to create the mixed-layer depth climatology (Holte et al., 2017) were collected and made freely available by the International Argo Program and the national programs that contribute to it. (http://www.argo.ucsd.edu, http://argo.jcommops.org). The Argo Program is part of the Global Ocean Observing System. doi.org/10.17882/42182#56126

Data Processing Description

Mixed layer depths are determined for this site using a combination of OOI WFP, glider, and fixed depth mooring data, with Argo data used to fill late summer gaps; for full details see Text S9 in Yoder et al. (2024).

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Related Datasets

IsRelatedTo

Ocean Observatories Initiative. (2014). *Irminger Sea Mobile Assets* [Dataset]. Ocean Observatories Initiative. https://doi.org/10.58046/OOI-GI05MOAS

Ocean Observatories Initiative. (2014). *Irminger Sea Profiler Mooring* [Dataset]. Ocean Observatories Initiative. https://doi.org/10.58046/OOI-GI02HYPM

Ocean Observatories Initiative. (2014). *Irminger Sea Surface Mooring* [Dataset]. Ocean Observatories Initiative. https://doi.org/10.58046/OOI-GI01SUMO

Ocean Observatories Initiative. (n.d.). OOI THREDDS Data Server: Catalog. Retrieved May 19, 2026, from https://thredds.dataexplorer.oceanobservatories.org/thredds/catalog/ooigoldcopy/public/catalog.html

Ocean Observatories Initiative. (n.d.). OOI raw data files [Data set]. Retrieved May 19, 2026, from https://rawdata.oceanobservatories.org/files/

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Parameters

Parameter	Description	Units
Date	Date, UTC timezone	unitless
MLD	Mixed layer depth	decibar (db)

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Project Information

CAREER: Constraining the high-latitude ocean carbon cycle: Leveraging the Ocean Observatories Initiative (OOI) Global Arrays as marine biogeochemical time series (OOI Global BGC time series)

NSF Award Abstract:
The ocean absorbs a large fraction of the atmospheric carbon dioxide generated by the burning of fossil fuels. Much of this uptake occurs in high latitude (polar) regions of the ocean. However, current monitoring capabilities in the polar ocean are limited. The Ocean Observatories Initiative (OOI) aims to address this need by providing 25 years of continuous physical and biogeochemical sensor data from autonomous platforms in the high latitude ocean. This CAREER project will improve understanding of the marine carbon cycle in the high latitude ocean using OOI data. The science team will use biogeochemical data collected by the OOI sensors to monitor long term changes in carbon cycling processes. In addition, this CAREER project includes educational activities to broaden participation in oceanographic research. The lead scientist will develop a new research seminar course to provide training and research opportunities for undergraduate students. A series of educational videos will be created to showcase the use and application of OOI data. The videos will be used in college level courses at three universities. This project will provide training opportunities for eight

undergraduate students, two doctoral students, and one postdoctoral researcher.

This CAREER project will utilize marine biogeochemical time series data from Ocean Observatories Initiative (OOI) locations in the subpolar North Atlantic and subarctic Northeast Pacific to evaluate the relative roles of biological, chemical, and physical processes driving the ocean’s carbon sink. The project seeks to improve the usability of OOI biogeochemical (BGC) sensor data and leverage these marine BGC time series data to determine changes in carbon cycling processes in the subpolar North Atlantic and subarctic Northeast Pacific Oceans. This research is key for predicting long term perturbations due to climate change and for understanding how changes in carbon cycling in these regions will influence carbon sequestration. The objectives of this project are to: 1) quantify the rates and drivers of carbon cycling and long-term carbon sequestration in the subpolar North Atlantic and subarctic Northeast Pacific Oceans and 2) determine the mechanistic controls on the ocean carbon sink due to inter-related biological, chemical, and physical processes over >10 years at each array site. The high temporal resolution BGC data collected by the arrays will improve understanding of the sampling resolution needed to capture key carbon cycling processes and test the hypothesis that short-time scale events during spring phytoplankton blooms and strong winter storms play a significant role in the overall annual carbon cycle. Education activities associated with this CAREER project include a series of educational videos about OOI and use of the data it provides that will be incorporated into undergraduate courses, a new research seminar course for undergraduates, and research opportunities for undergraduate and graduate students as well as a postdoctoral researcher.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2338450

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