

# Seaglider 658 profile data from a deployment from April to August 2022 on the Northeast US shelf deployed from the R/V Armstrong cruise AR66-A

**Website:** <https://www.bco-dmo.org/dataset/942906>

**Data Type:** Other Field Results

**Version:** 1

**Version Date:** 2024-11-05

## Project

» [Collaborative Research: Investigating meso- and submeso-scale variability in air-sea CO<sub>2</sub> exchange in the Gulf Stream region with autonomous platforms](#) (Gulf Stream Glider)

Contributors	Affiliation	Role
<a href="#">Gray, Alison</a>	University of Washington (UW)	Principal Investigator
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## Abstract

These profile data were collected by a Seaglider (serial number 658), carrying a Seabird CT0344 to measure temperature, salinity, and pressure; Aanderaa 4831IW to measure oxygen; and Wetlabs BBFL2IRB to measure optical properties of seawater (CDOM and chlorophyll fluorescence, and scattering). It profiled 561 times, typically between the surface and 1000 m (or within 10 m of the seafloor, if shallower) on the Northeast US continental shelf. The Seaglider was deployed at 2022-04-09 from 39.847459 °N, 70.731300W and last collected profiling data 2022-08-29 at 40.96°N and 70.87°W. The purpose of the deployment was to collect water column information beneath two Saildrone uncrewed surface vehicles also collecting data in the region. The project was funded by NSF-OCE, with co-PIs Alison Gray (UW), Jaime Palter and Lora Van Uffelen (URI).

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## Coverage

**Location:** Slope Sea, North Atlantic, approximately 40°N, 70W.

**Spatial Extent:** N:40.280105 E:-69.167727 S:38.404096 W:-72.388847

**Temporal Extent:** 2022-04-09 - 2022-08-29

## Dataset Description

This BCO-DMO dataset contains supplementary information and supporting metadata for this deployment. NetCDF files for the deployment are available at

[https://gandalf.gcoos.org/data/gandalf/uri/sg658/2022/2022\\_04\\_08/process...](https://gandalf.gcoos.org/data/gandalf/uri/sg658/2022/2022_04_08/process...)

\* See the "Related Datasets" section for more details of these data holdings and archived version at NCEI accessed through NOAA OneStop.

## Methods & Sampling

Seaglider 658 was deployed from the R/V Armstrong AR66-A (Cruise DOI: 10.7284/909534) and recovered from a small fishing boat in Rhode Island Sound.

All data were collected by factory-calibrated sensors carried by the Seaglider. Calibration files and characterization sheets for sensors are available under "Supplemental Files" of this dataset page.

Many sensor and engineering parameters are available in the self-describing netcdfs at [https://gandalf.gcoos.org/data/gandalf/uri/sg658/2022/2022\\_04\\_08/processed\\_data/nc\\_files/](https://gandalf.gcoos.org/data/gandalf/uri/sg658/2022/2022_04_08/processed_data/nc_files/)

\* See the "Related Datasets" section for more details of these data holding and archived version at NCEI accessed through NOAA OneStop.

Some examples of the sensor data are:

"pressure". [dbar]. Uncorrected sea-water pressure at pressure sensor

"temperature". [deg C] Temperature (in situ) corrected for thermistor first-order lag

"conductivity". [S/m] Conductivity corrected for anomalies

"Salinity" [PSU] Salinity corrected for thermal-inertia effects (PSU)

"aanderaa4831\_dissolved\_oxygen" [umol/kg] Dissolved oxygen concentration, calculated from optode tcphase corrected for salinity and depth

(see supplemental file "NetCDF header information" for more information about the structure and contents of the netCDF files.

## Data Processing Description

Binary files were internally logged on the Seaglider. These were converted to self-describing netcdf files (one per profile) and uploaded to the Gandalf server <https://gandalf.gcoos.org/>. No additional post processing was performed on these data.

Data were archived at NCEI after the mission was marked as completed. "sg658-20220408T0000" <https://data.noaa.gov/onestop/collections/details/4f9132fd-d275-4035-8ded-45e4c6f66f5e> (See "Related Datasets" section for more details).

## Problem Description

No known problems.

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## Related Datasets

### IsSupplementTo

Palter J, Gray A, Currier R. (2022). Seaglider SG658 profile data. Sustained Underwater Glider Observations for Improving Atlantic Tropical Cyclone Intensity Forecasts. NOAA Onestop [database] ID: sg658-20220408T0000. Available from <https://data.noaa.gov/onestop/collections/details/4f9132fd-d275-4035-8ded-45e4c6f66f5e>

Palter, J., Gray, A., Currier, R. (2022) Seaglider SG658 temperature and salinity profiles (ID:sg658-20220507T032111, format version gandalf\_sg2gdac.py V1). Available from [https://gandalf.gcoos.org/data/gandalf/uri/sg658/2022/2022\\_04\\_08/processed\\_data/nc\\_files/](https://gandalf.gcoos.org/data/gandalf/uri/sg658/2022/2022_04_08/processed_data/nc_files/)

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## Parameters

*Parameters for this dataset have not yet been identified*

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## Instruments

<b>Dataset-specific Instrument Name</b>	Aanderaa 4831IW, serial number 747
<b>Generic Instrument Name</b>	Aanderaa 4831F (fast-response) oxygen optode
<b>Generic Instrument Description</b>	A stand-alone oxygen optode with integrated temperature sensor, manufactured by Aanderaa. This instrument exploits the physio-chemical principle of dynamic fluorescence quenching to measure absolute oxygen concentration and percent saturation. Depth rating: 300 m, 3000 m or 6000 m; oxygen concentration accuracy of < 8 $\mu$ M or 5 %, and resolution of < 1 $\mu$ M; air saturation accuracy of < 5 %, and resolution of 0.4 %; response time (63 %): < 8 s.

<b>Dataset-specific Instrument Name</b>	Seabird CTD, serial number 0344
<b>Generic Instrument Name</b>	CTD Sea-Bird 41
<b>Dataset-specific Description</b>	model extracted from profile .nc metadata instrument_ctd:make_model = "Seabird SBE41"
<b>Generic Instrument Description</b>	The Sea-Bird SBE 41 CTD module was originally developed in 1997 for integration with sub-surface oceanographic floats. It uses MicroCAT Temperature, Conductivity, and Pressure sensors.

<b>Dataset-specific Instrument Name</b>	Kistler Piezoresistive Pressure Sensor 4260M091, serial number 5023276
<b>Generic Instrument Name</b>	Pressure Sensor
<b>Generic Instrument Description</b>	A pressure sensor is a device used to measure absolute, differential, or gauge pressures. It is used only when detailed instrument documentation is not available.

<b>Dataset-specific Instrument Name</b>	Wetlabs BBFL2IRB, serial number 5366
<b>Generic Instrument Name</b>	WETLabs ECO FLBB scattering fluorescence sensor
<b>Generic Instrument Description</b>	A dual-optical-sensor that carries a single-wavelength chlorophyll fluorometer (470nm ex/695nm em) and backscattering sensor (700 nm) that measures phytoplankton and particle concentration. It operates by using blue (470nm) and red (700 nm) LEDs that alternately flash. The blue LED stimulates chlorophyll fluorescence in plants while the red light illuminates the total particle field. The backscattering sensor has an in-water centroid angle of 142 degrees and can be calibrated to measure turbidity. The fluorometer can typically measure phytoplankton concentrations in the range 0-30 ug/l, with a sensitivity of 0.015 ug/l. The backscattering sensor can measure within the range 0-3 m <sup>-1</sup> , with a sensitivity of 0.0015 m <sup>-1</sup> . The instrument output in the standard version is digital and uses a low power mode and stores data. Other variants are used. The instrument is rated to a depth of 600m as standard, with the options of deeper instruments rated up to 6000m and instruments with bio-wipers, rated to 300 m. This instrument comes in the following optional models: FLbb(RT), FLbb(RT)D, FLbbB, FLbbS, FLbbBS, FLbb2k. Refer to the datasheet from the manufacturer: <a href="https://www.seabird.com/asset-get.download.jsa?id=55460873804">https://www.seabird.com/asset-get.download.jsa?id=55460873804</a>

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## Deployments

### AR66-A

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/942923">https://www.bco-dmo.org/deployment/942923</a>
<b>Platform</b>	R/V Neil Armstrong
<b>Start Date</b>	2022-04-08
<b>End Date</b>	2022-04-17

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## Project Information

### **Collaborative Research: Investigating meso- and submeso-scale variability in air-sea CO<sub>2</sub> exchange in the Gulf Stream region with autonomous platforms (Gulf Stream Glider)**

#### *NSF Award Abstract:*

The Gulf Stream current in the North Atlantic Ocean transports a large amount of warm water from south to north. Much of this heat is lost to the atmosphere as cold winds blow over the ocean. This heat loss causes local changes in the solubility of carbon dioxide in seawater and increases mixing of the upper ocean. Both of these impacts affect the ocean's ability to take up carbon dioxide from the atmosphere. Knowledge of the ocean's carbon uptake in this region is important for our ability to understand and predict the global carbon cycle that determines atmospheric carbon dioxide levels. Conditions in the Gulf Stream region change rapidly and are hard to sample, however. In this project, investigators will deploy a robotic glider for several weeks to measure temperature and salinity in the upper 1000 meters of the Gulf Stream region. The glider will overlap with other robotic vehicles called Saldrones that take measurements of surface waters and the atmosphere. Together these vehicles will produce a picture of ocean conditions and carbon uptake that is not possible with short-term sampling from ships. This project will support an early career scientist, a postdoctoral scholar, and a graduate student.

In this project, the Principal Investigators (PIs) will deploy one autonomous glider during the late spring-early

summer of 2022 that will measure subsurface ocean properties in upper 1000 m of the Gulf Stream region. This glider will target the waters around three Saldrones that are deployed in this area through an independent project funded by Google.org. Uncrewed surface vehicles such as Saldrone autonomously measure surface oceanic and atmospheric variables at high temporal resolution but generally lack subsurface observations. The water column data from the glider and the surface data from the Saldrones will allow the PIs to test the effectiveness of the synergy of the glider-Saldrone combination as a method to holistically characterize the ocean variability on the scale of tens of kilometers.

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
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-2148276</a>

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