Water column properties and carbon geochemistry from R/V Blackbeard and R/V Neil Armstrong cruises in coastal North Carolina in 2018 and 2019

Website: https://www.bco-dmo.org/dataset/880442
Version: 1
Version Date: 2022-09-13

Project
» 2018 Hurricane Season: RAPID: Associated Priming of Carbon in the Albemarle-Pamlico Estuarine System (APES), the Mid-Atlantic Bight and Gulf Stream (GSPS Hurricane)

Contributors	Affiliation	Role
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Abstract
These data include station ID, collection date, vessel, time, location, water depth, salinity, and temperature from cruises in the Albemarle-Pamlico Estuarine System, Coastal North Carolina, at the Western Edge of Gulf Stream in 2018 and 2019. These samples were collected in coastal North Carolina to investigate the impacts of the 2018 hurricane season.

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Coverage

Spatial Extent: **N**:35.9033 **E**:-74.8322 **S**:35.3767 **W**:-75.8613
Temporal Extent: 2018-10-25 - 2019-07-03

Methods & Sampling

Bulk surface water collection, boatside, using nitrile gloves. Water collected in HDPE bottles.

Issue report:
Time of Collection was not noted for two sample collections.

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Related Datasets

IsRelatedTo

Mitra, S., Field, E., Corbett, D. R. (2022) **Water and sediment microbial sequence accession and collection information from R/V Blackbeard and R/V Neil Armstrong cruises in coastal North Carolina in 2018 and 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-09-13 http://lod.bco-dmo.org/id/dataset/880479 [view at BCO-DMO]
Relationship Description: These datasets were generated from samples and measurements collected concurrently during the same cruises.

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Parameters

Parameter	Description	Units
PROJECT	Project label. GSPS = Gulf Stream Pamlico Sound (GSPS).	unitless
Collection_Vessel	Vessel name	unitless
Station_ID	Station identifier	unitless
DATE	Collection date (EST) in ISO 8601 format YYYY-MM-DD	unitless
Time	Collection time (EST) in format hh:m	unitless
ISO_DateTime_UTC	Collection timestamp (UTC) in ISO 8601 format YYYY-MM-DDThh:mmZ	unitless
Latitude	Collection latitude	unitless
Longitude	Collection longitude	unitless
Water_Depth	Water depth where sample was collected.	meters (m)
Temp	Temperature	Degrees Celsius (deg C)
Salinity	Salinity	Practical Saliinty Units (PSU)
TSS	Total suspended solids (TSS)	micrograms per gram (ug/g)
SL8	Lignin on suspended solids (SL8)	milligrams per gram (mg/g)
DL8	Dissolved phase lignin (DL8)	micrograms per liter (ug/L)
DOC	Dissolved Organic Carbon (DOC)	milligrams per liter (mg/L)
Replicate	Replicate identifier	unitless

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Instruments

Dataset-specific Instrument Name	Shimadzu QP2010S
Generic Instrument Name	Gas Chromatograph Mass Spectrometer
Generic Instrument Description	Instruments separating gases, volatile substances or substances dissolved in a volatile solvent by transporting an inert gas through a column packed with a sorbent to a detector for assay by a mass spectrometer.

Dataset-specific Instrument Name	YSI Salinometer
Generic Instrument Name	Salinometer
Generic Instrument Description	A salinometer is a device designed to measure the salinity, or dissolved salt content, of a solution.

Dataset-specific Instrument Name	Shimadzu TOCVPN
Generic Instrument Name	Total Organic Carbon Analyzer
Generic Instrument Description	A unit that accurately determines the carbon concentrations of organic compounds typically by detecting and measuring its combustion product (CO2). See description document at: http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/bs116.pdf

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Deployments

AR33

Website	https://www.bco-dmo.org/deployment/880475
Platform	R/V Neil Armstrong
Start Date	2018-11-17
End Date	2018-11-28

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Project Information

2018 Hurricane Season: RAPID: Associated Priming of Carbon in the Albemarle-Pamlico Estuarine System (APES), the Mid-Atlantic Bight and Gulf Stream (GSPS Hurricane)

Coverage: Albemarle-Pamlico Estuarine System and Gulf Stream

NSF Award Abstract:

In the early fall of 2018, two Atlantic hurricanes (Florence and Michael) deposited substantial amounts of rainfall in North Carolina. The Albemarle-Pamlico Estuarine System (APES), which was impacted by these storms, is the

second largest estuary in the United States, receiving freshwater from the Coastal Plain region of North Carolina and bounded on its seaward side by the Outer Banks (OBX). The exchange of water and suspended materials between the APES and the Atlantic Ocean occurs through three inlets (Oregon, Hatteras, and Ocracoke Inlets). This proposed research explores the overarching hypothesis that extreme precipitation from the 2018 Hurricane Season flushed land-derived organic material and microbes into the APES and that material will be exported into the North Atlantic through the OBX inlets, and impact coastal ocean ecosystems. The project will support a graduate student and two undergraduates. The investigators will present a summary of this research and synopsis of the impacts from the 2018 Hurricane Season to the OBX coastal community through the "Science on the Sound" presentation series at the Coastal Studies Institute.

The investigators propose two research questions to address their hypothesis: 1) will the pulse of the terrigenous dissolved organic matter and microbes from Florence and Michael change the regional Gulf Stream from a net sink to a net source of carbon dioxide to the atmosphere, and 2) will deposition of this elevated organic material and nutrients to the seabed seaward of the inlets, promote anaerobic and fermentation processes that will lead to algal blooms in surface waters adjacent to the Gulf Stream? Because marine dissolved organic matter is a highly complex and polydisperse mixture of different compounds, its priming and biodegradation resulting from the storms, even at rudimentary levels, may significantly affect coastal carbon cycling.

Large uncertainties exist in the regional carbon budgets of North America. Intense rain events (as defined by the upper 0.3% of daily rain events) and Category 4 and 5 Atlantic hurricanes are predicted to increase in frequency in extratropical regions, globally. Also, the erosion and entrainment of the substantial amounts of land-derived organic matter, nutrients, and microbes, collectively contribute to broad spatial and temporal uncertainties in regional carbon budgets. This study will provide data reducing these uncertainties in the Atlantic seaboard, in an area adjacent to the Gulf Stream.

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.

Acronym:
Gulf Stream Pamlico Sound (GSPS)

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1902496

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