

# Discrete data on hydrography (from CTD casts) and chemical analyses of dissolved nutrients and organic carbon on the Louisiana-Texas shelf in the Gulf of Mexico from R/V Acadiana cruise 18-21 September 2017

**Website:** <https://www.bco-dmo.org/dataset/844709>

**Data Type:** Cruise Results

**Version:** 1

**Version Date:** 2021-03-10

## Project

» [Collaborative Research: A RAPID response to Hurricane Harvey's impacts on coastal carbon cycle, metabolic balance and ocean acidification](#) (HarveyCarbonCycle)

Contributors	Affiliation	Role
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## Abstract

Discrete data on hydrography (from CTD casts) and chemical analyses of dissolved nutrients and organic carbon on the Louisiana-Texas shelf in the Gulf of Mexico from R/V Acadiana cruise 18-21 September 2017.

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## Coverage

**Spatial Extent:** N:29.64179 E:-90.2275 S:28.3825 W:-93.42667

**Temporal Extent:** 2017-09-18 - 2017-09-21

## Dataset Description

**Usage note:** Time zone information was not received by BCO-DMO so it is unknown if the dates and times in this dataset are local or UTC. Please contact the dataset PI if you have questions about this.

## Methods & Sampling

Conductivity, Temperature and Depth (CTD) data and water samples were collected at various depths across 23 stations (total n = 68) from the Louisiana-Texas shelf in the Gulf of Mexico using the *R/V Acadiana* between September 18, 2017 and September 21, 2017. At all stations, a vertical profile of salinity, dissolved oxygen concentration and temperature was collected using a CTD. The CTD rosette was equipped with 6, 4 L Niskin bottles for collecting aqueous samples at specific depths. Water samples were collected using a single Niskin

bottle per depth and were analyzed across various analytical instruments for nutrient concentrations.

Water samples were collected using a single Niskin bottle per depth on the CTD rosette. Samples for dissolved inorganic nutrients and dissolved organic carbon / total nitrogen were analyzed following the methods detailed in Roberts and Doty (2015) and Mason et al. (2016). Specifically, one Niskin bottle, water samples for dissolved inorganic nutrients ( $\text{NO}_3^- + \text{NO}_2^-$ ,  $\text{NO}_2^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{SiO}_2$ , and  $\text{NH}_4^+$ ) were analyzed in duplicate using a Lachat Instruments QuikChem FIA+ 8000 Series Automated Ion Analyzer with an ASX-400 Series XYZ autosampler after being filtered through acid-cleaned (10% HCl), 47 mm diameter, 0.2  $\mu\text{m}$  pore size, membrane filters (Pall SuporR-200) under low vacuum pressure. Samples were analyzed for dissolved  $\text{NO}_3^- + \text{NO}_2^-$  (by Cu-Cd reduction followed by azo dye colorimetry),  $\text{PO}_4^{3-}$  (by the automated ascorbic acid reduction method),  $\text{SiO}_2$ , and dissolved  $\text{NH}_4^+$  (by phenate colorimetry) (APHA, 1992). Dissolved  $\text{NO}_2^-$  was determined separately by azo dye colorimetry (without Cu-Cd reduction). Standard curves were prepared using certified standard stock solutions (Hach, Loveland CO) and yielded  $r^2$  values of  $\geq 0.999$ .  $\text{NO}_3^-$  concentration was determined by difference between  $\text{NO}_3^- + \text{NO}_2^-$  and  $\text{NO}_2^-$ .

Dissolved organic carbon (DOC) and total dissolved nitrogen (TDN) concentrations were measured at least in triplicate on a Shimadzu TOC-VCSH Analyzer with TNM-1 Module (MDL 1.5  $\mu\text{mol C L}^{-1}$ , 0.3  $\mu\text{mol N L}^{-1}$ ; Shimadzu Scientific Instruments, Columbia, MD) after being filtered through combusted (450°C), 47mm diameter Whatman GF/F filters under low vacuum pressure. Concentrations of dissolved organic nitrogen (DON) were determined by difference [ $\text{DON} = \text{TDN} - \text{DIN}$ ].

All water chemistry data went through quality control checks. CTD instrument probes were calibrated prior to cruise departure.

## Data Processing Description

CTD data were processed on Seabird's SBEDDataProcessing-Win32.

BCO-DMO Processing:

- renamed fields to conform with BCO-DMO naming conventions;
- changed year from 2019 to 2017 for station F7, bottle 1.

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## Data Files

File
<b>sept_2017_discrete.csv</b> (Comma Separated Values (.csv), 10.82 KB) MD5:af4acb227331fd8f89a8e12547b60f27
Primary data file for dataset ID 844709

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## Related Publications

APHA. 1992. Standard Methods for the Examination of Water and Wastewater, 18th Edn. Washington, DC : American Public Health Association.

*Methods*

Mason, O. U., Canter, E. J., Gillies, L. E., Paisie, T. K., & Roberts, B. J. (2016). Mississippi River Plume Enriches Microbial Diversity in the Northern Gulf of Mexico. *Frontiers in Microbiology*, 7. doi:[10.3389/fmicb.2016.01048](https://doi.org/10.3389/fmicb.2016.01048)

*Methods*

Roberts, B. J., & Doty, S. M. (2015). Spatial and Temporal Patterns of Benthic Respiration and Net Nutrient Fluxes in the Atchafalaya River Delta Estuary. *Estuaries and Coasts*, 38(6), 1918–1936. doi:[10.1007/s12237-015-9965-z](https://doi.org/10.1007/s12237-015-9965-z)

*Methods*

## Related Datasets

### IsRelatedTo

Roberts, B. (2022) **Discrete data on hydrography (from CTD casts) and chemical analyses of dissolved nutrients and organic carbon on the Louisiana-Texas shelf in the Gulf of Mexico from R/V Pelican cruise 28 September - 11 October 2017.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-03-17 doi:10.26008/1912/bco-dmo.844721.1 [[view at BCO-DMO](#)]

## Parameters

Parameter	Description	Units
Cruise	Cruise identification	unitless
Type	Type of cast (CTD)	unitless
DateTime	Date and time of sample collection	unitless
Date	Date of sample collection	unitless
Time	Time of sample collection	unitless
Station	Location of sample collection	unitless
Bottle_Depth	Depth of the sample bottle at collection	meters (m)
Longitude	Longitude, west is negative	decimal degrees North
Latitude	Latitude, south is negative	decimal degrees East
Bottle	Bottle number on the CTD	unitless
Depth	Depth of CTD at sample collection	meters (m)
Temperature	CTD water temperature in degrees Celsius	degrees C
Salinity	CTD salinity in practical salinity units (PSU)	PSU

OxygenSBE	CTD dissolved oxygen concentration	micromoles per kilogram (umol/kg)
NO3_NO2	Sample total NOx (nitrate + nitrite) concentration	micromoles per liter (umol N/L)
NO2	Sample nitrite concentration	micromoles per liter (umol N/L)
NO3_calculated	Calculated sample nitrate concentration	micromoles per liter (umol N/L)
NH4	Sample ammonium concentration	micromoles per liter (umol N/L)
DIN_calculated	Calculated dissolved inorganic nitrogen concentration	micromoles per liter (umol N/L)
PO4	Sample phosphate concentration	micromoles per liter (umol P/L)
SiO2	Sample silicate concentration	micromoles per liter (umol Si/L)
DOC	Sample dissolved organic carbon concentration	micromoles per liter (umol C/L)
TDN	Sample total dissolved nitrogen concentration	micromoles per liter (umol N/L)
DON_calculated	Calculated dissolved organic nitrogen concentration	micromoles per liter (umol N/L)

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## Instruments

<b>Dataset-specific Instrument Name</b>	Seabird SBE 19plus V2 SeaCAT Profiler CTD
<b>Generic Instrument Name</b>	CTD Sea-Bird SBE SEACAT 19plus
<b>Dataset-specific Description</b>	At all stations, a vertical profile of salinity, dissolved oxygen concentration and temperature was collected using a Seabird SBE 19plus V2 SeaCAT Profiler CTD. The CTD was on an ECO55 water sampler with 6 4 L Niskin bottles for collecting aqueous samples at specific depths.
<b>Generic Instrument Description</b>	Self contained self powered CTD profiler. Measures conductivity, temperature and pressure in both profiling (samples at 4 scans/sec) and moored (sample rates of once every 5 seconds to once every 9 hours) mode. Available in plastic or titanium housing with depth ranges of 600m and 7000m respectively. Minature submersible pump provides water to conductivity cell.

<b>Dataset-specific Instrument Name</b>	Lachat Instruments QuikChem® FIA+ 8000 Series Automated Ion Analyzer
<b>Generic Instrument Name</b>	Flow Injection Analyzer
<b>Dataset-specific Description</b>	Water samples were analyzed for $\text{NO}_3^- + \text{NO}_2^-$ , $\text{NO}_2^-$ , $\text{PO}_4^{3-}$ , $\text{SiO}_2$ , and $\text{NH}_4^+$ using a Lachat Instruments QuikChem® FIA+ 8000 Series Automated Ion Analyzer with an ASX-400 Series XYZ autosampler.
<b>Generic Instrument Description</b>	An instrument that performs flow injection analysis. Flow injection analysis (FIA) is an approach to chemical analysis that is accomplished by injecting a plug of sample into a flowing carrier stream. FIA is an automated method in which a sample is injected into a continuous flow of a carrier solution that mixes with other continuously flowing solutions before reaching a detector. Precision is dramatically increased when FIA is used instead of manual injections and as a result very specific FIA systems have been developed for a wide array of analytical techniques.

<b>Dataset-specific Instrument Name</b>	4 L Niskin bottles
<b>Generic Instrument Name</b>	Niskin bottle
<b>Dataset-specific Description</b>	At all stations, a vertical profile of salinity, dissolved oxygen concentration and temperature was collected using a Seabird SBE 19plus V2 SeaCAT Profiler CTD. The CTD was on an ECO55 water sampler with 6 4 L Niskin bottles for collecting aqueous samples at specific depths.
<b>Generic Instrument Description</b>	A Niskin bottle (a next generation water sampler based on the Nansen bottle) is a cylindrical, non-metallic water collection device with stoppers at both ends. The bottles can be attached individually on a hydrowire or deployed in 12, 24, or 36 bottle Rosette systems mounted on a frame and combined with a CTD. Niskin bottles are used to collect discrete water samples for a range of measurements including pigments, nutrients, plankton, etc.

<b>Dataset-specific Instrument Name</b>	Shimadzu Instruments TOC-VCSH and TNM-1
<b>Generic Instrument Name</b>	Total Organic Carbon Analyzer
<b>Dataset-specific Description</b>	Water samples were analyzed for dissolved organic carbon (DOC) and total dissolved nitrogen (TDN) content using a Shimadzu Instruments TOC-VCSH and TNM-1 with attached ASI-V auto sampler.
<b>Generic Instrument Description</b>	A unit that accurately determines the carbon concentrations of organic compounds typically by detecting and measuring its combustion product ( $\text{CO}_2$ ). See description document at: <a href="http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/bs116.pdf">http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/bs116.pdf</a>

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## Deployments

AC18-12

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/789093">https://www.bco-dmo.org/deployment/789093</a>
<b>Platform</b>	R/V Acadiana
<b>Start Date</b>	2017-09-17
<b>End Date</b>	2017-09-21

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## Project Information

### **Collaborative Research: A RAPID response to Hurricane Harvey's impacts on coastal carbon cycle, metabolic balance and ocean acidification (HarveyCarbonCycle)**

**Coverage:** Northwestern Gulf of Mexico

#### *NSF Award Abstract:*

Understanding how extreme events, like hurricanes, impact coastal ecosystems and the cycling of elements like carbon and oxygen, is important for improving our ability to predict how the global carbon cycle will respond to climate. This team of investigators, who have already been working together on understanding the carbon cycle in the Gulf of Mexico continental shelves, have important recent data against which to measure the effects of the passage of Hurricane Harvey in August, 2017. They will sample the waters and sediments of the northwestern Gulf of Mexico in September, October, and January to assess Harvey's impacts on a timescale of weeks to months.

The researchers pose three specific questions: 1. Will the region become a major source of carbon dioxide to the atmosphere, releasing carbon accumulated in the bottom water and sediments, and will this potential impact be faster and greater than during normal fall and winter mixing events? Will this process acidify the surface water and for how long? 2. Will the metabolic balance be substantially pushed toward net heterotrophy as a result of the storm in comparison to other years? 3. Can the amount of material delivered or redeposited across the continental shelf by a tropical cyclone be considerably larger than that related to winter storm systems? The PIs will measure water column nutrients, oxygen, organic carbon, and inorganic carbon system parameters; determine water column and benthic metabolic and nutrient flux rates; and sediment organic matter deposition rates. They will also collect end member river samples. They will compare the immediate (mid-Sept) but limited post-hurricane data and one-month post-hurricane, more detailed data with those collected in July and April to study the impacts of the storms. they will also compare 2017-2018 seasonal data to seasonal data over the same region collected in the past (2006-2008 and 2009-2010). They will also compare the impacts of Hurricane Harvey to those of Hurricanes Katrina and Rita (2005) and Tropical Storm Cindy (June 2017). The project will involve graduate and postdoctoral research and work to communicate results to the public.

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## Funding

<b>Funding Source</b>	<b>Award</b>
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1760687</a>

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