

CTD data collected on three NSF RAPID Plankton cruises on R/V Point Sur and R/V Pelican in the Gulf of Mexico during 2017-2018

Website: <https://www.bco-dmo.org/dataset/827969>

Data Type: Cruise Results

Version: 1

Version Date: 2020-11-02

Project

» [Collaborative Research: RAPID-HARVEY: Response of plankton assemblages and trophodynamics to a historic, hurricane-induced floodwater plume in a subtropical, pelagic environment](#) (RAPID Plankton)

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Abstract

This dataset includes processed CTD data collected during three NSF RAPID Plankton cruises. RAPID Plankton Cruise 1 took place on R/V Point Sur, cruise number PS1813, from October 28-November 3, 2017. RAPID Plankton Cruise 2 took place on R/V Pelican, cruise number PE18-18, from January 6- 12, 2018. RAPID Plankton Cruise 3 took place on R/V Pelican, cruise number PE18-21, from March 19- 23, 2018. Data were collected at 10 stations on each cruise.

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Coverage

Spatial Extent: N:29.30622 E:-93.68694 S:27.31797 W:-95.20932

Temporal Extent: 2017-11-03 - 2018-03-22

Dataset Description

Data collected during three NSF RAPID Plankton cruises.

RAPID Plankton Cruise 1 took place on R/V Point Sur, cruise number PS1813, from October 28-November 3, 2017. CTD data are reported from 10 stations.

RAPID Plankton Cruise 2 took place on R/V Pelican, cruise number PE18-18, from January 6- 12, 2018. CTD data are reported from 10 stations.

RAPID Plankton Cruise 3 took place on R/V Pelican, cruise number PE18-21, from March 19- 23, 2018. CTD data are reported from 10 stations.

Methods & Sampling

On each cruise, the CTD was lowered to within 10m of the bottom, or to the target max depth at standard speeds (30m/min first 100m, 60m/min thereafter). Water samples were collected in Niskin bottles during the upcast. CTD cast ended at approx. 2-5m, which counted as the surface for each cast.

Known Problems:

RAPID Plankton Cruise 1 (PS1813): Station 10, parameter (CDOM) malfunction observed.

RAPID Plankton Cruise 3 (PE18-21): Stations [6-10] WETLabs sensor applied for fluorescence parameter; Stations [1-5] Seapoint sensor applied for fluorescence parameter; Fluorecence sensor changed due to the malfunction of sensor during cruise.

Data Processing Description

Data Processing:

SBE Data Processing Software Version 7.26.7, from Sea-Bird Scientific was used to convert and bin the data. Upcast and downcast of hex files converted into cnv file. Converted cnv files binned by using downcast with 0.2 m depth bin.

BCO-DMO Processing:

- concatenated data from all 3 cruises into one dataset;
- re-named fields to conform with BCO-DMO naming conventions;
- added Cruise_ID column;
- added Cast column.

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Data Files

File
CTD.csv (Comma Separated Values (.csv), 4.89 MB) MD5:be7e5b5e132d8a13c39b39488fb48793 Primary data file for dataset ID 827969

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Related Publications

Kurtay, G., Prevost, H. J., & Stauffer, B. A. (2021). Pico- and nanoplankton communities on a near to offshore transect along the continental shelf of the northwestern Gulf of Mexico in the aftermath of Hurricane Harvey. *Limnology and Oceanography*, 66(7), 2779–2796. doi:[10.1002/lno.11788](https://doi.org/10.1002/lno.11788)
Results

Topor, Z. M., Robinson, K. L., & Turcu, A. (2020). Investigating Seasonal Succession Patterns in Mesozooplankton Community Structure Following Hurricane Harvey. *Frontiers in Marine Science*, 7. doi:[10.3389/fmars.2020.00462](https://doi.org/10.3389/fmars.2020.00462)
Results

Parameters

Parameter	Description	Units
Cruise_ID	Cruise identifier	unitless
Cast	Cast number	unitless
Station	Station number	unitless
Depth	Depth	meters
Latitude	Latitude	degrees North
Longitude	Longitude	degrees East
Potential_Temperature1	Potential temperature, primary	degrees Celsius
Potential_Temperature2	Potential temperature, secondary	degrees Celsius
Salinity_Practical1	Practical salinity, primary	PSU
Salinity_Practical2	Practical salinity, secondary	PSU
Oxygen_SBE1	Dissolved oxygen measured by SBE43, primary	milliliters per liter (ml/l)
Oxygen_SBE2	Dissolved oxygen measured by SBE43, secondary	milliliters per liter (ml/l)
Oxygen_pcmt_sat1	Percent oxygen saturation, primary	unitless (percent)
Oxygen_pcmt_sat2	Percent oxygen saturation, secondary	unitless (percent)
Fluorescence_WET_CDOM	Colored dissolved organic matter (CDOM)	milligrams per cubic meter (mg/m ³)

Fluorescence_WET	Fluorescence measured by WETLabs sensor	milligrams per cubic meter (mg/m ³)
Fluorescence_Chelsea	Fluorescence measure by Chelsea sensor	micrograms per liter (ug/l)
Fluorescence_Seapoint	Fluorescence measured by Seapoint sensor	micrograms per liter (ug/L)
Beam_Attenuation	Beam attenuation	1/m
Beam_Transmission	Transmission	unitless (percent)
PAR_Irradiance	Photosynthetically active radiation	micromoles photons per square meter per second (umol photons m ⁻² s ⁻¹)
SPAR	Surface photosynthetically active radiation	micromoles photons per square meter per second (umol photons m ⁻² s ⁻¹)
Altimeter	Altimeter reading	meters (m)
Density1	Density, primary	kilograms per cubic meter (kg/m ³)
Density2	Density, secondary	kilograms per cubic meter (kg/m ³)
Oxygen_raw1	Raw oxygen, primary	volts
Oxygen_raw2	Raw oxygen, secondary	volts
Conductivity1	Conductivity, primary	Siemens per meter (S/m)
Conductivity1_2	Conductivity, primary (duplicate)	Siemens per meter (S/m)
Conductivity_2	Conductivity, secondary	Siemens per meter (S/m)
Bottles_Fired	Number of bottles fired	unitless
flag	Flag	unitless

Start_ISO_DateTime_UTC	Start date and time of cast (UTC)	unitless
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Instruments

Dataset-specific Instrument Name	Seabird 9-11 Plus CTD rosette
Generic Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Description	The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Fluorometer, WET,Labs
Generic Instrument Name	Fluorometer
Dataset-specific Description	WETLabs Fluorometer used on PS1813 cruise; and on PE-18-21 cruise at stations 6-10.
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	Fluorometer, Chelsea, Aqua 3
Generic Instrument Name	Fluorometer
Dataset-specific Description	Fluorometer used on cruise PE18-18.
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	Fluorometer Seapoint
Generic Instrument Name	Fluorometer
Dataset-specific Description	Fluorometer used on cruise PE18-21 at stations 1-5.
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	Biospherical/Licor
Generic Instrument Name	LI-COR Biospherical PAR Sensor
Generic Instrument Description	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.

Dataset-specific Instrument Name	SBE43
Generic Instrument Name	Sea-Bird SBE 43 Dissolved Oxygen Sensor
Dataset-specific Description	SBE43: Dissolved oxygen sensors, Owens-Millard Calibration coefficient applied
Generic Instrument Description	The Sea-Bird SBE 43 dissolved oxygen sensor is a redesign of the Clark polarographic membrane type of dissolved oxygen sensors. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Transmissometer, WET Labs, C-Star
Generic Instrument Name	WET Labs {Sea-Bird WETLabs} C-Star transmissometer
Generic Instrument Description	The C-Star transmissometer has a novel monolithic housing with a highly integrated opto-electronic design to provide a low cost, compact solution for underwater measurements of beam transmittance. The C-Star is capable of free space measurements or flow-through sampling when used with a pump and optical flow tubes. The sensor can be used in profiling, moored, or underway applications. Available with a 6000 m depth rating. More information on Sea-Bird website: https://www.seabird.com/c-star-transmissometer/product?id=60762467717

Deployments

PS1813

Website	https://www.bco-dmo.org/deployment/827940
Platform	R/V Point Sur
Start Date	2017-10-28
End Date	2017-11-03

PE18-18

Website	https://www.bco-dmo.org/deployment/827941
Platform	R/V Pelican
Start Date	2018-01-06
End Date	2018-01-13
Description	More cruise information is available from the Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/PE18-18

PE18-21

Website	https://www.bco-dmo.org/deployment/827944
Platform	R/V Pelican
Start Date	2018-03-18
End Date	2018-03-23
Description	More information is available from the Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/PE18-21

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Project Information

Collaborative Research: RAPID-HARVEY: Response of plankton assemblages and trophodynamics to a historic, hurricane-induced floodwater plume in a subtropical, pelagic environment (RAPID Plankton)

Website: <https://cajunplankton.com/nsf-rapid-plankton/>

Coverage: Northwestern Gulf of Mexico 95-96°W, 30-27.5°N

NSF Award Abstract:

This project will examine how plankton in the northwestern Gulf of Mexico respond to large floodwater plumes generated by extreme weather events like Hurricane Harvey at time scales relevant to its development and evolution (days to months). The goal is to understand how the timing, magnitude, and constituent loads of a massive pulse of freshwater to the Louisiana-Texas shelf are: (1) driving changes in phytoplankton, zooplankton, and larval fish communities and distributions over monthly, seasonal, and annual time scales and, (2) what the consequences of those changes are to food web interactions within the plankton. The timing of Hurricane Harvey flood water disturbance coincides with the summer-fall spawning seasons for economically important Gulf of Mexico fisheries (e.g. red drum, sea trouts, snappers), raising additional questions of longer term effects of food web disruptions on recruitment. This project will train two undergraduate students and four PhD-level graduate students across three institutions, as well as support three early-career investigators. Pre- and post-floodwater plume data and samples will be shared with the broader scientific community within

one year of collection to facilitate their immediate use by scientists beyond the research team. The team will give coordinated public talks at established regional science communication series and through other existing regional outreach partnerships to extend the educational scope of the project. Finally, results from this research will be incorporated in course curriculum and shared through scientific presentations and publications in peer-reviewed journals.

Record-breaking rain delivered by Hurricane Harvey to Southeast Texas in late August 2017 has resulted in a massive floodwater plume being delivered to coastal waters in the northern Gulf of Mexico (GOM). This project will investigate the short- and mid-term effects of that plume on planktonic (from pico- to ichthyoplankton) community composition and trophic interactions in that system. Building on data collected in July 2017 during a GOM Ecosystems and Carbon Cycle (GOMECC-3) cruise, and from historical datasets in the region, plankton assemblages, abundance, and food web interactions will be assessed during three research cruises 2, 4, and 8 months after the event. Oceanographic data and samples will be collected and processed using standard and state of the art gear, including ZooScan, FlowCAM, flow cytometry, and next generation sequencing. Onboard micro- and mesozooplankton grazing experiments will be conducted to understand the trophodynamic interactions and relationships between different plankton groups under changing environmental conditions. Diet and growth rate analyses of larval fish will be undertaken and related to phyto- and zooplankton (i.e. prey) abundance and community composition data. Application of the same gear types and methods during the three project cruises will ensure comparability of these new data to existing samples and datasets. These post-Harvey data will be compared to immediately-preceding and long-term data collected in the area by NOAA's Southeast Area Monitoring and Assessment Program (SEAMAP), allowing for investigation of the temporal evolution of planktonic assemblages and interpretation of plankton regime shifts in seasonal, multiyear, and decadal contexts.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760704
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760674
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760465

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