CTD profile data from R/V Pt. Sur PS 18-09 Legs 01 and 03, Sept. - Oct. 2017

Website: https://www.bco-dmo.org/dataset/809428
Data Type: Cruise Results
Version: 1
Version Date: 2020-04-15

Project
» RAPID: Hurricane Impact on Phytoplankton Community Dynamics and Metabolic Response (HRR)

Contributors	Affiliation	Role
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Abstract
Processed CTD profile data from all electronic sensors mounted on rosette from R/V Pt. Sur PS 18-09 Legs 01 and 03, Hurricane Harvey RAPID Response cruise (western Gulf of Mexico) September-October 2017.

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Coverage

Spatial Extent: **N**:29.4907 **E**:-93.5325 **S**:27.0932 **W**:-97.2683
Temporal Extent: 2017-09-23 - 2017-10-01

Dataset Description

Processed CTD profile data from all electronic sensors mounted on rosette from R/V Pt. Sur PS 18-09 Legs 01 and 03, Hurricane Harvey RAPID Response cruise (western Gulf of Mexico) September-October 2017.

Methods & Sampling

Raw hex datafiles were produced by the CTD were processed using manufacturer-supplied software, Seabird

SeaSave. SBE Data Processing Version 7.26.6.28 was used to process the raw Sea-Bird CTD data (.hex) into a human-readable format (.cnv). The order of functions ran via SBE Data Processing was:

1. Data Conversion: to convert hex-files into human readable format;
2. Filter: apply low-pass filter to collected data;
3, Align CTD: to temporally align T and C sensors. Time constant equals 3.5 s (Gulf of Mexico);
4. Cell Thermal Mass: applies thermal mass correct;
5. Loop Edit: to remove effects of ship heave;
6. Derive: to estimate derived quantities such as salinity, density, dissolved oxygen concentration, potential temperature, etc; and
7. Bin Average: average data into vertical bins, downcast only.

See zipped metadata of individual files for date of calibration and calibration coefficients - Supplemental Files, below.

Data Processing Description

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions (e.g., replaced spaces and hyphens with underscores)
- extracted filename, date-time, lat, and lon from individual file headers
- converted date-time to ISO_DateTime_UTC
- converted lat and long from degrees/min/sec to decimal degrees
- extracted the HHR leg number and station id from the file_name to separate columns
- concatenated all .cnv data into a single file
- joined CTD data with header data (file_name, leg, station, ISO_DateTime_UTC, lat, lon)
- removed columns of raw voltages V3, V4, V5

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Data Files

File
HRR_ctd_2017.csv (Comma Separated Values (.csv), 1.53 MB) MD5:9c266f1521750453d2e6bda3a80b141f Primary data file for dataset ID 809428

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Supplemental Files

File
Original processed SeaBird .cnv files, PS18-09 leg 01 filename: HRRLEG1_CTD_FINAL.zip (ZIP Archive (ZIP), 789.84 KB) MD5:d4608b0503dd43891e5f989b350a5d11 Zipped file containing the original processed SeaBird .cnv files from PS18-09 leg 01, including the sensor calibration information
Original processed SeaBird .cnv files, PS18-09 leg 03 filename: HRRLEG3_CTD_FINAL.zip (ZIP Archive (ZIP), 90.94 KB) MD5:f73fb6affd76916c1c32d8d02030dda0 Zipped file containing the original processed SeaBird .cnv files from PS18-09 leg 03, including the sensor calibration information

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Related Publications

Potter, H., DiMarco, S. F., & Knap, A. H.(2019). Tropical cyclone heat potential and the rapid intensification of Hurricane Harvey in the Texas Bight.Journal of Geophysical Research:Oceans, 124. https://doi.org/10.1029/2018JC014776
Results

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Parameters

Parameter	Description	Units
file_name	name of the originators file	unitless
HHR_leg	cruise leg identifier	unitless
station	station identifier	unitless
lat_decdeg	latitude with positive values indicating North	decimal degrees
lon_decdeg	longitude with negative values indicating West	decimal degrees
ISO_DateTime_UTC	Date and time in UTC following ISO8601 format	yyyy-MM-dd'T'HH:mm:ss'Z'
prDM	Pressure	decibar (db)
t090C	Temperature ITS-90	degrees Celsius (C)
t190C	Temperature 2 ITS-90	degrees Celsius (C)
c0S_m	Conductivity	Siemens per meter (S/m)
sal00_1	Practical Salinity	PSU
sal11	Practical Salinity	PSU
sbeox0V	Oxygen raw SBE 43 from primary sensor	volts (V)
sbeox0ML_L_1	Oxygen SBE 43 from primary sensor	milliliters per liter (ml/l)
sbeox1V	Oxygen raw SBE 43 from secondary sensor	volts (V)

sbeox1ML_L_1	Oxygen SBE 43 from secondary sensor	milliliters per liter (ml/l)
cpar	CPAR/Corrected Irradiance	percent (%)
CStarAt0	Beam Attenuation; WET Labs C-Star	per meter (1/m)
CStarTr0	Beam Transmission; WET Labs C-Star	percent (%)
par	PAR/Irradiance Biospherical/Licor	unknown
wetCDOM	Fluorescence; WET Labs CDOM	milligrams/meter^3 [mg/m^3]
flECO_AFL	Fluorescence; WET Labs ECO-AFL/FL	millligrams/meter^3 [mg/m^3]
depSM	Depth in salt water at specified latitude	meters (m)
sal00_2	Practical Salinity	Practical Salinity Units (PSU)
sigma_e00	Density sigma-theta	kilogram per meter cubed (kg/m3)
sbeox0ML_L_2	Oxygen SBE 43 from primary sensor; WS=5 (?)	milliliters per liter (ml/l)
sbeox1ML_L_2	Oxygen SBE 43 from secondary sensor; WS=5 (?)	milliliters per liter (ml/l)
potemp090C	Potential temperature fro ITS-90	degrees Celsius
potemp190C	Potential temperature fro ITS-190	degrees Celsius
flag	data quality flag; 0 indicates good value	unitless

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Instruments

Dataset-specific Instrument Name	CTD system (11plus V 5.2)
Generic Instrument Name	CTD Sea-Bird SBE 911plus
Dataset-specific Description	These sensors were deployed with the CTD: Temperature sensor (Channel 1; S/N: 5134) Conductivity (Channel 2; S/N: 2922) Digiquartz pressure sensor (Channel 2; S/N: 45) Temperature Sensor (Channel 4; S/N: 4488) Conductivity (Channel 5; S/N: 2629) Dissolved oxygen (Channel 6; SBE-43; S/N: 0174) Dissolved oxygen (Channel 7; SBE-43; S/N: 3554) CDOM Fluorometer (Channel 8; WetLABS ECO, S/N:1379) Chlorophyll Fluorometer (Channel 9; WetLABS ECO-AFL, S/N: 1051) Altimeter (Channel 10; S/N 27002) PAR (Channel 12; Biospherical/Licor/Chelsea PAR/Irradiance, S/N: 4530) Transmissometer (Channel 13, WetLabs C-Star, S/N: CST-703DR) SPAR Surface Irradiance (Channel 15, S/N: 20148)
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

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Deployments

PS1809

Website	https://www.bco-dmo.org/deployment/784313
Platform	R/V Point Sur
Start Date	2017-09-22
End Date	2017-10-03
Description	HRR study with three legs. Chief Scientists: Steve DiMarco (Leg 1); Kristen Thyng (Leg 2); Lisa Campbell (Leg 3). R2R Cruise Page: https://www.rvdata.us/search/cruise/PS1809

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Project Information

RAPID: Hurricane Impact on Phytoplankton Community Dynamics and Metabolic Response (HRR)

Coverage: Texas coast

NSF Award Abstract:
Hurricane Harvey is the strongest hurricane to hit the Texas coast in decades and the resulting tidal surges, flooding and terrestrial runoff have had a severe impact on the coastal ocean. The effects on the phytoplankton, the first link in the food chain, may be unprecedented. To determine how the phytoplankton community will respond to such drastic changes in salinity, nutrient inputs, and potential toxins, immediate and continuous sampling is the only way to fully capture the effects and to identify when conditions return to "normal". An automated, continuous phytoplankton imaging instrument that is deployed on the Texas coast records images of the phytoplankton and permits calculation of the abundance of different species. Together

with molecular information on the genes that have been "turned on", or expressed, outcomes of this project will help determine the responses of individual types of phytoplankton. Extreme storms are expected to increase in frequency with future climate change, so the responses identified now will be valuable in predicting how such events will affect these primary producers, which in turn support most of the food webs in marine ecosystems, in the future.

High temporal resolution observations from the Imaging FlowCytobot (IFCB) have revealed that hurricanes in the Gulf of Mexico cause drastic changes in the phytoplankton community structure. The objectives of this RAPID project are: 1) to characterize the dynamics of the phytoplankton species in relation to the environmental variables along the Texas coast; 2) to assess the short and long-term changes in the phytoplankton community; and 3) to identify the strategies of the phytoplankton community for resource acquisition. To accomplish these objectives, this project will utilize IFCB time series to follow phytoplankton community structure during the recovery period from Hurricane Harvey. In addition, two RAPID response cruises (in late September and early October) to sample at 5 sites along a transect from Galveston to Port Aransas, TX. At each station, CTD profiles and water samples from surface and the chlorophyll maximum will be collected for nutrients, carbonate chemistry, and RNA sequencing for metatranscriptomic analysis. Metatranscriptomics can provide an indication of the metabolic strategies employed and functional relationships within the plankton community in response to changes in the environment. The advantage of a metatranscriptomic approach is that the entire molecular response to the environment is captured. So, while the response of phytoplankton to increased nutrient inputs from floodwater runoff is targeted, the responses to other environmental stresses (toxics, hypoxia, acidification) are also captured. Analyses of this time series using multivariate statistical techniques, such as principal component analysis (PCA), and network analysis, a powerful technique for identifying potential interactions among taxa, will provide insights on the environmental factors and metabolic responses structuring the community during the aftermath of the hurricane.

Related data from the The Texas Observatory for Algal Succession Time-Series (TOAST) can be found at the following: https://toast.tamu.edu/timeline?dataset=HRR_Cruise

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760620
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760381

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