High pressure liquid chromatography analyses of photosynthetic pigments taken on the R/V Acadian and R/V Pelican from September to October 2017 in the Central northern Gulf of Mexico

Website: https://www.bco-dmo.org/dataset/789061
Data Type: Cruise Results
Version: 1
Version Date: 2020-02-03

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

Contributors	Affiliation	Role
Lohrenz, Steven	University of Massachusetts Dartmouth (UMass Dartmouth)	Principal Investigator
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Abstract
High pressure liquid chromatography analyses of photosynthetic pigments taken on the R/V Acadian and R/V Pelican from September to October 2017 in the Central northern Gulf of Mexico.

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Coverage

Spatial Extent: **N**:29.4883 **E**:-90.2333 **S**:28.375 **W**:-93.4167
Temporal Extent: 2017-09-18 - 2017-10-10

Dataset Description

High pressure liquid chromatography analyses of photosynthetic pigments taken on the R/V Acadian and R/V Pelican from September to October 2017 in the Central northern Gulf of Mexico.

These data have been published in NASA SeaBASS Data Archive:

- https://seabass.gsfc.nasa.gov/archive/UMASS_D/lohrenz/NSF_Gulf_Rapid/AC18_12_Roberts/archive/
- https://seabass.gsfc.nasa.gov/archive/UMASS_D/lohrenz/NSF_Gulf_Rapid/PE18-11/archive/

Methods & Sampling

Seawater samples for pigment analyses were immediately filtered (2 to 5 l volume) onto Whatman 47 mm GF/F filters under low vacuum (<0.5 atm). The filters were blotted dry, and stored in 2 ml cryotubes (Fisher) in liquid nitrogen until analysis. Analyses were performed within 6 months to a year of sampling.

Extraction procedures and HPLC analytical methods follow those described in Thomas (2012) and HPLC_Method_Summary.pdf (see related files and publications).

Data Processing Description

HPLC samples were analyzed during August-September 2018 at the Horn Point Analytical Laboratory by Meg Maddox (mmaddox@umces.edu). Values of -8888 indicate concentrations that were below detection levels. Values of -9999 indicate missing data. Coefficient of variation (replicate filter precision) for all NSF_Gulf_Rapid_HPLC samples was TChl a = 3.09%; Ppig = 4.28%.

The HPLC was controlled by Agilent Chemstation software.

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Data Files

File
hplc_analysis.csv (Comma Separated Values (.csv), 28.29 KB) MD5:8563c655689125a464a0a82f3fedb25c Primary data file for dataset ID 789061

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Supplemental Files

File
HPLC Method Summary filename: HPLC_method_summary.pdf (Portable Document Format (.pdf), 52.99 KB) MD5:89c2c743188087f66f7c866cb7ee00f5 High Performance Liquid Chromatography (HPLC) Method Summary by Crystal Thomas

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Related Publications

Thomas, C. S. (2012), The HPL Method. In S.B. Hooker (Ed), The Fifth SeaWiFS HPLC Analysis Round-Robin Experiment (SeaHARRE-5) (pp. 63-72). Greenbelt, MD: National Aeronautics and Space Administration. *Methods*

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Parameters

Parameter	Description	Units
Hpl_id	Lab Sample ID	unitless

Sample	Cruise Sample ID	unitless
Station	Station	unitless
Volfilt	Volume Filtered	liter (L)
Depth	Sample Depth	meter (m)
Date	Date (yyyymmdd) in UTC	unitless
Time	Time (hh:mm:ss)	unitless
Lat	Latitude (N)	decimal degrees
Lon	Longitude (E)	decimal degrees
Tot_Chl_a	DV_Chl_a + MV_Chl_a + Chlide_a + Chl_a_allom + Chl_a_prime	milligram per cubic meter (mg/m^3)
Tot_Chl_b	DV_Chl_b + MV_Chl_b	milligram per cubic meter (mg/m^3)
Tot_Chl_c	chl_c1 + chl_c2 (i.e.: chl_c1c2) + chl_c3	milligram per cubic meter (mg/m^3)
alpha_beta_Car	Alpha (Beta;epsilon) + Beta (Beta;beta) Carotenes	milligram per cubic meter (mg/m^3)
But_fuco	19'-Butanoyloxyfucoxanthin	milligram per cubic meter (mg/m^3)
Hex_fuco	19'-Hexanoyloxyfucoxanthin	milligram per cubic meter (mg/m^3)
Allo	Alloxanthin	milligram per cubic meter (mg/m^3)
Diadino	Diadinoxanthin	milligram per cubic meter (mg/m^3)
Diato	Diatoxanthin	milligram per cubic meter (mg/m^3)
Fuco	Fucoxanthin	milligram per cubic meter (mg/m^3)
Perid	Peridin	milligram per cubic meter (mg/m^3)

Zea	Zeaxanthin	milligram per cubic meter (mg/m^3)
MV_Chl_a	Monovinyl Chorophyll a	milligram per cubic meter (mg/m^3)
DV_Chl_a	Divinyl Chorophyll a	milligram per cubic meter (mg/m^3)
Chlide_a	Chlorophyllide a	milligram per cubic meter (mg/m^3)
MV_Chl_b	Monovinyl Chorophyll b	milligram per cubic meter (mg/m^3)
DV_Chl_b	Divinyl Chorophyll b	milligram per cubic meter (mg/m^3)
Chl_c1c2	Chlorophyll c1 + c2 + Mg 2;4 divinyl pheoporphyrin a5 monomethyl ester	milligram per cubic meter (mg/m^3)
Chl_c3	Chlorophyll c3	milligram per cubic meter (mg/m^3)
Lut	Lutein	milligram per cubic meter (mg/m^3)
Neo	Neoxanthin	milligram per cubic meter (mg/m^3)
Viola	Violaxanthin	milligram per cubic meter (mg/m^3)
Phytin_a	Pheophytin a	milligram per cubic meter (mg/m^3)
Phide_a	Pheophorbide a	milligram per cubic meter (mg/m^3)
Pras	Prasinoxanthin	milligram per cubic meter (mg/m^3)
Gyro	Gyroxanthin	milligram per cubic meter (mg/m^3)
TChl	Tot_Chl_a + Tot_Chl_b + Tot_Chl_c	milligram per cubic meter (mg/m^3)
PPC	Photoprotective carotenoids (Allo + Diadino + Diato + Zeo + alpha-beta-Car)	milligram per cubic meter (mg/m^3)
PSC	Photosynthetic carotenoids (But-fuco + Fuco + Hex-fuco + Perid)	milligram per cubic meter (mg/m^3)

PSP	Photosynthetic pigments (PSC + Tchl)	milligram per cubic meter (mg/m^3)
Tcar	Total Carotenoids (PPC + PSC)	milligram per cubic meter (mg/m^3)
Tacc	Total accessory pigments (PPC + PSC + Tot_Chl_b + Tot_Chl_c)	milligram per cubic meter (mg/m^3)
Tpg	Total pigment concentration	milligram per cubic meter (mg/m^3)
DP	Total diagnostic pigments (PSC + Allo + Zea + Tot_Chl_b)	milligram per cubic meter (mg/m^3)
Tacc_Tchla	Ratio of Tacc to Tot_Chl_a	unitless
PSC_Tcar	Ratio of PSC to Tcar	unitless
PPC_Tcar	Ratio of PPC to Tcar	unitless
TChl_Tcar	Ratio of Tchl to Tcar	unitless
PPC_Tpg	Ratio of PPC to Tpg	unitless
PSP_Tpg	Ratio of PSC to Tpg	unitless
TChla_Tpg	Ratio of Tot_chl_a to Tpg	unitless
Cruise	Cruise ID (AC18_12_Roberts or PE18-11)	unitless
ISO_DateTime_UTC	Date and time (UTC) in ISO format (yyyy-mm-ddThh:mm:ss)	unitless

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Instruments

Dataset-specific Instrument Name	Agilent RR1200 HPLC
Generic Instrument Name	High-Performance Liquid Chromatograph
Dataset-specific Description	Agilent RR1200 HPLC controlled bu Agilent Chemstation software
Generic Instrument Description	A High-performance liquid chromatograph (HPLC) is a type of liquid chromatography used to separate compounds that are dissolved in solution. HPLC instruments consist of a reservoir of the mobile phase, a pump, an injector, a separation column, and a detector. Compounds are separated by high pressure pumping of the sample mixture onto a column packed with microspheres coated with the stationary phase. The different components in the mixture pass through the column at different rates due to differences in their partitioning behavior between the mobile liquid phase and the stationary phase.

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Deployments

AC18-12

Website	https://www.bco-dmo.org/deployment/789093
Platform	R/V Acadiana
Start Date	2017-09-17
End Date	2017-09-21

PE18-11

Website	https://www.bco-dmo.org/deployment/789096
Platform	R/V Pelican
Start Date	2017-09-28
End Date	2017-10-11
Description	Additional cruise information is available from the Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/PE18-11

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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

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760660
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760509

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