Sonde water quality measurements - Effects of Hurricane Harvey on Estuarine Water Quality in the Guadalupe Estuary between August 2017 and December 2017.

Website: https://www.bco-dmo.org/dataset/787319
Data Type: Cruise Results
Version: 1
Version Date: 2020-01-23

Project
» RAPID: Capturing the Signature of Hurricane Harvey on Texas Coastal Lagoons (Hurricane Harvey Texas Lagoons)

Contributors	Affiliation	Role
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Abstract
Bottom and surface water quality sonde data of the Guadalupe Estuary site (Texas) between August 2017 and December 2017.

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Coverage

Spatial Extent: **Lat**:28.39352 **Lon**:-96.7724
Temporal Extent: 2017-08-01 - 2017-12-05

Dataset Description

Bottom and surface water quality sonde data of the Guadalupe Estuary site (Texas) between August 2017 and December 2017 to test the effects of Hurricane Harvey on estuarine water quality.

Methods & Sampling

Water quality sondes (Hydrolab DS5X sondes) were deployed continuously on the surface and bottom of one site in the Guadalupe Estuary, Texas (Lat: 28.39352 , Lon: -96.7724). Sondes recorded water quality data noted above at 15-minute intervals. Datasondes were calibrated prior to deployment and traded out every 5-14 days depending on biofouling and weather conditions. A YSI ProPlus sonde recorded a water profile during each sonde deployment to compare grab sample data with sonde readings.

Sampling trips were conducted from one of five small (≤25') outboard engine equipped boats: Guardian, Mango, Stinger, Gator, or Guppy. Each cruise was less than 12 hrs in duration.

Data Processing Description

Sonde data underwent rigorous post-deployment quality control to eliminate erroneous data.

BCO-DMO processing notes:

- Combined bottom and surface measurements, added the column Sonde_WaterColumn_Loaction for distinction
- Added ISO_DateTime_UTC column for improved discoverability
- Added Latitude and Longitude of the site to dataset for improved discoverability
- Converted Data format from mm/dd/yyyy to yyyy-mm-dd

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Data Files

File
sonde_surface_bottom_combined.csv (Comma Separated Values (.csv), 2.20 MB) MD5:434aee65d29dc05f84a04f570af42f44 Primary data file for dataset ID 787319

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Parameters

Parameter	Description	Units
Date	Sample Date (yyyy-mm-dd) in Central Standard Time (CST)	unitless
Time	Time (HH:MM:SS) in Central Standard Time (CST)	unitless
Latitude	Latitude, south is negative	decimal degrees
Longitude	Longitude, west is negative	decimal degrees
Cond	Conductivity	micro siemens per cm (uS/cm)
Sal	Salinity	unitless
DOPct	Dissolved Oxygen saturation	percent (%)
DO	Dissolved Oxygen concentration	milligram per liter (mg/L)
pH	pH	pH units
Temp	Water temperature	degrees Celsius (°C)
Sonde_WaterColumn_Location	Location of the sonde in the water column: surface or bottom	unitless
ISO_DateTime_UTC	Date/Time (UTC) in ISO format (YYYY-mm-ddTHH:MM:SSZ (UTC time))	unitless

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Instruments

Dataset-specific Instrument Name	Hydrolab DS5X sondes
Generic Instrument Name	Hydrolab Series 5 probes
Dataset-specific Description	Hydrolab DS5X sondes
Generic Instrument Description	Multi-parameter probes that can measure from 12 (MS5) to 16 (DS5 and DS5X) parameters simultaneously. Measurements include temperature, depth, conductivity, salinity, specific conductance, TDS, pH, ORP, dissolved oxygen, turbidity, chlorophyll a, blue-green algae, Rhodamine WT, ammonium, nitrate, chloride, PAR and total dissolved gases. These probes can be deployed at depths up to 200 m and can be used in continuous monitoring programs.

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Deployments

Wetz_HurricaneHarveyTexasLagoons_sonde

Website	https://www.bco-dmo.org/deployment/805271
Platform	Small Boat
Description	Sampling trips were conducted from one of five small (≤25') outboard engine equipped boats: Guardian, Mango, Stinger, Gator, or Guppy. Each cruise was less than 12 hrs in duration. They are described below (Date (yyyy-mm-dd), Vessel, Lead Scientist): 2017-07-26, Guardian, Terry Palmer 2017-08-02, Guppy, Terry Palmer 2017-08-09, Mango?, Terry Palmer 2017-08-16, Guardian, Rick Kalke 2017-08-23, Guardian, Terry Palmer 2017-09-01, Mango, Terry Palmer 2017-09-08, Mango, Terry Palmer 2017-09-13, Mango, Terry Palmer 2017-09-25, Mango?, Terry Palmer 2017-10-06, ?, Terry Palmer 2017-10-17, Mango?, Lily Walker 2017-11-02, Gator, Lily Walker 2017-11-13, Guardian, Terry Palmer 2017-11-28, Stinger, Terry Palmer 2017-12-05, Guardian, Terry Palmer

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Project Information

RAPID: Capturing the Signature of Hurricane Harvey on Texas Coastal Lagoons (Hurricane Harvey Texas Lagoons)

Coverage: Northwest Gulf of Mexico estuaries on Texas Coast

NSF Award Abstract:
Hurricane Harvey made landfall Friday 25 August 2017 about 30 miles northeast of Corpus Christi, Texas as a Category 4 hurricane with winds up to 130 mph. This is the strongest hurricane to hit the middle Texas coast since Carla in 1961. After the wind storm and storm surge, coastal flooding occurred due to the storm lingering over Texas for four more days, dumping as much as 50 inches of rain near Houston. This will produce one of the largest floods ever to hit the Texas coast, and it is estimated that the flood will be a one in a thousand year event. The Texas coast is characterized by lagoons behind barrier islands, and their ecology and biogeochemistry are strongly influenced by coastal hydrology. Because this coastline is dominated by open water systems and productivity is driven by the amount of freshwater inflow, Hurricane Harvey represents a massive inflow event that will likely cause tremendous changes to the coastal environments. Therefore, questions arise regarding how biogeochemical cycles of carbon, nutrients, and oxygen will be altered, whether massive phytoplankton blooms will occur, whether estuarine species will die when these systems turn into

lakes, and how long recovery will take? The investigators are uniquely situated to mount this study not only because of their location, just south of the path of the storm, but most importantly because the lead investigator has conducted sampling of these bays regularly for the past thirty years, providing a tremendous context in which to interpret the new data gathered. The knowledge gained from this study will provide a broader understanding of the effects of similar high intensity rainfall events, which are expected to increase in frequency and/or intensity in the future.

The primary research hypothesis is that: Increased inflows to estuaries will cause increased loads of inorganic and organic matter, which will in turn drive primary production and biological responses, and at the same time significantly enhance respiration of coastal blue carbon. A secondary hypothesis is that: The large change in salinity and dissolved oxygen deficits will kill or stress many estuarine and marine organisms. To test these hypotheses it is necessary to measure the temporal change in key indicators of biogeochemical processes, and biodiversity shifts. Thus, changes to the carbon, nitrogen and oxygen cycles, and the diversity of benthic organisms will be measured and compared to existing baselines. The PIs propose to sample the Lavaca-Colorado, Guadalupe, Nueces, and Laguna Madre estuaries as follows: 1) continuous sampling (via autonomous instruments) of salinity, temperature, pH, dissolved oxygen, and depth (i.e. tidal elevation); 2) bi-weekly to monthly sampling for dissolved and total organic carbon and organic nitrogen, carbonate system parameters, nutrients, and phytoplankton community composition; 3) quarterly measurements of sediment characteristics and benthic infauna. The project will support two graduate students. The PIs will communicate results to the public and to state agencies through existing collaborations.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760006

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