Grain size and radiometric data from multi-core sediments collected Fall 2017 from the R/V Acadiana in the northwestern Gulf of Mexico to assess Hurricane Harvey impacts

Website: https://www.bco-dmo.org/dataset/825252
Data Type: Cruise Results
Version: 1
Version Date: 2021-02-15

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
Sediments of the northwestern Gulf of Mexico were analyzed for grain size and radiometric data (210-Pb, 234-Th, and 7-Be) to assess Hurricane Harvey impacts.

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Coverage

Spatial Extent: **N**:29.325 **E**:-90.2333 **S**:28.217 **W**:-95.2561
Temporal Extent: 2017-09-18 - 2017-10-09

Methods & Sampling

Sediments of the northwestern Gulf of Mexico were analyzed for grain size and radiometric data (^{210}Pb, ^{234}Th, and ^{7}Be) to assess Hurricane Harvey impacts. Samples were collected from the Louisiana-Texas shelf in September and October 2017 using the ship R/V Acadiana. Sediment cores were obtained using a multi corer and subsampled at 2 cm depth intervals.

Sediment core subsamples were dried, homogenized, and subsequently analyzed. Grain size distribution was determined using laser diffraction after deflocculation in a 0.05% sodium metaphosphate solution, and disaggregation with an ultrasonic probe (Denommee et al., 2016). Radiometric data (^{210}Pb, ^{234}Th, and ^{7}Be) were obtained using gamma spectroscopy (Maiti et al., 2010).

Data Processing Description

BCO-DMO processing notes:
- Converted datetimes to ISO8601 format (UTC format)
- Adjusted parameter names to comply with database requirements
- Rounded values to submitter's preferred number of digits
- Units added to Parameter description metadata section
- Added a conventional header with dataset name, PI name, version date.

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Data Files

File	
grain_size_radiometric_data.csv	(Comma Separated Values (.csv), 1.79 KB) MD5:f1a981f2a43d82078701c4993471e232
Primary data file for dataset ID 825252	

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Related Publications

Denommee, K. C., Bentley, S. J., Harazim, D., & Macquaker, J. H. S. (2016). Hydrodynamic controls on muddy sedimentary-fabric development on the Southwest Louisiana subaqueous delta. Marine Geology, 382, 162–175. doi:10.1016/j.margeo.2016.09.013
Methods

Maiti, K., Carroll, J., & Benitez-Nelson, C. R. (2010). Sedimentation and particle dynamics in the seasonal ice zone of the Barents Sea. Journal of Marine Systems, 79(1-2), 185–198. doi:10.1016/j.jmarsys.2009.09.001
Methods

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Parameters

Parameter	Description	Units
ISO_DateTime_UTC	UTC datetime in ISO format (yyyy-mm-dd hh:mm:ss)	unitless
Latitude	Latitude	decimal degrees
Longitude	Longitude, west is negative	decimal degrees
Be7_Inventory	Inventory of Beryllium-7	disintegrations per minute per centimeter squared (dpm/cm^2)
Pb210ex_Inventory	Inventory of excess (unsupported) Lead-210	disintegrations per minute per centimeter squared (dpm/cm^2)
Th234ex_Inventory	Inventory of excess Thorium-234	disintegrations per minute per centimeter squared (dpm/cm^2)
Be7_Depth	Penetration depth of Be-7 detection	centimeters (cm)
Clay	Sediment grain size in the clay fraction	percent (%)
Silt	Sediment grain size in the sand fraction	percent (%)
Sand	Sediment grain size in the silt fraction	percent (%)

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Instruments

Dataset-specific Instrument Name	Canberra Germanium Well Detectors GCW3523 and GCW4023
Generic Instrument Name	Gamma Ray Spectrometer
Dataset-specific Description	The CANBERRA High-Purity Germanium Well Detector provides maximum efficiency for small samples and allows spectroscopy from 20keV up to 10MeV. (More details in manual, http://www.gammadata.se/assets/Uploads/Germanium-Well-SS-C49321.pdf)
Generic Instrument Description	Instruments measuring the relative levels of electromagnetic radiation of different wavelengths in the gamma-ray waveband.

Dataset-specific Instrument Name	Beckman-Coulter LS13 320 Laser Diffraction Particle-Size Analyzer
Generic Instrument Name	Laser Diffraction Particle Size Analyzer
Dataset-specific Description	The Beckman Coulter LS 13 320 measures the size distribution of particles suspended either in a liquid or in dry powder form by using the principles of light scattering. Each particle's scattering pattern is characteristic of its size. The pattern measured by the LS 13 320 is the sum of the patterns scattered by each constituent particle in the sample.The LS 13 320 incorporates Beckman Coulter's patented PIDS (Polarization Intensity Differential Scattering) technology to provide a dynamic range of 0.017 µm to 2000 µm. (More details in the manual, https://www.beckmancoulter.com/wsrportal/techdocs?docname=B05577AB.pdf)
Generic Instrument Description	Laser diffraction is particle sizing technique for materials ranging from hundreds of nanometers up to several millimeters in size. Laser diffraction measures particle size distributions by measuring the angular variation in intensity of light scattered as a laser beam passes through a dispersed particulate sample. One example is the Beckman Coulter LS200.

Dataset-specific Instrument Name	Multi corer
Generic Instrument Name	Multi Corer
Dataset-specific Description	Sediment cores were obtained using a multi corer and subsampled at 2 cm depth intervals.
Generic Instrument Description	The Multi Corer is a benthic coring device used to collect multiple, simultaneous, undisturbed sediment/water samples from the seafloor. Multiple coring tubes with varying sampling capacity depending on tube dimensions are mounted in a frame designed to sample the deep ocean seafloor. For more information, see Barnett et al. (1984) in Oceanologica Acta, 7, pp. 399-408.

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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

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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-1760648

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