Hydrographic, nutrient and oxygen data from CTD bottles during R/V Pelican cruises from 2016-06-29 to 2018-06-24

Website: https://www.bco-dmo.org/dataset/753882
Data Type: Cruise Results
Version: 1
Version Date: 2019-01-28

Project
» REU Site: Ocean Observing for Emerging Ocean Scientists (REU-OTO)

Contributors	Affiliation	Role
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Abstract
Hydrographic, nutrient and oxygen data from CTD bottles during R/V Pelican cruises.

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Coverage

Spatial Extent: **N**:29.264 **E**:-91.72577 **S**:27.8681 **W**:-94.63563
Temporal Extent: 2016-06-29 - 2018-06-24

Dataset Description

Hydrographic, nutrient and oxygen data from CTD bottles during R/V Pelican cruises.

Methods & Sampling

Nutrient Analysis Equipment and Techniques:

Nutrient samples were collected, filtered (0.2 µm Acropak-200 polyethersulfone filters, Pall) and frozen on board until analysis on shore up to 3 months later. Nutrient analyses (phosphate, silicate, nitrate+nitrite, nitrite, ammonium, and urea) were performed on 6-channel Astoria-Pacific autoanalyzer using standard methods (WHPO 1994). Ammonia analyses were based on Solorzano (1969), using phenol/hypochlorite in alkaline medium with a sodium nitroprusside catalyst. Urea analyses were based on Aminot and Kerouel (1982) using diacetyl monoxime in acid solution.

Dissolved Oxygen Analysis Equipment and Techniques:

Samples were collected for dissolved oxygen analyses soon after the rosette was brought on board. Using a Tygon or silicone drawing tube, nominal 125 ml volume-calibrated iodine flasks were rinsed 3 times with minimal agitation, then filled and allowed to overflow for at least 3 flask volumes. Reagents (MnCl2 then NaI/NaOH) were added to fix the oxygen before stoppering. The flasks were shaken twice (>1 minute inversions) to assure thorough dispersion of the precipitate. The lip of the flask stopper was the filled with ultrapure water to prevent access to atmospheric oxygen during the up to 3 hours between sample collection and analysis.

Oxygen flask volumes were determined gravimetrically to determine flask volumes at TAMU Geochemical and Environmental Research Group (GERG). This is done once before using flasks for the first time and periodically thereafter when a suspect volume is detected.

Dissolved oxygen analyses were performed with an automated Winkler oxygen titrator (Langdon Enterprises, Miami) using amperometric end-point detection. Thiosulfate (nominally 0.01 N) was standardized against 0.01 N potassium iodate prior to sample analysis.

Salinity Analysis Equipment and Techniques:

Salinity samples were drawn into 200 mL Kimax high-alumina borosilicate bottles, which were rinsed three times with sample prior to filling to the shoulder. The bottles were sealed with plastic insert thimbles to reduce evaporation. PSS78 salinity (UNESCO 1981) was calculated for each sample from the measured conductivity ratios.

A Guildline Autosal 8400B salinometer (S/N 65715) was used for salinity/conductivity measurements. The salinity analyses were performed after samples had equilibrated to laboratory temperature, usually within 6 weeks after collection. The salinometer was standardized for each group of analyses using OSIL standard seawater, with frequent use of a secondary deep water standard to check for drift during runs.

Data Processing Description

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: Data Conversion, Filter, Align CTD, Cell Thermal Mass, Loop Edit, Derive, and Bin Average.

BCO-DMO Processing Notes:
- combined three years of data into one dataset
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- created date_time field with the format yyyy-mm-dd hh:mm

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Data Files

File
combined.csv (Comma Separated Values (.csv), 90.91 KB) MD5:020b23310d1202dd62530053c67bf5fe Primary data file for dataset ID 753882

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Related Publications

Aminot Alain, Kerouel R. (1982). Dosage automatique de l'urée dans l'eau de mer : une méthode très sensible à la diacétylmonoxime. Canadian journal of fisheries and aquatic sciences, 39, 174-183.

https://archimer.ifremer.fr/doc/1982/publication-5350.pdf
Methods

Solórzano, L. (1969). Determination of ammonia in natural waters by the phenolhypochlorite method 1 1.This research was fully supported by U.S. Atomic Energy Commission Contract No. ATS (11-1) GEN 10, P.A. 20. Limnology and Oceanography, 14(5), 799–801. doi:10.4319/lo.1969.14.5.0799
Methods

WHPO. 1994. WHP Operations and Methods. WOCE Hydrographic Office Report 91/1, as revised, WOCE Hydrographic Program Office, Woods Hole, MA.
Methods

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Parameters

Parameter	Description	Units
Station	Name of sampling station	unitless
Year	Year water samples were taken	unitless
Month	Month water samples were taken	unitless
Day	Day water samples were taken	unitless
Time	Time water samples were taken in UTC	unitless
date_time	date and time in UTC in ISO8601 format	unitless
Water_Depth	Maximum depth of bathymetry at station	meters
Latitude	Latitude of sampling station	decimal degrees
Longitude	Longitude of sampling station	decimal degrees
Niskin_Bottle	Niskin bottle samples were collected from	unitless
Bottle_Depth	Depth at which niskin bottle was closed	meters
Sequence	Order of stations	unitless
Nutrient_Bottle_no	Sample bottle number containing nutrient water sample	unitless
NO3_a	Nutrient analysis of nitrate content	umol/L

NO3_b	Nutrient analysis of nitrate content	mg/L N
HPO4_a	Nutrient analysis of hydrogen phosphate content	umol/L
HPO4_b	Nutrient analysis of hydrogen phosphate content	mg/L P
HSIO3_a	Nutrient analysis of hydrogen silicate content	umol/L
HSIO3_b	Nutrient analysis of hydrogen silicate content	mg/L SiO3
NH4_a	Nutrient analysis of ammonium content	umol/L
NH4_b	Nutrient analysis of ammonium content	mg/L N
NO2_a	Nutrient analysis of nitrogen dioxide content	umol/L
NO2_b	Nutrient analysis of nitrogen dioxide content	mg/L N
Urea_a	Nutrient analysis of urea content	umol/L
Urea_b	Nutrient analysis of urea content	mg/L N
NO3_NO2	Total nitrogen present in water sample	uM
Salinity_Bottle_no	Sample bottle number containing salinity water sample	unitless
Sample_Salinity	Salinity of collected water sample	PSU
CTD_Salinity	Salinity recorded from CTD	PSU
Oxygen_Bottle_no	Sample bottle number containing oxygen water sample	unitless
Burrette_Reading	Burrette reading of oxygen water sample	unitless
Dissolved_Oxygen_Content_a	Calculated dissolved oxygen content in water sample	mL/L
Dissolved_Oxygen_Content_b	Calculated dissolved oxygen content in water sample	mg/L

Dissolved_Oxygen_Content_c	Calculated dissolved oxygen content in water sample	mM/L
Density	Density	kg/m3
Temperature	Water Temperature	Degrees C
Transmissometer	percent transmittance	unitless
Chlorophyll_Fluoresence	cholorphyll fluoresence	ug/l
CDOM	Colored Dissolved Organic Matter	mg/m3
PAR	Photosynthetically Active Radiation	unitless
Comments	comments	unitless

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Instruments

Dataset-specific Instrument Name	adcp
Generic Instrument Name	Acoustic Doppler Current Profiler
Dataset-specific Description	adcp: Hawaii UHDAS: dx.doi.org/10.7284/126351
Generic Instrument Description	The ADCP measures water currents with sound, using a principle of sound waves called the Doppler effect. A sound wave has a higher frequency, or pitch, when it moves to you than when it moves away. You hear the Doppler effect in action when a car speeds past with a characteristic building of sound that fades when the car passes. The ADCP works by transmitting "pings" of sound at a constant frequency into the water. (The pings are so highly pitched that humans and even dolphins can't hear them.) As the sound waves travel, they ricochet off particles suspended in the moving water, and reflect back to the instrument. Due to the Doppler effect, sound waves bounced back from a particle moving away from the profiler have a slightly lowered frequency when they return. Particles moving toward the instrument send back higher frequency waves. The difference in frequency between the waves the profiler sends out and the waves it receives is called the Doppler shift. The instrument uses this shift to calculate how fast the particle and the water around it are moving. Sound waves that hit particles far from the profiler take longer to come back than waves that strike close by. By measuring the time it takes for the waves to bounce back and the Doppler shift, the profiler can measure current speed at many different depths with each series of pings. (More from WHOI instruments listing).

Dataset-specific Instrument Name	barameter
Generic Instrument Name	Barometer
Dataset-specific Description	Vaisala PTB101B: dx.doi.org/10.7284/124538
Generic Instrument Description	A barometer is an instrument used to measure atmospheric pressure. There are many types of barometers identified by make and model and method of measurement.

Dataset-specific Instrument Name	Sea-Bird SBE-911+
Generic Instrument Name	CTD Sea-Bird SBE 911plus
Dataset-specific Description	Sea-Bird SBE-911+: dx.doi.org/10.7284/124602
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	gnss
Generic Instrument Name	GPS receiver
Dataset-specific Description	Ashtech ADU800: dx.doi.org/10.7284/124579
Generic Instrument Description	Acquires satellite signals and tracks your location. This term has been deprecated. Use instead: https://www.bco-dmo.org/instrument/560

Dataset-specific Instrument Name	Vaisala HMP45
Generic Instrument Name	Hygrometer
Dataset-specific Description	dx.doi.org/10.7284/124539
Generic Instrument Description	Hygrometers are used for measuring relative humidity. This term is used when details of the make, model number and measurement principle are not known.

Dataset-specific Instrument Name	Sea-Bird SBE-21
Generic Instrument Name	Sea-Bird SeaCAT Thermosalinograph SBE 21
Dataset-specific Description	dx.doi.org/10.7284/124541
Generic Instrument Description	A platinum-electrode conductivity sensor and a thermistor mounted in a corrosion-resistant plastic and titanium housing designed to be continuously plumbed into a vessel's pumped seawater supply. The instrument may be interfaced to a remote SBE 38 temperature sensor mounted either on the hull or in the seawater inlet. Data are both stored in internal memory and output to a serial port for external logging. Conductivity is measured in the range 0-7 S/m with an accuracy of 0.001 S/m and a resolution of 0.0001 S/m. Housing temperature is measured in the range -5-35C with an accuracy of 0.01 C and a resolution of 0.001 C. Remote temperature is measured in the range -5-35C with an accuracy of 0.001 C and a resolution of 0.0003 C. More information at http://www.seabird.com/products/spec_sheets/21data.htm.

Dataset-specific Instrument Name	WET Labs C-Star
Generic Instrument Name	WET Labs {Sea-Bird WETLabs} C-Star transmissometer
Dataset-specific Description	dx.doi.org/10.7284/124540
Generic Instrument Description	The C-Star transmissometer has a novel monolithic housing with a highly intgrated 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

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Deployments

PE16-26

Website	https://www.bco-dmo.org/deployment/753935
Platform	R/V Pelican

PE17-25

Website	https://www.bco-dmo.org/deployment/753968
Platform	R/V Pelican

PE18-32

Website	https://www.bco-dmo.org/deployment/754276
Platform	R/V Pelican
Start Date	2018-06-22
End Date	2018-06-24

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Project Information

REU Site: Ocean Observing for Emerging Ocean Scientists (REU-OTO)

Website: https://ocean.tamu.edu/academics/reu/

Coverage: Gulf Mexico, Louisiana and Texas coast, Flower Garden Banks National Marine Sanctuary

NSF Award Abstract:
A new Research Experiences for Undergraduates (REU) Site will be located at Texas A&M University's campus in College Station, TX. The Geochemical and Environmental Research Group (GERG) and the Department of Oceanography will host 10 REU students for 10 weeks each summer, and the program will focus on innovative ocean observing technologies. Students will have access to a suite of ocean data acquisition technologies incorporated in TAMU's offshore buoy system, glider technology, remote real-time measurements from moored instrumentation, shipboard field surveys with CTD profiling and water sampling. A group project to develop and deploy a glider mission in the Gulf of Mexico onboard a research vessel will promote team building. Training modules on sensors, data analysis, graphical representation of oceanographic data, data management, and science writing will be provided. Students will participate in weekly REU seminars, and at the program end, they will demonstrate their communication skills with a final written report and a seminar presentation at the GERG REU Student Research Symposium. Although the program is open to students who are US citizens or permanent residents attending any university, local recruitment efforts will be coordinated with faculty in the NSF-funded Alliance for Graduate Education and the Professoriate (AGEP) program which supports mentoring of STEM majors across TAMU branch campuses (Kingsville, Corpus Christi, Prairie View and West Texas).

Related Projects:
This project is a renewed/continued by project "REU Site: Observing the Ocean" (OCE-1849932); see: https://www.bco-dmo.org/project/877594.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1455851

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