Bottle data from CTD casts conducted on R/V Endeavor cruise EN640 from June-July 2019

Website: https://www.bco-dmo.org/dataset/846628
Data Type: Cruise Results
Version: 3
Version Date: 2021-04-23

Project
» Collaborative Research: Impact of the Amazon River Plume on Nitrogen Availability and Planktonic Food Web Dynamics in the Western Tropical North Atlantic (Amazon River Plume Nitrogen)

Contributors	Affiliation	Role
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Abstract
This dataset contains bottle data from CTD casts conducted on R/V Endeavor cruise EN640 from June-July 2019.

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Coverage

Spatial Extent: **N**:16.035 **E**:-50.38404 **S**:4.87905 **W**:-60.02314
Temporal Extent: 2019-06-15 - 2019-07-08

Methods & Sampling

Hydrographic data were collected during casts with a CTD-rosette system (SBE11plus) equipped with a fluorometer, transmissometer, oxygen sensor, and a PAR sensor.

Data Processing Description

Data Processing: Data were processed using SeaSave v 7.26.7.107. See Supplemental File "EN640_CTD_Sea-Bird_File_Header" (PDF) for a representative file header, which includes the SeaSave processing steps. Refer to Supplemental File "EN640_CTD_Data_Notes" (PDF) for Excel processing notes.

BCO-DMO Processing:
- converted date/time fields to ISO8601 format;

- renamed fields to comply with BCO-DMO naming conventions.

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Data Files

File
EN640_Bottles.csv (Comma Separated Values (.csv), 633.46 KB) MD5:1c0bf29922929f478e0e1da00a82cb4e Primary data file for dataset ID 846628

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Supplemental Files

File
EN640_CTD_Data_Notes.pdf (Portable Document Format (.pdf), 406.71 KB) MD5:b850ad1a5b6039ef52aa625444aa4b5b Processing notes describing the steps taken to compile data from the .btl files into the Excel file that was submitted to BCO-DMO.
EN640_CTD_Sea-Bird_File_Header.pdf (Portable Document Format (.pdf), 316.07 KB) MD5:b500ac9a4eb949d9264b0b10299ce46d Representative Sea-Bird header file for the CTD casts conducted on cruise EN640. Includes sensor calibration information and SeaSave processing steps.

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Parameters

Parameter	Description	Units
FileName	Original name of data file	unitless
Cruise	Cruise identifer	unitless
Station	Station number	unitless
StnEvent	Numeric identifier for each deployment in the format SSS.EE. SSS is the station number and EE identifies the specific sampling event.	unitless
BottleID	Bottle identifier (station, event, bottle)	unitless
Bottle	Bottle number	unitless
ISO_DateTime_UTC	Date and time (UTC) in ISO8601 format: YYYY-MM-DDThh:mm:ssZ	unitless

Sal00	Salinity, Practical	PSU
Sal11	Salinity, Practical, 2	PSU
Sigma_t00	Density [sigma-theta]	kilograms per cubic meter (kg/m^3)
Sigma_t11	Density, 2 [sigma-theta]	kilograms per cubic meter (kg/m^3)
Sbeox0Mm_L	Oxygen, SBE 43, WS = 2	micromoles per liter (umol/l)
Sbeox1Mm_L	Oxygen, SBE 43, 2, WS = 2	micromoles per liter (umol/l)
Potemp090C	Potential Temperature [ITS-90]	degrees Celsius
Potemp190C	Potential Temperature, 2 [ITS-90]	degrees Celsius
SvCM	Sound Velocity [Chen-Millero]	meters per second (m/s)
SvCM1	Sound Velocity, 2 [Chen-Millero]	meters per second (m/s)
Scan	Scan count	unitless
Scan_SD	Standard deviation of Scan	unitless
TimeJ	Julian day (UTC)	unitless
TimeJ_SD	Standard deviation of TimeJ	unitless
TimeS	Time elapsed	seconds
TimeS_SD	Standard deviation of TimeS	seconds
PrDM	Pressure, Digiquartz	decibars (db)
PrDM_SD	Standard deviation of PrDM	decibars (db)
DepSM	Depth [salt water, m]	meters (m)

DepSM_SD	Standard deviation of DepSM	meters (m)
T090C	Temperature [ITS-90]	degrees Celsius
T090C_SD	Standard deviation of T090C	degrees Celsius
T190C	Temperature, 2 [ITS-90]	degrees Celsius
T190C_SD	Standard deviation of T190C	degrees Celsius
T2_T190C	Temperature Difference, 2 - 1 [ITS-90]	degrees Celsius
T2_T190C_SD	Standard deviation of T2_T190C	degrees Celsius
C0S_m	Conductivity	Siemens per meter (S/m)
C0S_m_SD	Standard deviation of C0S_m	Siemens per meter (S/m)
C1S_m	Conductivity, 2	Siemens per meter (S/m)
C1S_m_SD	Standard deviation of C1S_m	Siemens per meter (S/m)
C2_C1S_m	Conductivity Difference, 2 - 1	Siemens per meter (S/m)
C2_C1S_m_SD	Standard deviation of C2_C1S_m	Siemens per meter (S/m)
V0	Voltage 0	volts (V)
V0_SD	Standard deviation of V0	volts (V)
CStarAt0	Beam Attenuation, WET Labs C-Star	reciprocal meters (1/m)
CStarAt0_SD	Standard deviation of CStarAt0	reciprocal meters (1/m)
CStarTr0	Beam Transmission, WET Labs C-Star	percent (%)
CStarTr0_SD	Standard deviation of CStarTr0	percent (%)

V1	Voltage 1	volts (V)
V1_SD	Standard deviation of V1	volts (V)
FlECO_AFL	Fluorescence, WET Labs ECO-AFL/FL	milligrams per cubic meter (mg/m^3)
FlECO_AFL_SD	Standard deviation of FIECO_AFL	milligrams per cubic meter (mg/m^3)
V2	Voltage 2	volts (V)
V2_SD	Standard deviation of V2	volts (V)
AltM	Altimeter	meters (m)
AltM_SD	Standard deviation of AltM	meters (m)
V3	Voltage 3	volts (V)
V3_SD	Standard deviation of V3	volts (V)
Par	PAR/Irradiance, Biospherical/Licor	micromoles photons per square meter per second (umol photons/m^2/sec)
Par_SD	Standard deviation of Par	micromoles photons per square meter per second (umol photons/m^2/sec)
V4	Voltage 4	volts (V)
V4_SD	Standard deviation of V4	volts (V)
Sbeox0V	Oxygen raw, SBE 43	volts (V)
Sbeox0V_SD	Standard deviation of Sbeox0V	volts (V)
V5	Voltage 5	volts (V)
V5_SD	Standard deviation of V5	volts (V)
Sbeox1V	Oxygen raw, SBE 43, 2	volts (V)

Sbeox1V_SD	Standard deviation of Sbeox1V	volts (V)
V6	Voltage 6	volts (V)
V6_SD	Standard deviation of V6	volts (V)
V7	Voltage 7	volts (V)
V7_SD	Standard deviation of V7	volts (V)
Spar	SPAR, Biospherical/Licor	micromoles photons per square meter per second (umol photons/m^2/sec)
Spar_SD	Standard deviation of Spar	micromoles photons per square meter per second (umol photons/m^2/sec)
Latitude	Latitude	degrees North
Latitude_SD	Standard deviation of Latitude	degrees North
Longitude	Longitude	degrees East
Longitude_SD	Standard deviation of Longitude	degrees East

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Instruments

Dataset-specific Instrument Name	Seabird SBE 11plus v5.2
Generic Instrument Name	CTD Sea-Bird
Generic Instrument Description	A Conductivity, Temperature, Depth (CTD) sensor package from SeaBird Electronics. This instrument designation is used when specific make and model are not known or when a more specific term is not available in the BCO-DMO vocabulary. Refer to the dataset-specific metadata for more information about the specific CTD used. More information from: http://www.seabird.com/

Dataset-specific Instrument Name	PAR/Irradiance & SPAR, Biospherical/Licor
Generic Instrument Name	LI-COR Biospherical PAR Sensor
Generic Instrument Description	The LI-COR Biospherical PAR Sensor is used to measure Photosynthetically Available Radiation (PAR) in the water column. This instrument designation is used when specific make and model are not known.

Dataset-specific Instrument Name	
Generic Instrument Name	Niskin bottle
Generic Instrument Description	A Niskin bottle (a next generation water sampler based on the Nansen bottle) is a cylindrical, non-metallic water collection device with stoppers at both ends. The bottles can be attached individually on a hydrowire or deployed in 12, 24, or 36 bottle Rosette systems mounted on a frame and combined with a CTD. Niskin bottles are used to collect discrete water samples for a range of measurements including pigments, nutrients, plankton, etc.

Dataset-specific Instrument Name	Oxygen, SBE 43
Generic Instrument Name	Sea-Bird SBE 43 Dissolved Oxygen Sensor
Generic Instrument Description	The Sea-Bird SBE 43 dissolved oxygen sensor is a redesign of the Clark polarographic membrane type of dissolved oxygen sensors. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Fluorometer, WET Labs ECO-AFL/FL
Generic Instrument Name	Wet Labs ECO-AFL/FL Fluorometer
Generic Instrument Description	The Environmental Characterization Optics (ECO) series of single channel fluorometers delivers both high resolution and wide ranges across the entire line of parameters using 14 bit digital processing. The ECO series excels in biological monitoring and dye trace studies. The potted optics block results in long term stability of the instrument and the optional anti-biofouling technology delivers truly long term field measurements. more information from Wet Labs

Dataset-specific Instrument Name	Transmissometer, WET Labs C-Star
Generic Instrument Name	WET Labs {Sea-Bird WETLabs} C-Star transmissometer
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

EN640

Website	https://www.bco-dmo.org/deployment/846173
Platform	R/V Endeavor
Start Date	2019-06-13
End Date	2019-07-08
Description	See more information from the Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/EN640

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Project Information

Collaborative Research: Impact of the Amazon River Plume on Nitrogen Availability and Planktonic Food Web Dynamics in the Western Tropical North Atlantic (Amazon River Plume Nitrogen)

Coverage: Amazon River plume

NSF Award Abstract:
This is a focused program of field research in waters of the Western Tropical North Atlantic influenced by the Amazon River Plume during the high river flow season. The Amazon Plume region supports diverse plankton communities in a dynamic system driven by nutrients supplied by transport from the river proper as well as nutrients entrained from offshore waters by physical mixing and upwelling. This creates strong interactions among physical, chemical, and biological processes across a range of spatial and temporal scales. The field program will link direct measurements of environmental properties with focused experimental studies of nutrient supply and nutrient limitation of phytoplankton, as well as the transfer of phytoplankton nitrogen to the zooplankton food web. The Amazon Plume exhibits a close juxtaposition of distinct communities during the high-flow season, making it an ideal site for evaluating how nutrient availability, nutrient supply, and habitat longevity interact to drive offshore ecosystem dynamics and function. This project will include German collaborators and will seamlessly integrate education and research efforts. The investigators and their institutions have a strong commitment to undergraduate and graduate education and to increasing the diversity of the ocean science community through active recruiting and training efforts. The team has a strong track record of involving both undergraduate and graduate students in their field and lab research. The two research cruises planned will provide opportunities for students and technicians to interact with an interdisciplinary and international research team.

The ultimate objectives of this project are to understand the processes and interactions that promote distinct communities of nitrogen-fixing organisms (diazotrophs) and other phytoplankton around the Amazon Plume and to explore the impacts of these diazotroph-rich communities on zooplankton biomass and production. The research team includes scientists with expertise in nutrient and stable isotope biogeochemistry, remote sensing as well as specialists in characterizing water mass origin and history using naturally occurring radium isotopes. This combination of approaches will provide a unique opportunity to address fundamental questions related to plankton community structure, primary production, and links to secondary production in pelagic ecosystems. The project will address the following key questions focused on fundamental issues in plankton ecology resulting from previous research in this region:

A. What mechanisms promote the preferential delivery of bioavailable phosphorus and the resulting strong nitrogen limitation associated with the northern reaches of the Amazon Plume during the high flow season?

B. What factors lead to the clear niche separation between diazotrophs within and around the Amazon Plume and how are the distinct diazotroph communities influenced by hydrographic and biogeochemical controls associated with the Amazon River Plume and offshore upwelling processes?

C. How does the nitrogen fixed by the different types of diazotrophs contribute to secondary production, and how efficiently does diazotroph nitrogen move through the food web?

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1737078

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