Temperature and salinity from drifters deployed during R/V Hugh R. Sharp DANCE cruise HRS1414 in the Mid and South-Atlantic Bight from July to August of 2014 (DANCE project)

Website: https://www.bco-dmo.org/dataset/733965
Data Type: Cruise Results
Version: 1
Version Date: 2018-04-19

Project
» Collaborative Research: Impacts of atmospheric nitrogen deposition on the biogeochemistry of oligotrophic coastal waters (DANCE)

Contributors	Affiliation	Role
Najjar, Raymond	Pennsylvania State University (PSU)	Principal Investigator, Contact
Herrmann, Maria	Pennsylvania State University (PSU)	Scientist
York, Amber D.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
15-min location, temperature, and salinity data from three drifting buoys deployed during DANCE cruise HRS1414 in the Mid and South-Atlantic Bight from July to August of 2014 (DANCE project)

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Coverage

Spatial Extent: **N**:38.686 **E**:-71.106 **S**:35.51 **W**:-72.748
Temporal Extent: 2014-08-01 - 2014-08-14

Methods & Sampling

Methodology:

Three drifting buoys (with ID numbers 103, 104, and 105) were deployed during the cruise to track the position of precipitation-receiving water masses (eddies) and simultaneously record temperature and salinity. The drifters were equipped with 10-m drogues and so approximately follow the surface mixed layer; the sensors were located at the depth of approximately 2 m.

Instruments:
Model 121 GPS / Iridium drifters by Brightwaters Instruments (BI) with temperature and salinity sensors (http://brightwaters.com/products/121/121.htm). Model 121 a current following (Lagrangian) drifting buoy, is released in a body of water and moves with the currents over a period of hours to months. Onboard electronics acquire a time series of positions using the Global Position System (GPS) as the drifter moves. Positions and optional sensor data are telemetered over the worldwide Iridium satellite network and delivered to the end user via a web browser. The DANCE drifters were configured with the “standard” size hull, which is

approximately 1 meter (40 in.) tall excluding the antenna mast and weighs about 11 Kg (24 lbs). The Model 121 features a 12 channel GPS receiver and records position to 0.001 minute of latitude and longitude (1.8 meters). Absolute accuracy of the position is better than 15 meters worldwide. In areas served by one of three Satellite Based Augmentation Systems (WAAS in North America, EGNOS in Europe, and MSAS in East Asia) absolute accuracy is better than 3 meters 2DRMS. BI conductivity / temperature sensor: -10 to +40C, resolution 0.01C; 0-60 mmho/cm, resolution 0.01 mmho/cm; full digital sensor with individual calibration yields typical postprocessed accuracy of 0.05C and 0.05 mmho/cm.

Data Processing Description

Raw output was processed using Matlab.

BCO-DMO Data Manager Processing Notes:
* added a conventional header with dataset name, PI name, version date
* modified parameter names to conform with BCO-DMO naming conventions
* added ISO DateTime from year, month, day, hour, min, sec fields.
* NaN values displayed as "nd" for "no data"
* removed two lines containing bad lat/lon values

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Data Files

File	
dance_DATASET_DRIFTERS.csv	(Comma Separated Values (.csv), 176.64 KB) MD5:ce822ecc1b83c678c7801385bbe32a99
Primary data file for dataset ID 733965	

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Parameters

Parameter	Description	Units
drifter_id	Drifting buoy number	unitless
yr	Year (UTC)	unitless
mon	Month (UTC)	unitless
day	Day (UTC)	unitless
hr	Hour (UTC)	unitless
min	Minute (UTC)	unitless
sec	Second (UTC)	unitless
ISO_DateTime_UTC	ISO timestamp based on the ISO 8601:2004(E) standard in format YYYY-mm-ddTHH:MM:SSZ (UTC)	unitless
lat	Latitude	decimal degrees
lon	Longitude	decimal degrees
temp	Tempertaure	degrees Celsius
salt	Salinity	parts per thousand (ppt)

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Instruments

Dataset-specific Instrument Name	Model 121 GPS / Iridium drifters by Brightwaters Instruments (BI)
Generic Instrument Name	Drifter Buoy
Dataset-specific Description	Model 121 GPS / Iridium drifters by Brightwaters Instruments (BI) with temperature and salinity sensors (http://brightwaters.com/products/121/121.htm).
Generic Instrument Description	Drifting buoys are free drifting platforms with a float or buoy that keep the drifter at the surface and underwater sails or socks that catch the current. These instruments sit at the surface of the ocean and are transported via near-surface ocean currents. They are not fixed to the ocean bottom, therefore they "drift" with the currents. For this reason, these instruments are referred to as drifters, or drifting buoys. The surface float contains sensors that measure different parameters, such as sea surface temperature, barometric pressure, salinity, wave height, etc. Data collected from these sensors are transmitted to satellites passing overhead, which are then relayed to land-based data centers. definition sources: https://mmisw.org/ont/ioos/platform/drifting_buoy and https://www.aoml.noaa.gov/phod/gdp/faq.php#drifter1

Dataset-specific Instrument Name	12 channel GPS receiver
Generic Instrument Name	GPS receiver
Generic Instrument Description	Acquires satellite signals and tracks your location. This term has been deprecated. Use instead: https://www.bco-dmo.org/instrument/560

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Deployments

HRS1414

Website	https://www.bco-dmo.org/deployment/731505
Platform	R/V Hugh R. Sharp
Start Date	2014-07-29
End Date	2014-08-16

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Project Information

Collaborative Research: Impacts of atmospheric nitrogen deposition on the biogeochemistry of oligotrophic coastal waters (DANCE)

Coverage: Offshore Mid-Atlantic Bight and northern South-Atlantic Bight between latitudes 31.60°N and 38.89°N, and longitudes 71.09°W and 75.16°W

NSF abstract:

Deposition of atmospheric nitrogen provides reactive nitrogen species that influence primary production in nitrogen-limited regions. Although it is generally assumed that these species in precipitation contributes

substantially to anthropogenic nitrogen loadings in many coastal marine systems, its biological impact remains poorly understood. Scientists from Pennsylvania State University, William & Mary College, and Old Dominion University will carry out a process-oriented field and modeling effort to test the hypothesis that deposits of wet atmospheric nitrogen (i.e., precipitation) stimulate primary productivity and accumulation of algal biomass in coastal waters following summer storms and this effect exceeds the associated biogeochemical responses to wind-induced mixing and increased stratification caused by surface freshening in oligotrophic coastal waters of the eastern United States. To attain their goal, the researchers would perform a Lagrangian field experiment during the summer months in coastal waters located between Delaware Bay and the coastal Carolinas to determine the response of surface-layer biogeochemistry and biology to precipitation events, which will be identified and intercepted using radar and satellite data. As regards the modeling effort, a 1-D upper ocean mixing model and a 1-D biogeochemical upper-ocean will be calibrated by assimilating the field data obtained a part of the study using the adjoint method. The hypothesis will be tested using sensitivity studies with the calibrated model combined with in-situ data and results from the incubation experiments. Lastly, to provide regional and historical context for the field measurements and the associated 1-D modeling, linked regional atmospheric-oceanic biogeochemical modeling will be conducted.

Broader Impacts. Results from the study would be incorporated into class lectures for graduate courses on marine policy and marine biogeochemistry. One graduate student from Pennsylvania State University, one graduate student from the College of William and Mary, and one graduate and one undergraduate student from Old Dominion University would be supported and trained as part of this project.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1260574

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