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
York, Amber	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)

Table of Contents

Coverage

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

Acquisition Description

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.

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

[table of contents | back to top]

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)

[table of contents | back to top]

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	Drifter buoy to include the Beardsley Drifter. Generic drifter buoys may be surface or sub-surface buoys that move with the current. They have a variety of instruments attached, providing a platform that allows for the measurement of surface drifts, air pressure and other variables. The Beardsley Drifters are near-surface satellite-tracked drifters used for observations of circulation patterns. They are WOCE-style drifters featuring holey sock drogues. Each drifter has a small (~ 30 cm diameter) surface float with ARGOS transmitter and batteries tethered to a holey sock drogue centered at 15 m below the surface. The drogue, about 10 m tall and 1 m in diameter, is designed to "lock" itself to the water so that the surface float follows the mean water motion at 15 m depth with very little slippage even in high winds. Thus measuring the drifter's position as a function of time provides a Lagrangian measurement of the 15-m ocean current. (http://globec.whoi.edu/jg/info/globec/soglobec/drifters_argos%7Bdir=glob...?) WOCE-drifters: http://woce.nodc.noaa.gov/wdiu/diu_summaries/svp/index.htm

Dataset-specific Instrument Name	12 channel GPS receiver
Generic Instrument Name	GPS receiver
Generic Instrument Description	Acquires satellite signals and tracks your location.

[table of contents | back to top]

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

[table of contents | back to top]

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.

[table of contents | back to top]

Funding

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

[table of contents | back to top]