

Total column ozone (O3) measured measured during DANCE cruise HRS1414 aboard the R/V Hugh R. Sharp from July to August 2014.

Website: <https://www.bco-dmo.org/dataset/732116>

Data Type: Cruise Results

Version: 1

Version Date: 2018-03-27

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
Martins, Douglas K.	Pennsylvania State University (PSU)	Scientist
Switzer, Megan	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract

Total column ozone (O3) measured measured during DANCE cruise HRS1414 aboard the R/V Hugh R. Sharp from July to August 2014.

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Coverage

Spatial Extent: N:38.89 E:-71.09 S:31.6 W:-75.16

Temporal Extent: 2014-07-29 - 2014-08-14

Dataset Description

Total column ozone measured measured during DANCE cruise HRS1414 aboard the R/V Hugh R. Sharp from July to August 2014 on the 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. Sampling procedures and methods are found in Martins et al. 2016.

Data Processing Description

BCO-DMO processing notes:

- changes parameter names to BCO-DMO naming conventions
- organized under top-level file by station number

Data Files

File
PANDORA_O3.csv (Comma Separated Values (.csv), 698.29 KB) MD5:af754655fe786c0ccf4bc472003cb203
Primary data file for dataset ID 732116

Related Publications

Martins, D. K., Najjar, R. G., Tzortziou, M., Abuhassan, N., Thompson, A. M., & Kollonige, D. E. (2016). Spatial and temporal variability of ground and satellite column measurements of NO₂ and O₃ over the Atlantic Ocean during the Deposition of Atmospheric Nitrogen to Coastal Ecosystems Experiment. *Journal of Geophysical Research: Atmospheres*, 121(23), 14,175–14,187. doi:10.1002/2016jd024998

<https://doi.org/10.1002/2016jd024998>

Methods

Parameters

Parameter	Description	Units
Station_ID	Station ID	no units
Date_Time	UT date and time for center of measurement (yyyymmddThhmmssZ)	no units
Samp_time	Total duration of measurement in seconds	seconds
Zenith	Solar zenith angle at the center-time of the measurement in degrees	degrees
Azimuth	Solar azimuth at the center-time of the measurement in degrees; 0=north; increases clockwise	degrees
rms_unweighted	rms of unweighted spectral fitting residuals	no units
rms_weighted	Normalized rms of weighted spectral fitting residuals	no units
O3_vert	Ozone vertical column amount	Dobson units
O3_uncert	Uncertainty of nitrogen dioxide vertical column amount	Dobson units
O3_dir_sun	Direct sun nitrogen dioxide air mass factor	no units

err_index	Sum over 2^i with i being a level 2 error index	no units
Temp	Effective temperature; 999=no effective temperature given	degrees Celsius
Res_stray_light	Estimated average residual stray light level	percent
Wavelength_shift	Retrieved wavelength shift	nanometers (nm)
Filterwheel_pos	Position of filterwheel #2; 0=filterwheel not used; 1-9 are valid positions	no units
Result_index	Fitting result index; 1 and 2=no error; >2=error	no units
O3_temp	Ozone effective temperature	degrees Kelvin (K)
O3_temp_uncert	Uncertainty of nitrogen dioxide effective temperature	degrees Kelvin (K)
lat	Latitude, negative is south	decimal degrees
lon	Longitude, negative is west	decimal degrees

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Instruments

Dataset-specific Instrument Name	Eppley PIR
Generic Instrument Name	Eppley Longwave Radiometer
Generic Instrument Description	The Eppley Precision Infrared Radiometer (PIR) pyrgeometer measures longwave (infrared) radiation. It is housed in a weatherproof titanium canister that has been painted with a very flat black paint that absorbs radiation. A small glass dome at the top of the instrument is covered with an 'interference coating' which allows only infrared radiation to come through. Light levels are detected as temperature changes creating voltages in fine wire coil detectors. more from Eppley Labs

Dataset-specific Instrument Name	R.M. Young 50202
Generic Instrument Name	Precipitation Gauge
Generic Instrument Description	measures rain or snow precipitation

Dataset-specific Instrument Name	Eppley PSP
Generic Instrument Name	Precision Spectral Pyranometer
Generic Instrument Description	This radiometer measures sun and sky irradiance in the range of wavelengths 0.285 to 2.8 microns, including most of the solar spectrum. The PSP is intended to weight the energy flux in all wavelengths equally. It is a "hemispheric receiver" intended to approximate the cosine response for oblique rays. The Eppley Precision Spectral Pyranometer (PSP) is primarily used where high accuracy is required or where it is used to calibrate other pyranometers. The PSP outputs a low level voltage ranging from 0 to a maximum of about 12mV depending on sensor calibration and radiation level. An instruction manual provided by Eppley contains the sensor calibration constant and serial number. The Precision Spectral Pyranometer is a World Meteorological Organization First Class Radiometer and comes with a calibration certificate traceable to the World Radiation Reference and a temperature compensation curve. More information is available from Eppley Labs.

Dataset-specific Instrument Name	Metcon 2-pi radiometer
Generic Instrument Name	Radiometer
Generic Instrument Description	Radiometer is a generic term for a range of instruments used to measure electromagnetic radiation (radiance and irradiance) in the atmosphere or the water column. For example, this instrument category includes free-fall spectral radiometer (SPMR/SMSR System, Satlantic, Inc), profiling or deck cosine PAR units (PUV-500 and 510, Biospherical Instruments, Inc). This is a generic term used when specific type, make and model were not specified.

Dataset-specific Instrument Name	Aerodyne CAPS; Thermo 49C; Thermo 48; Thermo 42C
Generic Instrument Name	Spectrophotometer
Generic Instrument Description	An instrument used to measure the relative absorption of electromagnetic radiation of different wavelengths in the near infra-red, visible and ultraviolet wavebands by samples.

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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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