

Extracted chlorophyll concentrations from Niskin bottle samples from the PICO time-series station (34.7181 deg N, 76.6707 deg W) from 2010-2012 (PICO project)

Website: <https://www.bco-dmo.org/dataset/4030>

Version: 30 Aug 2013

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Project

» [Pivers Island Coastal Observatory](#) (PICO)

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Dataset Description

Total extracted chlorophyll concentrations (>0.22 µm) from the Pivers Island Coastal Observatory (PICO) from 2010 to 2012.

Note: Chlorophyll was not measured at all time points, thus, some dates have no data ('nd') in the 'chl_extracted' column.

Methods & Sampling

Water was sampled using a 5 L niskin bottle centered at 1 m with a bottle length of 0.7 m. Methods described in Johnson et al. 2010: Chlorophyll concentrations were measured by filtering 20 mL of seawater sample onto a 0.22 micrometer (µm) pore size polycarbonate filter using gentle vacuum (<100 mm Hg) and extracting in 100% MeOH at -20 degrees C in the dark for >24 h following Holm-Hansen and Riemann (1978). Fluorescence was measured using a Turner Designs 10-AU fluorometer following Welschmeyer (1994) that was calibrated against a standard chlorophyll solution (Ritchie, 2006).

References:

Johnson, Z.I., Shyam, R., Ritchie, A.E., Lin, Y., Mioni, C., Lance, V.P. et al. 2010. The effects of iron- and light-limitation on phytoplankton communities of deep chlorophyll maxima of the Western Pacific Ocean. *Journal of Marine Research* 68: 1-26. doi: [10.1357/002224010793721433](https://doi.org/10.1357/002224010793721433)

Holm-Hansen, O., and Riemann, B. 1978. Chlorophyll a determination: Improvements in methodology. *Oikos* 30: 438-447.

Welschmeyer, N.A. 1994. Fluorometric analysis of chlorophyll a in the presence of chlorophyll b and pheopigments. *Limnology and Oceanography* 39: 1985-1992.

Ritchie, R. 2008. Universal chlorophyll equations for estimating chlorophylls a, b, c, and d and total chlorophylls in natural assemblages of photosynthetic organisms using acetone, methanol, or ethanol solvents. *Photosynthetica* 46: 115-126. doi: [10.1007/s11099-008-0019-7](https://doi.org/10.1007/s11099-008-0019-7)

Data Processing Description

Note: >0.22 um referred to as "total" or simply "chlorophyll".

Quality Scores (qflag) as follows:

- 1 = excellent (no known issues),
- 2 = suspect,
- 3 = poor (known reason to suspect data).

BCO-DMO Processing Notes:

- Created 'replicate' column and re-arranged data so that replicates are in rows, not columns.
- Modified parameter names to conform with BCO-DMO naming conventions.
- Replaced blanks with 'nd' to indicate 'no data'.
- Separated date into month, day, and year columns.

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Data Files

File
chlorophyll.csv (Comma Separated Values (.csv), 55.82 KB) MD5:3ecbdaa994311c56354c850a35a25041
Primary data file for dataset ID 4030

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Parameters

Parameter	Description	Units
deployment	Deployment name/id number.	text
lat	Latitude of sampling location. Positive = North.	decimal degrees
lon	Longitude of sampling location. Positive = East.	decimal degrees
year	Year (local time) of the sampling event.	YYYY
month_local	Month (local time) when the sampling event occurred.	mm (01 to 12)
PID_num	Unique, sequential "occupation" number for sampling. (The unique time/day when sampling occurred.)	dimensionless
day_local	Day of month (local time) when the sampling event occurred.	dd (01 to 31)
time_local	Time (local) when the sampling event occurred; 24-hour clock.	HHMM.mm
time_qflag	Quality score for time_local: 1 = excellent (no known issues); 2 = suspect; 3 = poor (known reason to suspect data).	dimensionless
replicate	Replicate identifier. (All of the "A" chlorophyll samples are from the same bottle, however "A" replicates for chlorophyll are unrelated to "A" replicates in the other PICO datasets.)	text
chl_extracted	Extracted chlorophyll concentration (>0.22 um).	milligrams Chl-a per cubic meter (mg Chl-a m-3)
chl_qflag	Quality score for chl_extracted: 1 = excellent (no known issues); 2 = suspect; 3 = poor (known reason to suspect data).	dimensionless
depth	Depth of water sampling.	meters
yrday	Consecutive day of year for a specified year, as a decimal. The fraction of the value represents the time within the day (e.g. a value of 1.5 means January 1 at 1200 hours).	dimensionless
ISO_DateTime_Local	Date-time (local) formatted to ISO 8601 standard.	YYYY-MM-DDTHH:MM:SS.ss

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Instruments

Dataset-specific Instrument Name	Niskin bottle
Generic Instrument Name	Niskin bottle
Dataset-specific Description	Water was sampled using a 5 Liter 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	Turner Designs Fluorometer -10-AU
Generic Instrument Name	Turner Designs Fluorometer 10-AU
Generic Instrument Description	The Turner Designs 10-AU Field Fluorometer is used to measure Chlorophyll fluorescence. The 10AU Fluorometer can be set up for continuous-flow monitoring or discrete sample analyses. A variety of compounds can be measured using application-specific optical filters available from the manufacturer. (read more from Turner Designs, turnerdesigns.com, Sunnyvale, CA, USA)

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Deployments

PICO_1-301

Website	https://www.bco-dmo.org/deployment/59063
Platform	Duke University Marine Lab
Start Date	2010-06-28
End Date	2012-06-26
Description	The PICO time series is sampled weekly (or more frequently) to capture physical, chemical and biological variability in the coastal ocean. This time series enables the investigator to collaborate with a number of researchers and will serve as a long-term research focus. Project information: http://oceanography.ml.duke.edu/johnson/research/pico/

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Project Information

Pivers Island Coastal Observatory (PICO)

Website: <http://oceanography.ml.duke.edu/johnson/research/pico/>

Coverage: 34.7181 deg N, 76.6707 deg W

From the [project website](#):

Carbon dioxide is rising at ~3% per year in the atmosphere and oceans leading to increases in dissolved inorganic carbon and a reduction in pH. This trend is expected to continue for the foreseeable future and ocean pH is predicted to decrease substantially making the ocean more acidic, potentially affecting the marine ecosystem. However, coastal estuaries are highly dynamic systems that often experience dramatic changes in environmental variables over short periods of times. In this study, the investigators are measuring key variables of the marine carbon system along with other potential forcing variables and characteristics of the ecosystem that may be affected by these pH changes. The goal of this project is to determine the time-scales and magnitude of natural variability that will be superimposed on any long term trends in ocean chemistry.

This project is associated with [Ocean Acidification: microbes as sentinels of adaptive responses to multiple stressors: contrasting estuarine and open ocean environments.](#)

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1031064
NSF Ocean Sciences Research Initiation Grants (NSF OCE-RIG)	OCE-RIG-1322950

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