

# Dissolved inorganic carbon (DIC) 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/4031>

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## Project

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

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## Dataset Description

Dissolved inorganic carbon (DIC;  $\mu\text{M}$  Carbon) from the Pivers Island Coastal Observatory (PICO) from 2010 to 2012.

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

## Methods & Sampling

Water was sampled using a 5 L niskin bottle centered at 1 m with a bottle length of 0.7 m. DIC was measured on mercuric chloride poisoned samples by acidification and subsequent quantification of released CO<sub>2</sub> using a CO<sub>2</sub> detector (Li-Cor 7000). DIC samples were collected following recommended procedures (Dickson et al., 2007) and measurements were calibrated against Certified Reference Materials provided by Dr. A. G. Dickson at Scripps Institution of Oceanography (SIO), University of California, San Diego (UCSD).

## References:

Dickson, A.G., Sabine, C.L., and Christian, J.R. (eds) (2007) Guide to best practices for ocean CO<sub>2</sub> measurements: PICES Special Publication 3.

## Data Processing Description

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
<b>DIC.csv</b> (Comma Separated Values (.csv), 84.11 KB) MD5:f1bcdb33a4ee8f95a43aefcd9f2c6df4 Primary data file for dataset ID 4031

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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
depth	Depth of water sampling.	meters
replicate	Replicate identifier. (All of the "A" DIC samples are from the same bottle, however "A" replicates for DIC are unrelated to "A" replicates in the other PICO datasets.)	text
DIC	Dissolved inorganic carbon.	micromolar Carbon ( $\mu\text{M C}$ )
DIC_qflag	Quality score for DIC: 1 = excellent (no known issues); 2 = suspect; 3 = poor (known reason to suspect data).	dimensionless
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

<b>Dataset-specific Instrument Name</b>	LI-COR LI-7000 Gas Analyzer
<b>Generic Instrument Name</b>	LI-COR LI-7000 Gas Analyzer
<b>Dataset-specific Description</b>	DIC was measured on mercuric chloride poisoned samples by acidification and subsequent quantification of released CO <sub>2</sub> using a Li-Cor 7000 CO <sub>2</sub> detector.
<b>Generic Instrument Description</b>	The LI-7000 CO <sub>2</sub> /H <sub>2</sub> O Gas Analyzer is a high performance, dual cell, differential gas analyzer. It was designed to expand on the capabilities of the LI-6262 CO <sub>2</sub> / H <sub>2</sub> O Gas Analyzer. A dichroic beam splitter at the end of the optical path provides radiation to two separate detectors, one filtered to detect radiation absorption of CO <sub>2</sub> and the other to detect absorption by H <sub>2</sub> O. The two separate detectors measure infrared absorption by CO <sub>2</sub> and H <sub>2</sub> O in the same gas stream. The LI-7000 CO <sub>2</sub> / H <sub>2</sub> O Gas Analyzer is a differential analyzer, in which a known concentration (which can be zero) gas is put in the reference cell, and an unknown gas is put in the sample cell.

<b>Dataset-specific Instrument Name</b>	Niskin bottle
<b>Generic Instrument Name</b>	Niskin bottle
<b>Dataset-specific Description</b>	Water was sampled using a 5 Liter niskin bottle.
<b>Generic Instrument Description</b>	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.

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## Deployments

### PICO\_1-301

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/59063">https://www.bco-dmo.org/deployment/59063</a>
<b>Platform</b>	Duke University Marine Lab
<b>Start Date</b>	2010-06-28
<b>End Date</b>	2012-06-26
<b>Description</b>	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: <a href="http://oceanography.ml.duke.edu/johnson/research/pico/">http://oceanography.ml.duke.edu/johnson/research/pico/</a>

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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
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1031064</a>
<a href="#">NSF Ocean Sciences Research Initiation Grants (NSF OCE-RIG)</a>	<a href="#">OCE-RIG-1322950</a>

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