Gridded in-situ oxygen profiles from glider deployments in the San Pedro Channel, CA in 2013 and 2014

Website: https://www.bco-dmo.org/dataset/768685
Data Type: Other Field Results
Version: 2
Version Date: 2019-07-03

Project
» Collaborative Research: Use of Triple Oxygen Isotopes and O2/Ar to constrain Net/Gross Oxygen Production during upwelling and non-upwelling periods in a Coastal Setting (UpRISEE O2 upwelling)

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Abstract
Gridded in-situ oxygen profiles from glider deployments in the San Pedro Channel, CA in 2013 and 2014.

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Coverage

Spatial Extent: **N**:33.72 **E**:-118.25003 **S**:33.45003 **W**:-118.59992
Temporal Extent: 2013-03-12 - 2014-07-07

Dataset Description

Related dataset (collected during same glider deployments):
Gridded in-situ profiles: https://www.bco-dmo.org/dataset/751128

In addition to the tabular form of this dataset available by clicking the "Get Data" button on this page, it is also available as a Matlab (*.mat) file containing data matrices and vectors. See the "Supplemental Files" section on this page for the data in this form along with the matlab m-file used to transform the data matrices to a tabular dataset.

Acquisition Description

Glider deployment: For this study, a slocum glider was deployed between March and July in 2013 and 2014 in the San Pedro Channel, located in the Southern California Bight off the coast of Los Angeles. The glider was deployed on a 28 km cross-channel path between Catalina Island and the Palos Verdes Peninsula and completed a single cross-channel pass every 1.5–2 days (average speed 1 km h−1). Data were collected between ∼ 3 and 90 m, with the exception of when the glider crossed the major shipping lanes where the glider was constrained to depths below 20 m to avoid damage or loss from ship traffic. The GMT time stamp indicates the earliest time stamp for data binned within a single profile. Glider deployments were from small boats belonging to the USC Wrigley Marine Sciences Center or from the R/V Yellowfin.

Optode oxygen concentration was corrected for measurement lag and calibrated using Winkler titrations.

Processing Description

BCO-DMO Data Manager Processing Notes: Data Version 1: 2018-12-14
* tabular dataset constructed from original .mat data file
* tabular dataset imported into the BCO-DMO data system with added header with dataset name, PI name, version date.
* orignal matlab file served as a downloadable link on this dataset landing page.
* blank values in the BCO-DMO data system are displayed as "nd" for "no data." nd is the default missing data identifier in the BCO-DMO system. Blank values in the original .mat file are the matlab default value NaN.

BCO-DMO Data Manager Processing Notes: Data Version 2: 2019-07-03
* Same processing performed on version 1 as version 1.
* New version had lat/lon values corrected by the data submitter.
* Version 2 has column OXYGEN which was called O2 in version 1.

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Parameters

Parameter	Description	Units
BINID	Bin identifier	unitless
DATENUM_GMT	Matlab datenum (Greenwich Mean Time)	unitless
ISO_DateTime_UTC	Timestamp (UTC) in standard ISO 8601:2004(E) format yyyy-mm-ddTHH:MM:SSZ	unitless
YEAR	Year in format yyyy	unitless
LAT	Latitude	decimal degrees (DD)
LON	Longitude	decimal degrees (DD)
DEPTH	Depth	meters (m)
OXYGEN	Oxygen concentration	millimoles per cubic meter (mmol m^-3)

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Instruments

Dataset-specific Instrument Name	Sea-Bird flow-through CTD
Generic Instrument Name	CTD Sea-Bird
Dataset-specific Description	Sea-Bird flow-through CTD (used for temperature, salinity, and pressure)
Generic Instrument Description	Conductivity, Temperature, Depth (CTD) sensor package from SeaBird Electronics, no specific unit identified. This instrument designation is used when specific make and model are not known. See also other SeaBird instruments listed under CTD. More information from Sea-Bird Electronics.

Dataset-specific Instrument Name	Aanderaa Oxygen Optode 5013w (3835)
Generic Instrument Name	Aanderaa Oxygen Optodes
Generic Instrument Description	Aanderaa Oxygen Optodes are instrument for monitoring oxygen in the environment. For instrument information see the Aanderaa Oxygen Optodes Product Brochure.

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Deployments

UpRISEE_SPOT_13-14

Website	https://www.bco-dmo.org/deployment/684011
Platform	R/V Yellowfin
Start Date	2013-01-16
End Date	2014-06-19
Description	A series of cruises were conducted from January 2013 to June 2014 to the San Pedro Ocean Time-Series (SPOT) station. These cruises were part of a study aimed at characterizing the biological response to upwelling at SPOT: the Upwelling Regime In-Situ Ecosystem Efficiency (Up.R.I.S.E.E.) study.

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Project Information

Collaborative Research: Use of Triple Oxygen Isotopes and O2/Ar to constrain Net/Gross Oxygen Production during upwelling and non-upwelling periods in a Coastal Setting (UpRISEE O2 upwelling)

Coverage: Northeast Pacific Ocean

The marine biological pump is one of the primary pathways via which anthropogenic carbon dioxide may be sequestered from the atmosphere and exported to the deep ocean as organic carbon. While the link between nutrient supply and high primary productivity in upwelling regions is well established, factors controlling the organic carbon export efficiency of upwelling ecosystems are not well known. Scientists from the University of Southern California and Pomona College plan to determine the factors that control the rates and magnitudes of two components of biological production, Net Community Production (NCP) and Gross Primary Production (GPP), as well as particulate organic carbon export efficiency, at the San Pedro Ocean Time Series, a coastal site in the California Borderland during periods of minimal and high upwelling velocity over a 2-year span. At this site, past and ongoing observations of hydrography and carbon rain will provide an historical context for interpreting results and mechanisms at work. Rates of NCP and GPP will be quantified at different upwelling intensity, using dissolved oxygen to argon (O2/Ar) ratios and the oxygen triple isotope composition of dissolved oxygen (O2). The export of organic carbon will be established using 234Th (thorium) profiles in the water column, coupled with floating sediment trap deployments, and the development of a carbon isotope balance for the water column. Upwelling will be characterized using non-steady state budgets for atmospheric 7Be (beryllium) input and its depth-integrated

decay, as well as estimating rates based on remote measurements of wind stress curl and budgets for dissolved inorganic carbon and silicon. Application of the O2/Ar ratio and the oxygen triple isotope approach will require depth-integrated profiles of these tracers to evaluate the impact of upwelling on mixed layer inputs and use of non-steady state models during seasonal transitions in upwelling. The comprehensive data set to be obtained should provide insights into the organic carbon export efficiency under variable upwelling regimes and help to relate the satellite-based measurements of chlorophyll to the organic carbon export of these highly productive ecosystems. Broader Impacts: One graduate and one undergraduate student from the University of Southern California and two undergraduate students from Pomona College 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-1260296
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