

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

Website: <https://www.bco-dmo.org/dataset/751128>

Data Type: Other Field Results

Version: 1

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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

This dataset includes chlorophyll a fluorescence and water temperature from gridded in-situ profiles from a slocum glider 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.

Table of Contents

- [Coverage](#)
- [Dataset Description](#)
 - [Acquisition Description](#)
 - [Processing Description](#)
- [Related Publications](#)
- [Parameters](#)
- [Instruments](#)
- [Deployments](#)
- [Project Information](#)
- [Funding](#)

Coverage

Spatial Extent: N:33.69088 E:-118.33291 S:33.4642 W:-118.516

Temporal Extent: 2013-03-12 - 2014-07-06

Dataset Description

This dataset includes chlorophyll a fluorescence and water temperature from gridded in-situ profiles from a Slocum Glider 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.

These data were published in Teel et al., 2018.

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. * Note that the tabular dataset has a "DEPTH" parameter, but there is none in the above .mat file. Each row of the matrices corresponds to 1m depth increments starting with the first row which corresponds to 1m depth to the last row number 80 corresponding to 80m depth.

Direct download link for GriddedGlider_TandCHL.mat (2.3 MB):

https://datadocs.bco-dmo.org/docs/UpRISEE/751128/1/data_docs/GriddedGlid...

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.

Instruments:

Teledyne Webb G1 Slocum electric gliders equipped with a WET Labs EcoPuck FL3 fluorometer (used for Chlorophyll a fluorescence), a WET Labs EcoPuck BB3 sensor (used for backscatter at wavelengths of 532, 660, and 880 nm), and a Sea-Bird flow-through CTD (used for temperature, salinity, and pressure).

For more methodology information see Teel et al., 2018.

Processing Description

Data processing:

Glider data were processed in Matlab (versions R2012b, R2014a, R2015b, and R2016b). The glider data from each 2-day transect were gridded onto an idealized glider transect with 500 m horizontal resolution and 1 m vertical resolution that was approximately perpendicular to the mean flow and the coastline. Only glider data within 5 km of the idealized transect were used in this analysis (Fig. 1). Each 500 m bin ($N = 62$) corresponded approximately with a single downcast and upcast. Only profiles with data for $> 85\%$ of the vertical bins were used for further analyses, thereby excluding partial profiles from under the shipping lanes. The remaining missing data ($< 15\%$ of each profile) were filled using 2-D interpolation from all neighboring bins. A total of 557 profiles from 2013 and 1049 profiles from 2014 were accepted for further analyses.

BCO-DMO Data Manager Processing notes:

- * Script to transform originally submitted matlab data matrices and vectors into a tabular dataset attached as a supplemental document to this dataset landing page.
- * Tabular version of the data available by pressing the "Get Data" button. NaNs in the matlab data are displayed as "nd" for no data in the BCO-DMO data system.
- * Data was rounded in matlab (or else would be 13 decimal places). LAT and LON rounded to 5 decimal places. CHL and TEMP rounded to 3 decimal places.
- * ISO_DateTime_UTC (yyyy-mm-ddTHH:MM:SSZ) timestamp with time zone added to the tabular dataset in addition to the matlab datenum column.
- * Added depth column to tabular dataset based on submitter's information that each row in the mat file corresponds to 1 m depth increments with row 1 starting at 1 m.

[[table of contents](#) | [back to top](#)]

Related Publications

Cetinić, I., Toro-Farmer, G., Ragan, M., Oberg, C., & Jones, B. H. (2009). Calibration procedure for Slocum glider deployed optical instruments. *Optics Express*, 17(18), 15420. doi:[10.1364/OE.17.015420](https://doi.org/10.1364/OE.17.015420)

Teel, E. N., Liu, X., Seegers, B. N., Ragan, M. A., Haskell, W. Z., Jones, B. H., & Levine, N. M. (2018). Contextualizing time-series data: quantification of short-term regional variability in the San Pedro Channel using high-resolution in situ glider data. *Biogeosciences*, 15(20), 6151–6165. doi:[10.5194/bg-15-6151-2018](https://doi.org/10.5194/bg-15-6151-2018)

Teel, E. N., Liu, X., Seegers, B. N., Ragan, M. A., Haskell, W. Z., Jones, B. H., & Levine, N. M. (2018). Supplement of Contextualizing time-series data: quantification of short-term regional variability in the San Pedro Channel using high-resolution in situ glider data. Supplement of *Biogeosciences*, 15(20), 6151–6165. doi: [10.5194/bg-15-6151-2018-supplement](https://doi.org/10.5194/bg-15-6151-2018-supplement)

[[table of contents](#) | [back to top](#)]

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)
CHL	Chlorophyll a fluorescence	milligrams per meter cubed (mg/m ³)
TEMP	Water temperature	degrees Celsius (C)

[[table of contents](#) | [back to top](#)]

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	WET Labs EcoPuck FL3
Generic Instrument Name	Fluorometer
Dataset-specific Description	WET Labs EcoPuck FL3 fluorometer (used for Chlorophyll a fluorescence).
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	WET Labs EcoPuck BB3
Generic Instrument Name	Optical Backscatter Sensor
Dataset-specific Description	WET Labs EcoPuck BB3 sensor (used for backscatter at wavelengths of 532, 660, and 880 nm)

[[table of contents](#) | [back to top](#)]

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.

[[table of contents](#) | [back to top](#)]

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.

[[table of contents](#) | [back to top](#)]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1260296
NSF Division of Ocean Sciences (NSF OCE)	OCE-1260692

[[table of contents](#) | [back to top](#)]