Fluorescence from PAM fluorometer from fishing vessels in the Southern California Bight off Huntington Beach in 2012 (SoCalPlumeEx2012 project)

Website: https://www.bco-dmo.org/dataset/537666
Version: 04 November 2014
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Project
» Assessing the Ecophysiological and Biogeochemical Response to Deliberate Nutrient Loading in the Southern California Bight (SoCalPlumeEx2012)

Contributors	Affiliation	Role
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Dataset Description

PAM Fluorescence Data

Data are described in the following manuscript:
Kudela, R.M., Lucas, A.J., Negrey, K.H., Howard, M. McLaughlin, K. Submitted to Est. Coast. Shelf Sci. Death from below: Investigation of inhibitory factors in bloom development during a wastewater effluent diversion.

Methods & Sampling

Sampling and Analytical Methodology:
Water samples were collected from an instrumented rosette and dark adapted for 30 minutes. Samples were then analyzed using a Heinz-Walz WATER-PAM fluorometer, with 0.2 µm filtered seawater used as a blank. See references below for more details.

Data Processing Description

Data Processing:
PAM fluorescence data were fit to a 3-parameter photosynthesis versus irradiance curve (see references), using 3x replicate samples. Curve fit parameters are provided.

Data were processed using a 3-parameter curve fit as described in the following references:
Kudela RM, Ryan JP, Blakely MD, Lane JQ, Peterson TD (2008) Linking the physiology and ecology of Cochlodinium to better understand harmful algal bloom events: A comparative approach. Harmful Algae 7:278–

Kromkamp JC, Forster RM (2003) The use of variable fluorescence measurements in aquatic ecosystems: differences between multiple and single turnover measuring protocols and suggested terminology. European Journal of Phycology 38:103–112

Jassby AD, Platt T (1976) Mathematical formulation of the relationship between photosynthesis and light for phytoplankton. Limnology and Oceanography 21:540–547

BCO-DMO Processing Notes
 - Generated from original file: "SoCalPlumeEx2012_PAM.csv" contributed by Raphael Kudela
 - Parameter names edited to conform to BCO-DMO naming convention found at Choosing Parameter Name
 - Date reformatted from MM/DD/YY to YYYYMMDD

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Data Files

File
PAM.csv (Comma Separated Values (.csv), 5.52 KB) MD5:ddfcae8042bd7c4d724b084f6ede9af9
Primary data file for dataset ID 537666

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Parameters

Parameter	Description	Units
Date	Date (GMT)	YYYYMMDD
Station_ID	Station Id	text
Latitude	Latitude Position (South is negative)	decimal degrees
Longitude	Longitude Position (West is negative)	decimal degrees
Depth	Depth	meters
Yield	Yield (unitless)	unitless
PBs	PBs (maximum relative Electron Transport Rate; rETR)	(tbd)
a	a (initial slope of the rETR curve)	(tbd)
b	b (light-inhibition slope of the rETR curve)	(tbd)
r2	r2 (r2 value for the model fit)	(tbd)
PBm	PBm (maximum rETR with photo-inhibition included)	(tbd)
Em	Em (irradiance of maximum light inhibition; umol photons m-2 s-1)	umol photons m-2 s-1
Ek	Ek (irradiance of rETR half-saturation; umol photons m-2 s-1)	umol photons m-2 s-1

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Instruments

Dataset-specific Instrument Name	CTD SBE 911plus
Generic Instrument Name	CTD Sea-Bird SBE 911plus
Dataset-specific Description	Water samples were collected from an instrumented rosette
Generic Instrument Description	The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Heinz-Walz WATER-PAM fluorometer
Generic Instrument Name	Fluorometer
Dataset-specific Description	Samples were then analyzed using a Heinz-Walz WATER-PAM fluorometer, with 0.2 µm filtered seawater used as a blank
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	Niskin bottle
Generic Instrument Name	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.

Deployments

SoCalPlumeEx2012

Website	https://www.bco-dmo.org/deployment/537425
Platform	Fishing Vessels
Start Date	2012-09-06
End Date	2012-10-17
Description	Multiple vessels used for this effort. R/V Yellowfin R/V Nerissa

Project Information

Assessing the Ecophysiological and Biogeochemical Response to Deliberate Nutrient Loading in the Southern California Bight (SoCalPlumeEx2012)

Website: http://oceandatacenter.ucsc.edu/MBHAB/hotspots/

Coverage: Southern California Bight [33-33.75° N, 117.25-118.5° W]

In autumn 2012, Orange County Sanitation District (OCSD) will divert ~150 million gallons/day of secondarily-treated effluent to a nearshore (1 mile offshore) outfall pipe over a period of ~4 weeks. No discharges of this magnitude have been conducted in decades. The planned diversion is expected to create a buoyant surface plume that will spread over much of the coastal region. Because OCSD plans to "super-chlorinate" and then dechlorinate the discharge, the effect of the plume should be predominantly a nutrient addition rather than direct addition of intact microbial populations. The PIs propose to address two broad questions through a study of the plume:

First, what happens ecologically and physiologically to the phytoplankton assemblage when nutrients are discharged in the surface ocean for extended periods of time?
Second, can this dynamic and shifting environment be sampled by deploying multiple technologies to identify the physical/chemical drivers of the biological response at ecologically relevant space and time scales?

They will test two hypotheses:
H1: Continual discharge of nutrients to the surface ocean results in a dinoflagellate-dominated bloom which leads to dampening or cessation of vertical migration of the dinoflagellates and drives a shift to net heterotrophy.
H2: The bloom will initially result in a strong local sink for carbon dioxide which gradually develops into a strong source as heterotrophy develops.

The study is expected to provide a time-evolving picture of interactions within and between autotrophic and heterotrophic communities and will illustrate the short-term biogeochemical and ecological consequences of sustained nutrient discharge to a shallow coastal site. The planned diversion provides an unprecedented opportunity to study the ecophysiological response in a natural setting over a period of weeks, including the interaction of biology, chemistry, and physics, and it will contribute to basic understanding of anthropogenic nutrient loading to the coastal ocean. Undergraduate and graduate education and training will be furthered through active participation in lab, field, and data synthesis activities involving academic, government, and industry partners.

Affiliated Programs or Projects:
- NOAA ECOHAB Project (NA11NOS4780030): A Regional Comparison of Upwelling and Coastal Land Use Patterns on the Development of HAB Hotspots Along the California Coast
- Southern California Coastal Ocean Observing System
- Central and Northern California Coastal Ocean Observing System

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1251573
NSF Division of Ocean Sciences (NSF OCE)	OCE-1251547