Nutrients and pigments from HPLC analysis for fire ash deposition to coastal ocean study, southern California, December 2017

Website: https://www.bco-dmo.org/dataset/765868
Data Type: Cruise Results
Version: 1
Version Date: 2019-04-22

Project
» RAPID: Biogeochemical effects of fire ash deposition to the coastal ocean, in response to the 2017 Southern California fires (FADCO)

Contributors	Affiliation	Role
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Abstract
Nutrients and pigments from HPLC analysis for fire ash deposition to coastal ocean study, southern California, December 2017.

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Coverage

Spatial Extent: **N**:34.367 **E**:-117.734 **S**:32.867 **W**:-120.072
Temporal Extent: 2017-12-16 - 2017-12-22

Dataset Description

Nutrients and pigments from HPLC analysis for fire ash deposition to coastal ocean study, southern California, December 2017.

Methods & Sampling

POC: 500 mL seawater was filtered from depths above 100 m. One L seawater was filtered for depths below 100 m. All seawater samples were filtered gently via vacuum (<10 mm Hg) through 25 mm (0.7 µm) Whatman GF/F filters that were precombusted at 450˚C for 4 hours. Filters were folded in quarters and stored in pre-combusted (450˚C for 4 h) glass scintillation vials. Samples were stored at -20˚C until analysis at the UC Santa Barbara Marine Science Institute Analytical Lab on an Automated Organic Elemental Analyzer following the Dumas combustion method.

Nutrients: 40 mL of seawater was directly filtered from the Niskin bottle through a 0.8 µm polycarbonate filter housed in a 47 mm polycarbonate filter holder into a sterile 50 mL conical centrifuge tube. Samples were

stored at -20˚C until analysis at the UC Santa Barbara Marine Science Institute Analytical Lab via flow-injection analysis on a QuickChem 8500 Series 2.

HPLC: Approximately 2 L seawater was filtered through 25 mm (0.7 µm) Whatman GF/F filters. Filters were folded in half, stored in foil packets, and put immediately in liquid nitrogen, where they were kept through shipment to and until analysis at NASA Goddard Space Flight Center. HPLC pigments were analyzed by Crystal Thomas following Van Heukelem and Thomas (2001): https://oceancolor.gsfc.nasa.gov/fsg/hplc/

Quality flags reflect those used by the World Ocean Circulation Experiment (WOCE):
1: sample taken
2: acceptable measurement
3. questionable measurement
4. bad measurement
5. not reported
9. no sample drawn

Data Processing Description

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date

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Data Files

File
FADCO_nuts_hplc.csv (Comma Separated Values (.csv), 231.45 KB) MD5:8f9f151d55ddfada034696e6a7cdb02f Primary data file for dataset ID 765868

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Parameters

Parameter	Description	Units
Cruise	Cruise Number	unitless
Station	Station Number	unitless
Time_Stamp	Date & Time formatted as yyyy-mm-ddThh:mm	unitless
Latitude	latitude; north is positive	decimal degrees
Longitude	longitude; east is positive	decimal degrees
Bottom_Z	Bottom Depth	meters
CruiseCN	Cruise Cast Number	unitless
Niskin	Niskin Bottle Number	unitless
Target_Z	Niskin Target Depth	meters
Conductivity	conductivity from sensor	S/m
BeamAt	Beam Attenuation from sensor	1/m
BeamT	percent Beam Transmission from sensor	unitless
Density00	Density from sensor	kg m3

Z	Depth from sensor	meters
Fluorescence	fluorescence from sensor	mg m-3
Oxygen	Oxygen from sensor	ml L-1
Par	Photosynthetically Available Radiation	umol photons m-2 s-1
Salinity	salinity	psu
Temperature	temperature	degrees C
Pressure	pressure	db
Neutral_Density	neutral density	kg m3
Sigma_Theta	potential density	kg m3
Potential_Temp	potential temperature	degrees C
PO4	Phosphate	umol P L-1
PO4_QF	Phosphate Quality Flag	unitless
SiO4	Silicate	umol Si L-1
SiO4_QF	Silicate Quality Flag	unitless
NO2	Nitrite	umol N L-1
NO2_QF	Nitrite Quality Flag	unitless
NO2_NO3	Nitrite + Nitrate	umol N L-1
NO2_NO3_QF	Nitrite + Nitrate Quality Flag	unitless
NH4	Ammonia	umol N L-1
NH4_QF	Ammonia Quality Flag	unitless
POC	Particulate Organic Carbon	ug L-1
POC_QF	Particulate Organic Carbon Quality Flag	unitless
PON	Particulate Organic Nitrogen	ug L-1
PON_QF	Particulate Organic Nitrogen Quality Flag	unitless
TChl_a	Chlorophyll a from HPLC	mg m-3
TChl_b	Chlorophyll b from HPLC	mg m-3
TChl_c	Chlorophyll c from HPLC	mg m-3
Alpha_beta_Car	Alpha beta carotene from HPLC	mg m-3
But_fuco	19'-Butanoyloxyfucoxanthin from HPLC	mg m-3
Hex_fuco	19'-hexanoyloxyfucoxanthin from HPLC	mg m-3
Allo	Alloxanthin from HPLC	mg m-3
Diadino	Diadinoxanthin from HPLC	mg m-3
Diato	Diatoxanthin from HPLC	mg m-3
Fuco	Fucoxanthin from HPLC	mg m-3
Perid	Peridinin from HPLC	mg m-3
Zea	Zeaxanthin from HPLC	mg m-3
MV_Chl_a	Monovinyl Chlorphyll a from HPLC	mg m-3
DV_Chl_a	Divinyl Chlorophyll a from HPLC	mg m-3
Chlide_a	Chlorophyllide from HPLC	mg m-3
MV_Chl_b	Monovinyl Chlorophyll b from HPLC	mg m-3
DV_Chl_b	Divinyl Chlorophyll b from HPLC	mg m-3

Chl_c2	Chlorophyll C2 from HPLC	mg m-3
Chl_c3	Chlorophyll C3 from HPLC	mg m-3
Lut	Lutein [ug/L]	mg m-3
Neo	Neoxanthin from HPLC	mg m-3
Viola	Violaxanthin from HPLC	mg m-3
Phytin_a	Total pheophytin a from HPLC	mg m-3
Phide_a	Total pheophorbide a from HPLC	mg m-3
Pras	Prasinoxanthin from HPLC	mg m-3

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	CTD Sea-Bird SBE 911plus
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	
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.

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Deployments

SR1718

Website	https://www.bco-dmo.org/deployment/777408
Platform	R/V Sally Ride
Start Date	2017-12-16
End Date	2017-12-22
Description	Sampling for project ACIDD: Across the Channel: Investigating Diel

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Project Information

RAPID: Biogeochemical effects of fire ash deposition to the coastal ocean, in response to the 2017 Southern California fires (FADCO)

Coverage: Santa Barbara Channel

NSF Award Abstract:

Massive wildfires in coastal regions cause ash to fall into the ocean, with unknown impacts. Ash contains chemical elements and materials that can encourage the growth of microscopic organisms in the surface ocean. The Thomas Fire has burned over 240,000 acres in southern California since Dec 4, 2017. The winds have carried a plume of smoke, ash and soot more than 1000 km over the Santa Barbara Channel. The intellectual merit of this RAPID project focuses on the impact of fire ash supply to coastal ocean ecosystems, by studying the 2017 Thomas Fire. This is achieved through a combination of experiments and environmental measurements, including an oceanographic expedition to the affected area aboard the R/V Sally Ride. The broader impacts of this award include the shipboard training of more than twelve graduate students as well as providing insight as to effects of the Thomas Fire on the coastal ocean.

Massive wildfires can couple terrestrial ecosystems to coastal ocean ecosystems through depositional and runoff processes. The Thomas Fire, which began on Dec 4, 2017, has burned over 240,000 acres and the persistent offshore winds created a plume of smoke, ash and soot that extended over 1000 km off shore. This unfortunate circumstance provides an opportunity to investigate the impact of ash deposition on the coastal ocean. This research entails a series of incubation experiments and measurements designed to assess the impact of fire ash deposition on the biogeochemistry of the coastal ocean. Specifically, the research tests the hypothesis that the deposition of wildfire-derived particulate matter to the coastal ocean impacts the planktonic communities of the upper water column, providing nutrients that facilitate blooms of phytoplankton, leaching dissolved organic carbon to surface waters that feeds heterotrophic bacterial populations, and serving as a source of sinking particulate matter that feeds heterotrophic bacterial populations deeper in the water column. These hypotheses are tested through a series of experiments at sea and in the home laboratories, and through shipboard measurements and analysis of samples collected from impacted waters.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1821916

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