Vertical profiles of primary productivity from R/V Thomas G. Thompson cruise TN210 in the Gulf of Alaska, North Pacific in 2007 (Northern Gulf of Alaska Phytoplankton project)

Website: https://www.bco-dmo.org/dataset/3612
Version: 27 January 2012
Version Date: 2012-01-27

Project
» Influence of continental margin iron on phytoplankton species composition and production in the northern Gulf of Alaska (Northern Gulf of Alaska Phytoplankton)

Contributors	Affiliation	Role
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Dataset Description

Primary Productivity determined following standard JGOFS protocols for C14 using simulated in situ (deck) incubations as described in Kudela et al. 2006.

Methods & Sampling

Methods described in (.pdf):
Kudela R, Cochlan W, Peterson T, Trick C (2006) Impacts on phytoplankton biomass and productivity in the Pacific Northwest during the warm ocean conditions of 2005. Geophysical Research Letters 33:doi:10.1029/2006GL026772

Data Processing Description

Methods described in (.pdf):
Kudela R, Cochlan W, Peterson T, Trick C (2006) Impacts on phytoplankton biomass and productivity in the Pacific Northwest during the warm ocean conditions of 2005. Geophysical Research Letters 33:doi:10.1029/2006GL026772

BCO-DMO Processing/Edits
- Generated from original file "TN210-PP.txt" contributed by Ralph Kudela

- Parameter names changed to conform to BCO-DMO parameter naming convention
- Date reformatted to YYYYMMDD
- Time reformatted to HHMMSS

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Data Files

File
TN210_PP.csv (Comma Separated Values (.csv), 5.88 KB) MD5:fd8a83f0f5e35681e381c63f21d74486 Primary data file for dataset ID 3612

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Parameters

Parameter	Description	Units
station	STATION	text
date	DATE (PDT)	YYYYMMDD
lat	Station latitude (South is negative)	decimal degrees
lon	Station longitude (West is negative)	decimal degrees
sample	SAMPLE STATION ID	text
percent_Eo	DEPTH PERCENT SURFACE IRRADIANCE	percentage
depth	DEPTH	meters
PP	PRIMARY PRODUCTIVITY	mg C /m3/d
chl_a	CHLOROPHYLL A	mg/m3
PB	PRODUCTIVITY INDEX	PP/CHL

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Instruments

Dataset-specific Instrument Name	CTD Sea-Bird 9
Generic Instrument Name	CTD Sea-Bird 9
Generic Instrument Description	The Sea-Bird SBE 9 is a type of CTD instrument package. The SBE 9 is the Underwater Unit and is most often combined with the SBE 11 Deck Unit (for real-time readout using conductive wire) when deployed from a research vessel. The combination of the SBE 9 and SBE 11 is called a SBE 911. The SBE 9 uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 and SBE 4). The SBE 9 CTD can be configured with auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorometer, altimeter, etc.). Note that in most cases, it is more accurate to specify SBE 911 than SBE 9 since it is likely a SBE 11 deck unit was used. more information from Sea-Bird Electronics

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.

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Deployments

TN210

Website	https://www.bco-dmo.org/deployment/58769
Platform	R/V Thomas G. Thompson
Start Date	2007-08-15
End Date	2007-09-21
Description	USGS Info Bank for TN210 Cruise information and original data are available from the NSF R2R data catalog.

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Project Information

Influence of continental margin iron on phytoplankton species composition and production in the northern Gulf of Alaska (Northern Gulf of Alaska Phytoplankton)

Website: http://oceandatacenter.ucsc.edu/home/index.html

Coverage: Gulf of Alaska

Influence of continental margin iron on phytoplankton species composition and production in the northern Gulf of Alaska (part of Enhanced Phytoplankton Biomass-Northwest Gulf of Alaska)

The northern Gulf of Alaska (GOA) is among the ocean's most productive ecosystems and supports a rich coastal fisheries. Although strong cross-shelf gradients in phytoplankton (chlorophyll decreasing offshore) have been identified, yet the specific factors that regulate and control primary production have only been hypothesized. Cross-shelf patterns in primary production/species composition are consistent with a gradient of iron availability (Strom et al., in press), but this has yet to be rigorously tested. In collaboration with the NSF-funded project Mixing of iron-rich coastal waters with nutrient-rich HNLC waters leading to enhanced phytoplankton biomass: a focus on the northwest Gulf ofAlaska (K. Bruland), this project will examine the influence of cross-shelf exchange and physico-chemical gradients on phytoplankton distributions, physiology, and assemblage structure in the northern GOA, making use of complementary high-resolution iron data and building on the results from previous studies. The proposed work directly complements studies accomplished by the US GLOBEC Coastal Gulf of Alaska (CGOA) program, and is essential to link Bruland's study of trace metal dynamics and speciation to key biological processes. Bruland's project seeks to quantify the inputs of iron from the Copper River, AK, and to characterize and assess the interactions among river inputs and shelf/offshore systems. The quasi-synoptic sampling scheme enables characterization at the mesoscale, the dominant scale of variability in the region. The station grid allows quasi-synoptic sampling while remaining flexible to take advantage of interesting mesoscale features. Should a mesoscale eddy be present, the study will focus on the role that eddy circulation plays in facilitating the offshore transport (suggested by Stabeno et al., 2004) of bio-active trace metals.

This project aims to provide a detailed examination of the phytoplankton rates, assemblage structure, and response to cross-shelf transport/ mixing across gradients in iron and light to better parameterize satellite observations and future modeling efforts. Specific questions include: 1) Do cross-shelf gradients in iron correspond to patterns of carbon assimilation, nutrient uptake, new production, and species composition of phytoplankton in the northern GOA? 2) Do iron and light interact to structure species assemblages and patterns of carbon assimilation? 3) How do frontal regions influence phytoplankton distributions and physiology? 4) What bio-optical properties characterize the different water masses (inshore/offshore), and how well do satellite observations describe phytoplankton standing stocks and rates? 5) What chemical characteristics define the deep Fe-source identified by Lam et al. (2006), and what is the bioavailability of this material when mixed with near-surface waters? This study will provide the first concurrent measurements of iron concentration and phytoplankton physiological parameters in the waters of the northern GOA.

Broader Impacts. The proposed work will be extremely valuable in testing hypotheses arising from many years of effort by GLOBEC CGOA. Data from this study will further our understanding of ocean-climate interactions in an economically and ecologically important region. The results could have far-reaching implications for our basic understanding of coupled biogeochemical cycles in shelf ecosystems. This will have both direct and indirect impacts on our understanding of carbon cycling, as well as how other researchers parameterize regional and global biogeochemical models.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0726858

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