CTD profile data 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/3619
Version: 01 February 2012
Version Date: 2012-02-01

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
Kudela, Raphael M.	University of California-Santa Cruz (UCSC)	Principal Investigator, Contact
Edwards, Christopher	University of California-Santa Cruz (UCSC)	Co-Principal Investigator
Gegg, Stephen R.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

CTD profile data

Methods & Sampling

Sea-Bird SBE 9 Data File:
FileName = G:Data21000101.hex
Software Version Seasave V 7.0h
Temperature SN = 2131
Conductivity SN = 2881
Number of Bytes Per Scan = 41
Number of Voltage Words = 4
Number of Scans Averaged by the Deck Unit = 1
Append System Time to Every Scan
System UpLoad Time = Aug 18 2007 01:25:56
NMEA Latitude = 54 35.96 N
NMEA Longitude = 134 03.38 W
NMEA UTC (Time) = Aug 18 2007 01:25:53
Store Lat/Lon Data = Append to Every Scan
Ship: Thomas G. Thompson
Cruise name: NRL #4
Cruise number: TN208

nquan = 25
nvalues = 200
units = specified
name 0 = prDM: Pressure, Digiquartz [db]
name 1 = depSM: Depth [salt water, m]
name 2 = t090C: Temperature [ITS-90, deg C]
name 3 = t190C: Temperature, 2 [ITS-90, deg C]
name 4 = c0mS/cm: Conductivity [mS/cm]
name 5 = c1mS/cm: Conductivity, 2 [mS/cm]
name 6 = altM: Altimeter [m]
name 7 = latitude: Latitude [deg]
name 8 = longitude: Longitude [deg]
name 9 = timeS: Time, Elapsed [seconds]
name 10 = timeY: Time, System [seconds]
name 11 = flECO-AFL: Fluorescence, Wetlab ECO-AFL/FL [mg/m^3]
name 12 = par: PAR/Irradiance, Biospherical/Licor
name 13 = sbeox0ML/L: Oxygen, SBE 43 [ml/l]
name 14 = xmiss: Beam Transmission, Chelsea/Seatech/Wetlab CStar [%]
name 15 = sigma-é00: Density [sigma-theta, Kg/m^3]
name 16 = sigma-t00: Density [sigma-t, Kg/m^3]
name 17 = sigma-é11: Density, 2 [sigma-theta, Kg/m^3]
name 18 = sigma-t11: Density, 2 [sigma-t, Kg/m^3]
name 19 = potemp090C: Potential Temperature [ITS-90, deg C]
name 20 = potemp190C: Potential Temperature, 2 [ITS-90, deg C]
name 21 = sal00: Salinity [PSU]
name 22 = sal11: Salinity, 2 [PSU]
name 23 = svCM: Sound Velocity [Chen-Millero, m/s]
name 24 = flag: flag
span 0 =   2.000,   103.000
span 1 =   1.980,   102.049
span 2 =   6.3851,   15.1536
span 3 =   6.3859,   15.6442
span 4 = 33.069511, 37.810101
span 5 = 33.071484, 38.161823
span 6 =   0.94,   124.52
span 7 =   54.59930,   54.59938
span 8 = -134.05646, -134.05640
span 9 =   81.537,   854.430
span 10 = 1187400437, 1187401210
span 11 =   -0.0742,   6.2105
span 12 = 7.3999e+00, 9.3234e+01
span 13 =   3.72266,   7.10852
span 14 =   77.4994,   97.1311
span 15 =   22.2944,   26.0131
span 16 =   22.2943,   26.0120
span 17 =   22.1385,   26.0138
span 18 =   22.1384,   26.0127
span 19 =   6.3763,   15.1533
span 20 =   6.3772,   15.6439
span 21 =   30.2677,   33.1114
span 22 =   30.2021,   33.1124
span 23 =   1475.56,   1501.69
span 24 = 0.0000e+00, 0.0000e+00
interval = decibars: 1
start_time = Aug 18 2007 01:25:56
bad_flag = -9.990e-29
sensor 0 = Frequency 0 temperature, primary, 2131, 23-jan-07
sensor 1 = Frequency 1 conductivity, primary, 2881, 17-jan-07, cpcor = -9.5700e-08
sensor 2 = Frequency 2 pressure, 34901, 01-Feb-2007
sensor 3 = Frequency 3 temperature, secondary, 1703, 23-jan-07
sensor 4 = Frequency 4 conductivity, secondary, 0855, 17-jan-07, cpcor = -9.5700e-08
sensor 5 = Extrnl Volt 2 WET Labs, ECO_AFL
sensor 6 = Extrnl Volt 3 transmissometer, primary, CST-401DR, 09-feb-2007

sensor 7 = Extrnl Volt 4 Oxygen, SBE, primary, 0023, 12 oct 2006
sensor 8 = Extrnl Volt 5 altimeter
sensor 9 = Extrnl Volt 6 irradiance (PAR), primary, 4747, 10-July-2006
datcnv_date = Aug 18 2007 03:36:31, 5.37e
datcnv_in = g:data21000101.hex g:data21000101.CON
datcnv_skipover = 0
wildedit_date = Aug 18 2007 03:36:32, 5.37e
wildedit_in = g:data21000101.cnv
wildedit_pass1_nstd = 2.0
wildedit_pass2_nstd = 20.0
wildedit_pass2_mindelta = 0.000e+000
wildedit_npoint = 100
wildedit_vars = prDM depSM t090C t190C c0mS/cm c1mS/cm flECO-AFL par sbeox0ML/L xmiss
wildedit_excl_bad_scans = yes
celltm_date = Aug 18 2007 03:36:33, 5.37e
celltm_in = g:data21000101.cnv
celltm_alpha = 0.0300, 0.0300
celltm_tau = 7.0000, 7.0000
celltm_temp_sensor_use_for_cond = primary, secondary
filter_date = Aug 18 2007 03:36:33, 5.37e
filter_in = g:data21000101.cnv
filter_low_pass_tc_A = 0.030
filter_low_pass_tc_B = 0.150
filter_low_pass_A_vars = prDM
filter_low_pass_B_vars = c0mS/cm c1mS/cm
loopedit_date = Aug 18 2007 03:36:34, 5.37e
loopedit_in = g:data21000101.cnv
loopedit_minVelocity = 0.000
loopedit_surfaceSoak: minDepth = 5.0, maxDepth = 20, useDeckPress = 1
loopedit_excl_bad_scans = yes
binavg_date = Aug 18 2007 03:36:34, 5.37e
binavg_in = g:data21000101.cnv
binavg_bintype = decibars
binavg_binsize = 1
binavg_excl_bad_scans = yes
binavg_skipover = 0
binavg_surface_bin = no, min = 0.000, max = 0.000, value = 0.000
Derive_date = Aug 18 2007 03:36:34, 5.37e
Derive_in = g:data21000101.cnv g:data21000101.CON
file_type = ascii

Data Processing Description

CTD cast data processed using standard (NODC) methods.
See (.pdf): Rovegno, PS, CA Edwards, and KW Bruland, 2009, Observations of a Kenai eddy and Sitka eddy in the Northern Gulf of Alaska. J. Geophys. Res. 114: C11012.

BCO-DMO Processing Notes
- Awk written to reformat original .cnv files contributed by Ralph Kudela
- AWK: TN210_CTDcnv_2_bcodmo.awk
- space delimited reformatted to tab delimited
- all records with "#" or "*" ignored
- blank lines ignored
- BCO-DMO header o/p from routine

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Data Files

File
TN210_CTD.csv (Comma Separated Values (.csv), 28.93 MB) MD5:44869712ebd44c4de42f660ed7201c10 Primary data file for dataset ID 3619

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Parameters

Parameter	Description	Units
CTD_DataSet_Id	CTD Dataset Id	text
date	Station date	YYYYMMDD
time	Station time	HHMMSS
lat	Station latitude (South is negative)	decimal degrees
lon	Station longitude (West is negative)	decimal degrees
prDM	Pressure Digiquartz	db
depSM	Depth salt water	m
t0	Temperature ITS-90	deg C
t1	Temperature 2 ITS-90	deg C
c0	Conductivity	mS/cm
c1	Conductivity 2	mS/cm
altM	Altimeter	m
latitude	Latitude (South is negative)	deg
longitude	Longitude (West is negative)	deg
timeS	Time Elapsed	seconds
timeY	Time System	seconds
fluor	Fluorescence Wetlab ECO-AFL/FL	mg/m^3
par	PAR/Irradiance Biospherical/Licor	(tbd)
sbeox0	Oxygen SBE 43	ml/l
xmiss	Beam Transmission Chelsea/Seatech/Wetlab CStar	percentage
sigma_e00	Density sigma-theta	Kg/m^3
sigma_t00	Density sigma-t	Kg/m^3
sigma_e11	Density 2 sigma-theta	Kg/m^3
sigma_t11	Density 2 sigma-t	Kg/m^3
potemp0	Potential Temperature ITS-90	deg C
potemp1	Potential Temperature 2 ITS-90	deg C
sal00	Salinity	PSU
sal11	Salinity 2	PSU
svCM	Sound Velocity Chen-Millero	m/s
flag	flag	(na)
station	Station number from .cnv filename	integer
cast	Cast number from .cnv filename	integer

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Instruments

Dataset-specific Instrument Name	CTD Sea-Bird 9
Generic Instrument Name	CTD Sea-Bird 9

Dataset-specific Description	Sea-Bird SBE 9 Data File: FileName = G:Data21000101.hex Software Version Seasave V 7.0h Temperature SN = 2131 Conductivity SN = 2881 Number of Bytes Per Scan = 41 Number of Voltage Words = 4 Number of Scans Averaged by the Deck Unit = 1 Append System Time to Every Scan System UpLoad Time = Aug 18 2007 01:25:56 NMEA Latitude = 54 35.96 N NMEA Longitude = 134 03.38 W NMEA UTC (Time) = Aug 18 2007 01:25:53 Store Lat/Lon Data = Append to Every Scan Ship: Thomas G. Thompson Cruise name: NRL #4 Cruise number: TN208 nquan = 25 nvalues = 200 units = specified name 0 = prDM: Pressure, Digiquartz [db] name 1 = depSM: Depth [salt water, m] name 2 = t090C: Temperature [ITS-90, deg C] name 3 = t190C: Temperature, 2 [ITS-90, deg C] name 4 = c0mS/cm: Conductivity [mS/cm] name 5 = c1mS/cm: Conductivity, 2 [mS/cm] name 6 = altM: Altimeter [m] name 7 = latitude: Latitude [deg] name 8 = longitude: Longitude [deg] name 9 = timeS: Time, Elapsed [seconds] name 10 = timeY: Time, System [seconds] name 11 = flECO-AFL: Fluorescence, Wetlab ECO-AFL/FL [mg/m^3] name 12 = par: PAR/Irradiance, Biospherical/Licor name 13 = sbeox0ML/L: Oxygen, SBE 43 [ml/l] name 14 = xmiss: Beam Transmission, Chelsea/Seatech/Wetlab CStar [%] name 15 = sigma-é00: Density [sigma-theta, Kg/m^3] name 16 = sigma-t00: Density [sigma-t, Kg/m^3] name 17 = sigma-é11: Density, 2 [sigma-theta, Kg/m^3] name 18 = sigma-t11: Density, 2 [sigma-t, Kg/m^3] name 19 = potemp090C: Potential Temperature [ITS-90, deg C] name 20 = potemp190C: Potential Temperature, 2 [ITS-90, deg C] name 21 = sal00: Salinity [PSU] name 22 = sal11: Salinity, 2 [PSU] name 23 = svCM: Sound Velocity [Chen-Millero, m/s] name 24 = flag: flag span 0 = 2.000, 103.000 span 1 = 1.980, 102.049 span 2 = 6.3851, 15.1536 span 3 = 6.3859, 15.6442 span 4 = 33.069511, 37.810101 span 5 = 33.071484, 38.161823 span 6 = 0.94, 124.52 span 7 = 54.59930, 54.59938 span 8 = -134.05646, -134.05640 span 9 = 81.537, 854.430 span 10 = 1187400437, 1187401210 span 11 = -0.0742, 6.2105 span 12 = 7.3999e+00, 9.3234e+01 span 13 = 3.72266, 7.10852 span 14 = 77.4994, 97.1311 span 15 = 22.2944, 26.0131 span 16 = 22.2943, 26.0120 span 17 = 22.1385, 26.0138 span 18 = 22.1384, 26.0127 span 19 = 6.3763, 15.1533 span 20 = 6.3772, 15.6439 span 21 = 30.2677, 33.1114 span 22 = 30.2021, 33.1124 span 23 = 1475.56, 1501.69 span 24 = 0.0000e+00, 0.0000e+00 interval = decibars: 1 start_time = Aug 18 2007 01:25:56 bad_flag = -9.990e-29 sensor 0 = Frequency 0 temperature, primary, 2131, 23-jan-07 sensor 1 = Frequency 1 conductivity, primary, 2881, 17-jan-07, cpcor = -9.5700e-08 sensor 2 = Frequency 2 pressure, 34901, 01-Feb-2007 sensor 3 = Frequency 3 temperature, secondary, 1703, 23-jan-07 sensor 4 = Frequency 4 conductivity, secondary, 0855, 17-jan-07, cpcor = -9.5700e-08 sensor 5 = Extrnl Volt 2 WET Labs, ECO_AFL sensor 6 = Extrnl Volt 3 transmissometer, primary, CST-401DR, 09-feb-2007 sensor 7 = Extrnl Volt 4 Oxygen, SBE, primary, 0023, 12 oct 2006 sensor 8 = Extrnl Volt 5 altimeter sensor 9 = Extrnl Volt 6 irradiance (PAR), primary, 4747, 10-July-2006 datcnv_date = Aug 18 2007 03:36:31, 5.37e datcnv_in = g:data21000101.hex g:data21000101.CON datcnv_skipover = 0 wildedit_date = Aug 18 2007 03:36:32, 5.37e wildedit_in = g:data21000101.cnv wildedit_pass1_nstd = 2.0 wildedit_pass2_nstd = 20.0 wildedit_pass2_mindelta = 0.000e+000 wildedit_npoint = 100 wildedit_vars = prDM depSM t090C t190C c0mS/cm c1mS/cm flECO-AFL par sbeox0ML/L xmiss wildedit_excl_bad_scans = yes celltm_date = Aug 18 2007 03:36:33, 5.37e celltm_in = g:data21000101.cnv celltm_alpha = 0.0300, 0.0300 celltm_tau = 7.0000, 7.0000 celltm_temp_sensor_use_for_cond = primary, secondary filter_date = Aug 18 2007 03:36:33, 5.37e filter_in = g:data21000101.cnv filter_low_pass_tc_A = 0.030 filter_low_pass_tc_B = 0.150 filter_low_pass_A_vars = prDM filter_low_pass_B_vars = c0mS/cm c1mS/cm loopedit_date = Aug 18 2007 03:36:34, 5.37e loopedit_in = g:data21000101.cnv loopedit_minVelocity = 0.000 loopedit_surfaceSoak: minDepth = 5.0, maxDepth = 20, useDeckPress = 1 loopedit_excl_bad_scans = yes binavg_date = Aug 18 2007 03:36:34, 5.37e binavg_in = g:data21000101.cnv binavg_bintype = decibars binavg_binsize = 1 binavg_excl_bad_scans = yes binavg_skipover = 0 binavg_surface_bin = no, min = 0.000, max = 0.000, value = 0.000 Derive_date = Aug 18 2007 03:36:34, 5.37e Derive_in = g:data21000101.cnv g:data21000101.CON file_type = ascii

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	LI-COR Biospherical PAR Sensor
Generic Instrument Name	LI-COR Biospherical PAR Sensor
Dataset-specific Description	LI-COR Biospherical PAR Sensor
Generic Instrument Description	The LI-COR Biospherical PAR Sensor is used to measure Photosynthetically Available Radiation (PAR) in the water column. This instrument designation is used when specific make and model are not known.

Dataset-specific Instrument Name	SBE 43 Dissolved Oxygen Sensor
Generic Instrument Name	Sea-Bird SBE 43 Dissolved Oxygen Sensor
Dataset-specific Description	SBE 43 Dissolved Oxygen Sensor
Generic Instrument Description	The Sea-Bird SBE 43 dissolved oxygen sensor is a redesign of the Clark polarographic membrane type of dissolved oxygen sensors. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Wet Labs ECO-AFL/FL Fluorometer
Generic Instrument Name	Wet Labs ECO-AFL/FL Fluorometer
Dataset-specific Description	Wet Labs ECO-AFL/FL Fluorometer
Generic Instrument Description	The Environmental Characterization Optics (ECO) series of single channel fluorometers delivers both high resolution and wide ranges across the entire line of parameters using 14 bit digital processing. The ECO series excels in biological monitoring and dye trace studies. The potted optics block results in long term stability of the instrument and the optional anti-biofouling technology delivers truly long term field measurements. more information from Wet Labs

Dataset-specific Instrument Name	Wet Labs CSTAR Transmissometer
Generic Instrument Name	WET Labs {Sea-Bird WETLabs} C-Star transmissometer
Dataset-specific Description	Wet Labs CSTAR Transmissometer
Generic Instrument Description	The C-Star transmissometer has a novel monolithic housing with a highly intgrated opto-electronic design to provide a low cost, compact solution for underwater measurements of beam transmittance. The C-Star is capable of free space measurements or flow-through sampling when used with a pump and optical flow tubes. The sensor can be used in profiling, moored, or underway applications. Available with a 6000 m depth rating. More information on Sea-Bird website: https://www.seabird.com/c-star-transmissometer/product?id=60762467717

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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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