Chemical and biological data from CTD Niskin bottle samples from RVIB Nathaniel B. Palmer NBP1201 in the Ross Sea from 2011-2012 (PRISM-RS project)

Website: https://www.bco-dmo.org/dataset/511219
Data Type: Cruise Results
Version: 2017-05-31

Project
» Processes Regulating Iron Supply at the Mesoscale - Ross Sea (PRISM-RS)

Programs
» Ocean Carbon and Biogeochemistry (OCB)
» Integrated Marine Biogeochemistry and Ecosystem Research -US (IMBER-US)

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Coverage

Spatial Extent: **N**:-72.181833 **E**:-164.2508 **S**:-77.7955 **W**:159.0163
Temporal Extent: 2012-01-06 - 2012-02-05

Dataset Description

CTD data including nutrients, particulates, primary productivity, and trace metals from the Ross Sea collected in January and February, 2012

Methods & Sampling

Hydrographic data and water samples were collected using a rosette sampler fitted with 24 10-L Niskin bottles (General Oceanics), an SBE 911 plus conductivity, temperature, and depth (CTD) sensors (SeaBird Electronics) and a WET Labs C-Star transmissometer (see additional instruments below). Nitrate and other macronutrient concentrations were measured at sea using standard autoanalyzer techniques. Seawater samples for trace metal analysis were collected with custom-modified 5-L Teflon-lined external-closure Niskin-X samplers (General Oceanics) on a trace-metal clean rosette deployed on a nonmetallic line, and dFe was determined post-cruise following the methods described by Sedwick et al. (2011).

Relevant References:

Sedwick, P. N. et al. Early season depletion of dissolved iron in the Ross Sea polynya: Implications for iron dynamics on the Antarctic continental shelf. Journal of Geophysical Research 116, C12019, doi:10.1029/2010jc006553 (2011).

Data Processing Description

2017-05-31 updates:
replaced version:2015-10-09. The original data is still the same but they expanded to include other parameters and made some data corrections.
1. 2 um Particulate TM data is added.
2. HPLC data is added.
3. Bottle file format in part of columns names location.
4. Several DATA CORRECTIONS were made in a process of merging

2015-10-09 updates:
replaced version:2014-04-11. The values are the same but the parameter names and the order of the columns was changed.

2014-04-11:
Original submission
1. Columns in data source:

2,4,6-9: Station info from CTD data files headers;
10: ISO_DateTime_UTC: added by DMO;
3,5,11-30: Sea-Bird SBE 9 CTD BTL data;
31-36: CTD Bottle Nutrients;
37-41: CTD Bottle biological data - Chlorophyll;
42-44: CTD Bottle biological data - Particulates;
45-47: CTD Bottle biological data - Primary productivity.
48-54: TMCTD stations info;
55-96: TMCTD Metals data

2. nd indicates not available data;

3. Flag -999.999 indicates “bad” data

CTD data was merged with TMCTD data at each station using CTD nominal depth and finding TMCTD data inside some depth interval depending on depth level. Nominal depth and location/time data for both instruments is included in the data.

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Data Files

File
bottle_NBP1201.csv(Comma Separated Values (.csv), 1.37 MB) MD5:cdd66c7028497079906b0a6d412fd47b Primary data file for dataset ID 511219

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Parameters

Parameter	Description	Units
sta	station number	unitless
depth_n	nominal depth	meters
press	CTD pressure	decibars
cast	CTD cast number	unitless
bottle	CTD bottle number	unitless
date	CTD date	yyyymmdd
time	CTD time	hhmm
lat	CTD latitude	decimal degrees
lon	CTD longitude	decimal degrees
ISO_DateTime_UTC	Date/Time (UTC) ISO formatted	YYYY-MM-DDTHH:MM:SS[xx]Z
sal	salinity from primary sensor	unitless
sal2	salinity from secondary sensor	unitless
density	sigma-theta density from primary sensor	kilograms/meter^3
density2	sigma-theta density from secondary sensor	kilograms/meter^3
temp	temperature from primary sensor	degrees Celsius
temp2	temperature from secondary sensor	degrees Celsius
cond	conductivity from primary sensor	Siemens/meter
cond2	conductivity from secondary sensor	Siemens/meter
fluor	fluorescence	milligrams/m^3
trans	beam transmission	percent
alt	altitude	meters
par	PAR/Irradiance	microEinsteins/centimeter^2/second
cpar	corrected Irradiance: CPAR = (100 * ratio multiplier * underwater PAR) / surface PAR where ratio multiplier = scaling factor used for comparing light fields of disparate intensity; input in .con file entry for surface PAR sensor.	microEinsteins/centimeter^2/second
spar	SPAR/Surface Irradiance	microEinsteins/centimeter^2/second
O2_v	oxygen voltage	volts
O2_v2	oxygen voltage; secondary sensor	volts
potemp	potential temperature	degrees Celsius
potemp2	potential temperature; secondary sensor	degrees Celsius
O2_ml_L1	dissolved oxygen from CTD sensor	milliliters per liter

O2_ml_L2	dissolved oxygen from CTD secondary sensor	milliliters per liter
bottle_nuts	CTD bottle number for nutrient analyses	unitless
PO4	Phosphate concentration	microMolar
NO2	nitrited concentration	microMolar
NO2_NO3	nitrate and nitrite concentration	microMolar
NH4	ammonium concentration	microMolar
SiO4	silicate concentration	microMolar
Fo	fluorometric reading of non-adicified chlorophyll sample	unitless
Fa	fluorometric reading of adicified chlorophyll sample	unitless
Fo_Fa	ratio of chlorophyll-a to phaeopigment based on fluorometric readings of a non acidified (Fo) and acidified (Fa) samples	unitless
chl_a	chlorophyll	micrograms/liter
phaeo	total phaeopigment	micrograms/liter
Bsi	biogenic Silica	microMolar
PON	particulate organic Nitrogen	microMolar
PIC	particulate organic Carbon	microMolar
PP_L_hr	primary productivity	micrograms C/liter/hour
PP_int_hr	integrated primary productivity per hour	micrograms C/square meter/hour
PP_int_day	integrated primary productivity per day	micrograms C/square meter/day
cast_tmctd	Trace Metal-CTD cast number	unitless
lat_tmctd	Trace Metal-CTD latitude	decimal degrees
lon_tmctd	Trace Metal-CTD longitude	decimal degrees
bottle_tmctd	Trace Metal-CTD bottle number	unitless
depth_tmctd	Trace Metal-CTD depth	meters
date_tmctd	Trace Metal-CTDdate	yyyymmdd
time_tmctd	Trace Metal-CTD time	hhmm
dFe	dissolved Fe concentration	nanoMolar
filter_code_0_4micron	filter code for 0.4 micron filter from TMCTD: 1=IC; 2=IE; 3=IR; 4=IF; 5=IG	unitless
filter_id_0_4micron	filter number for 0.4 micron filter from TMCTD	unitless
vol_filt_0_4micron	volume filtered for 0.4 micron filter from TMCTD	liters
Mg_0_4micron	concentration of Magnesium in 0.4 micron filter from TMCTD	nanoMolar
Mg_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Al_0_4micron	concentration of Aluminum in 0.4 micron filter from TMCTD	nanoMolar
Al_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Si_0_4micron	concentration of Silica in 0.4 micron filter from TMCTD	nanoMolar

Si_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
P_0_4micron	concentration of Phophorous in 0.4 micron filter from TMCTD	nanoMolar
P_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
S_0_4micron	concentration of Sulfur in 0.4 micron filter from TMCTD	nanoMolar
S_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Cl_0_4micron	concentration of Chlorine in 0.4 micron filter from TMCTD	nanoMolar
Cl_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
K_0_4micron	concentration of Potassium in 0.4 micron filter from TMCTD	nanoMolar
K_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Ca_0_4micron	concentration of Calcium in 0.4 micron filter from TMCTD	nanoMolar
Ca_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Ti_0_4micron	concentration of Titanium in 0.4 micron filter from TMCTD	nanoMolar
Ti_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
V_0_4micron	concentration of Vanadium in 0.4 micron filter from TMCTD	nanoMolar
V_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Cr_0_4micron	concentration of Chromium in 0.4 micron filter from TMCTD	nanoMolar
Cr_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Mn_0_4micron	concentration of Manganese in 0.4 micron filter from TMCTD	nanoMolar
Mn_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Fe_P_0_4micron	concentration of particulate Iron in 0.4 micron filter from TMCTD	nanoMolar
Fe_P_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Ni_0_4micron	concentration of Nickel in 0.4 micron filter from TMCTD	nanoMolar
Ni_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Cu_0_4micron	concentration of Copper in 0.4 micron filter from TMCTD	nanoMolar
Cu_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Zn_0_4micron	concentration of Zinc in 0.4 micron filter from TMCTD	nanoMolar
Zn_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Br_0_4micron	concentration of Bromine in 0.4 micron filter from TMCTD	nanoMolar
Br_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
Sr_0_4micron	concentration of Strontium in 0.4 micron filter from TMCTD	nanoMolar
Sr_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar

Pb_0_4micron	concentration of Lead in 0.4 micron filter from TMCTD	nanoMolar
Pb_3sd_0_4micron	3 standard deviations from TMCTD	nanoMolar
prim_prod	Primary Productivity	micrograms Carbon/Liter/Hour (ug C/L/h)
prim_prod2	Integrated Primary Productivity	miligrams Carbon/Meter^2/Hour (mg C/m^2/h)
prim_prod3	Integrated Primary Productivity	miligrams Carbon/Meter^2/Day (mg C/m^2/d)
filter_code_2micron	filter code for 2 micron filter from TMCTD: 6=IM; 7=IN; 8=IO; 9=IP	unitless
filter_id_2micron	filter number for 2 micron filter from TMCTD	unitless
vol_filt_2micron	volume filtered for 2 micron filter from TMCTD	liters (L)
Mg_2micron	concentration of Magnesium in 2 micron filter from TMCTD	nanoMolar
Mg_err_2micron	error from TMCTD	nanoMolar
Al_2micron	concentration of Aluminum in 2 micron filter from TMCTD	nanoMolar
Al_err_2micron	error from TMCTD	nanoMolar
Si_2micron	concentration of Silica in 2 micron filter from TMCTD	nanoMolar
Si_err_2micron	error from TMCTD	nanoMolar
P_2micron	concentration of Phophorous in 2 micron filter from TMCTD	nanoMolar
P_err_2micron	error from TMCTD	nanoMolar
S_2micron	concentration of Sulfur in 2 micron filter from TMCTD	nanoMolar
S_err_2micron	error from TMCTD	nanoMolar
Cl_2micron	concentration of Chlorine in 2 micron filter from TMCTD	nanoMolar
Cl_err_2micron	error from TMCTD	nanoMolar
K_2micron	concentration of Potassium in 2 micron filter from TMCTD	nanoMolar
K_err_2micron	error from TMCTD	nanoMolar
Ca_2micron	concentration of Calcium in 2 micron filter from TMCTD	nanoMolar
Ca_err_2micron	error from TMCTD	nanoMolar
Ti_2micron	concentration of Titanium in 2 micron filter from TMCTD	nanoMolar
Ti_err_2micron	error from TMCTD	nanoMolar
V_2micron	concentration of Vanadium in 2 micron filter from TMCTD	nanoMolar
V_err_2micron	error from TMCTD	nanoMolar
Cr_2micron	concentration of Chromium in 2 micron filter from TMCTD	nanoMolar
Cr_err_2micron	error from TMCTD	nanoMolar

Mn_2micron	concentration of Manganese in 2 micron filter from TMCTD	nanoMolar
Mn_err_2micron	error from TMCTD	nanoMolar
Fe_P_2micron	concentration of particulate Iron in 2 micron filter from TMCTD	nanoMolar
Fe_P_err_2micron	error from TMCTD	nanoMolar
Ni_2micron	concentration of Nickel in 2 micron filter from TMCTD	nanoMolar
Ni_err_2micron	error from TMCTD	nanoMolar
Cu_2micron	concentration of Copper in 2 micron filter from TMCTD	nanoMolar
Cu_err_2micron	error from TMCTD	nanoMolar
Zn_2micron	concentration of Zinc in 2 micron filter from TMCTD	nanoMolar
Zn_err_2micron	error from TMCTD	nanoMolar
Br_2micron	concentration of Bromine in 2 micron filter from TMCTD	nanoMolar
Br_err_2micron	error from TMCTD	nanoMolar
Sr_2micron	concentration of Strontium in 2 micron filter from TMCTD	nanoMolar
Sr_err_2micron	error from TMCTD	nanoMolar
Pb_2micron	concentration of Lead in 2 micron filter from TMCTD	nanoMolar
Pb_err_2micron	error from TMCTD	nanoMolar
hplc_sample_num	HPLC sample number	unitless
hplc_tot_vol_mL	HPLC volume filtered seawater	mililiters (mL)
hplc_tot_vol_L	HPLC volume filtered seawater	Liters (L)
hplc_vol_90pcnt_acetone	volume of 90 pcnt acetone	microliters (uL)
hplc_vol_CTX	volume of canthaxanthin	microliters (uL)
hplc_vol_extract_uL	total volume extraction (acetone + cantha) (uL)	microliters (uL)
hplc_vol_extract_mL	Vext: total volume extraction (acetone + cantha)	mililiters (mL)
hplc_inject_vol_sample	for injection: volume sample	microliters (uL)
hplc_buff_vol	volume buffer	microliter (uL)
hplc_samp_buff_vol	sample + buffer volume	microliter (uL)
hplc_vol_inj_samp_bot	Vinj: vol injected sample + buffer	microliter (uL)
hplc_buff_dil_factor	B: buffer dilution factor	unitless
hplc_chl_c3	chlorophyll c3 (RT = 6.200) pick area (Ap)	unitless
hplc_peri	peridinin (partial peak) (see Notes Worksheet) (RT = 9.783) pick area (Ap)	unitless
hplc_but19	19-butanoyloxyfucoxanthin (RT = 10.850) pick area (Ap)	unitless
hplc_fuco	fucoxanthin (RT = 10.867) pick area (Ap)	unitless
hplc_hex19	19hex (RT = 11.633) pick area (Ap)	unitless

hplc_allo	allo (RT 15.3 min) (RT = 15.950) pick area (Ap)	unitless
hplc_cantha	canthaxanthine (RT = 18.150) pick area (Ap)	unitless
hplc_chla_allo	chla allo pick area (Ap)	unitless
hplc_chla	chla (RT = 23.316) pick area (Ap)	unitless
hplc_chla_epi	chlorophyll a epimer pick area (Ap)	unitless
hplc_chla_sum	sum chla pick area (Ap)	unitless
hplc_chl_c3_slope	Slope from calibration; total pigment in injected sample; 8945657: chlorophyll c3	micrograms (ug)
hplc_peri_slope	Slope from calibration; total pigment in injected sample; 5631629: peridinin	micrograms (ug)
hplc_but19_slope	Slope from calibration; total pigment in injected sample; 8477663: 19-butanoyloxyfucoxanthin	micrograms (ug)
hplc_fuco_slope	Slope from calibration; total pigment in injected sample; 8795122: fucoxanthin	micrograms (ug)
hplc_hex19_slope	Slope from calibration; total pigment in injected sample; 9134242: 19hex	micrograms (ug)
hplc_allo_slope	Slope from calibration; total pigment in injected sample; 10983522: allo	micrograms (ug)
hplc_cantha_slope	Slope from calibration; total pigment in injected sample; 8809622: canthaxanthine (red = too low or too high; see Notes worksheet)	micrograms (ug)
hplc_chla_slope	Slope from calibration; total pigment in injected sample; 2148822: chla	micrograms (ug)
hplc_jeff_chl_c3	Jeffrey chlorophyll c3	nanograms/Liter (ng/L)
hplc_jeff_peri	Jeffrey peridinin	nanograms/Liter (ng/L)
hplc_jeff_19but	Jeffrey 19-butanoyloxyfucoxanthin	nanograms/Liter (ng/L)
hplc_jeff_fuco	Jeffrey fucoxanthin	nanograms/Liter (ng/L)
hplc_jeff_19hex	Jeffrey 19hex	nanograms/Liter (ng/L)
hplc_jeff_allo	Jeffrey allo	nanograms/Liter (ng/L)
hplc_jeff_cantha	Jeffrey canthaxanthine	nanograms/Liter (ng/L)
hplc_jeff_chla	Jeffrey chla	nanograms/Liter (ng/L)
hplc_fluor_chl_a	fluor Chl a	micrograms/Liter (ug/L)
hplc_fluor_phaeo_a	fluor phaeo a	micrograms/Liter (ug/L)

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Instruments

Dataset-specific Instrument Name	Altimeter
Generic Instrument Name	Altimeter
Generic Instrument Description	An instrument that measures height above a fixed surface. The data can be used to map ocean-surface topography and generate gridded surface height fields.

Dataset-specific Instrument Name	CTD SBE 911plus
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	HPLC
Generic Instrument Name	High-Performance Liquid Chromatograph
Dataset-specific Description	High Performance Liquid Chromatograph
Generic Instrument Description	A High-performance liquid chromatograph (HPLC) is a type of liquid chromatography used to separate compounds that are dissolved in solution. HPLC instruments consist of a reservoir of the mobile phase, a pump, an injector, a separation column, and a detector. Compounds are separated by high pressure pumping of the sample mixture onto a column packed with microspheres coated with the stationary phase. The different components in the mixture pass through the column at different rates due to differences in their partitioning behavior between the mobile liquid phase and the stationary phase.

Dataset-specific Instrument Name	LI-COR Biospherical PAR
Generic Instrument Name	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	Niskin bottle
Generic Instrument Name	Niskin bottle
Dataset-specific Description	Rosette fitted with 24 10-L General Oceanics Niskin bottles
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.

Dataset-specific Instrument Name	Niskin-1010X
Generic Instrument Name	Niskin-1010X
Dataset-specific Description	Custom-modified 5-L Teflon-lined external-closure Niskin-X samplers (General Oceanics) on a trace-metal clean rosette deployed on a nonmetallic line.
Generic Instrument Description	The Model 1010X NISKIN-X External Spring Niskin Water Sampler is a Niskin water sample bottle with the stainless steel closure springs mounted externally. The external closure mechanism is designed to support applications such as trace metal analysis where the inside of the sampler must be totally free of contaminants. The 1010X Niskin bottle, manufactured by General Oceanics Inc., is available in a variety of sizes (sample volume). It can be activated by the GO Devil Messenger (1000-MG) if individually or serially attached to a hydrocable or can be deployed as part of a Rosette multibottle array. The bottles can be teflon-lined and are available as GO-FLO bottles to further avoid sample contamination. (more from General Oceanics)

Dataset-specific Instrument Name	SBE-43 DO
Generic Instrument Name	Sea-Bird 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	Transmissometer
Generic Instrument Name	Transmissometer
Dataset-specific Description	Chelsea/Seatech transmissometer
Generic Instrument Description	A transmissometer measures the beam attenuation coefficient of the lightsource over the instrument's path-length. This instrument designation is used when specific manufacturer, make and model are not known.

Dataset-specific Instrument Name	ECO AFL/FL
Generic Instrument Name	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

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Deployments

NBP1201

Website	https://www.bco-dmo.org/deployment/506350
Platform	RVIB Nathaniel B. Palmer
Report	http://data.bco-dmo.org/PRISM/PRISM_cruise_report_draft_feb_12.pdf
Start Date	2011-12-24
End Date	2012-02-11
Description	From McMurdo Station to Punta Arenas, Chile More information: http://gcmd.gsfc.nasa.gov/KeywordSearch/Metadata.do?Portal=amd&KeywordPa...

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Project Information

Processes Regulating Iron Supply at the Mesoscale - Ross Sea (PRISM-RS)

Website: http://science.whoi.edu/users/olga/PRISM_RS/PRISM_RS.html

Coverage: Ross Sea continental shelf; Southern Ocean

The NSF proposal title was "Impact of Mesoscale Processes on Iron Supply and Phytoplankton Dynamics in the Ross Sea"

The Ross Sea continental shelf is one of the most productive areas in the Southern Ocean, and may comprise a significant, but unaccounted for, oceanic CO2 sink, largely driven by phytoplankton production. The processes that control the magnitude of primary production in this region are not well understood, but data suggest that iron limitation is a factor. Field observations and model simulations indicate four potential sources of dissolved iron to surface waters of the Ross Sea: (1) circumpolar deep water intruding from the shelf edge; (2) sediments on shallow banks and nearshore areas; (3) melting sea ice around the perimeter of the polynya; and (4) glacial meltwater from the Ross Ice Shelf. The principal investigators hypothesize that hydrodynamic transport via mesoscale currents, fronts, and eddies facilitate the supply of dissolved iron from these four sources to the surface waters of the Ross Sea polynya. These hypotheses will be tested through a combination of in situ observations and numerical modeling, complemented by satellite remote sensing. In situ observations will be obtained during a month-long cruise in the austral summer. The field data will be incorporated into model simulations, which allow quantification of the relative contributions of the various hypothesized iron supply mechanisms, and assessment of their impact on primary production. The research will provide new insights and a mechanistic understanding of the complex oceanographic phenomena that regulate iron supply, primary production, and biogeochemical cycling. The research will thus form the basis for predictions about how this system may change in a warming climate. The research will contribute to the goals of the international research programs ICED (Integrated Climate and Ecosystem Dynamics) and GEOTRACES (Biogeochemical cycling and trace elements in the marine environment).

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Program Information

Ocean Carbon and Biogeochemistry (OCB)

Website: http://us-ocb.org/

Coverage: Global

The Ocean Carbon and Biogeochemistry (OCB) program focuses on the ocean's role as a component of the global Earth system, bringing together research in geochemistry, ocean physics, and ecology that inform on and advance our understanding of ocean biogeochemistry. The overall program goals are to promote, plan, and coordinate collaborative, multidisciplinary research opportunities within the U.S. research community and with international partners. Important OCB-related activities currently include: the Ocean Carbon and Climate Change (OCCC) and the North American Carbon Program (NACP); U.S. contributions to IMBER, SOLAS, CARBOOCEAN; and numerous U.S. single-investigator and medium-size research projects funded by U.S. federal agencies including NASA, NOAA, and NSF.

The scientific mission of OCB is to study the evolving role of the ocean in the global carbon cycle, in the face of environmental variability and change through studies of marine biogeochemical cycles and associated ecosystems.

The overarching OCB science themes include improved understanding and prediction of: 1) oceanic uptake and release of atmospheric CO2 and other greenhouse gases and 2) environmental sensitivities of biogeochemical cycles, marine ecosystems, and interactions between the two.

The OCB Research Priorities (updated January 2012) include: ocean acidification; terrestrial/coastal carbon fluxes and exchanges; climate sensitivities of and change in ecosystem structure and associated impacts on biogeochemical cycles; mesopelagic ecological and biogeochemical interactions; benthic-pelagic feedbacks on biogeochemical cycles; ocean carbon uptake and storage; and expanding low-oxygen conditions in the coastal and open oceans.

Integrated Marine Biogeochemistry and Ecosystem Research -US (IMBER-US)

Website: http://www.imber.info/

Coverage: global

The BCO-DMO database includes data from IMBER endorsed projects lead by US funded investigators. There is no dedicated US IMBER project or data management office. Those functions are provided by US-OCB and BCO-DMO respectively.

The information in this program description pertains to the Internationally coordinated IMBER research program. The projects contributing data to the BCO-DMO database are those funded by US NSF only. The full IMBER data catalog is hosted at the Global Change Master Directory (GCMD).

IMBER Data Portal: The IMBER project has chosen to create a metadata portal hosted by the NASA's Global Change Master Directory (GCMD). The GCMD IMBER data catalog provides an overview of all IMBER endorsed and related projects and links to datasets, and can be found at URL http://gcmd.nasa.gov/portals/imber/.

IMBER research will seek to identify the mechanisms by which marine life influences marine biogeochemical cycles, and how these, in turn, influence marine ecosystems. Central to the IMBER goal is the development of a predictive understanding of how marine biogeochemical cycles and ecosystems respond to complex forcings, such as large-scale climatic variations, changing physical dynamics, carbon cycle chemistry and nutrient fluxes, and the impacts of marine harvesting. Changes in marine biogeochemical cycles and ecosystems due to global change will also have consequences for the broader Earth System. An even greater challenge will be drawing together the natural and social science communities to study some of the key impacts and feedbacks between the marine and human systems.

To address the IMBER goal, four scientific themes, each including several issues, have been identified for the IMBER project: Theme 1 - Interactions between Biogeochemical Cycles and Marine Food Webs; Theme 2 - Sensitivity to Global Change: How will key marine biogeochemical cycles, ecosystems and their interactions, respond to global change?; Theme 3 - Feedback to the Earth System: What are the roles of the ocean biogeochemistry and ecosystems in regulating climate?; and Theme 4 - Responses of Society: What are the relationships between marine biogeochemical cycles, ecosystems, and the human system?

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Funding

Funding Source	Award
NSF Antarctic Sciences (NSF ANT)	ANT-0944165

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