VPR data from RVIB Nathaniel B. Palmer NBP1201 in the Ross Sea from Dec. 2011 - Feb. 2012 (PRISM-RS project)

Website: https://www.bco-dmo.org/dataset/542461
Version: 1
Version Date: 2015-10-09

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)

Contributors	Affiliation	Role
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Dataset Description

The raw VPR data file collection organized by cruise. You may access the files at: http://science.whoi.edu/users/mcgillic2/nbp1201_vpr/. The /rois directory is set up with a subdirectory for each cast, subdirectories for year-days and further subdirectories for hours.

Tip: To work with the raw files files, make a separate subdirectory for the cruise and download the files to that cruise subdirectory. It will require about 1.5 TB of disk space, and you should have a collection of subdirectories similar to those at http://science.whoi.edu/users/mcgillic2/nbp1201_vpr/.

Contact:

Anyone trying to use these raw VPR files is encouraged to contact either Dennis McGillicuddy with any questions.

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Methods & Sampling

Each VPR tow (vpr1, vpr2, vpr3, etc.) has subdirectories called d### (day), then h## (hour), then the roi tifs collected during that hour and the ctd.dat file of corresponding physical data.

Data Processing Description

The images (.TIFF files) were extracted from video using Matlab-based software. The data are raw; no processing has been applied.

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Data Files

File
vpr_NBP1201.csv (Comma Separated Values (.csv), 118 bytes) MD5:52db1b31db9024ca3319005c992b134b Primary data file for dataset ID 542461

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Parameters

Parameter	Description	Units
description	description of the data available for download.	unitless
data_link	link to external data location (FTP)	unitless

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Instruments

Dataset-specific Instrument Name	VPR
Generic Instrument Name	Video Plankton Recorder
Dataset-specific Description	The Video Plankton Recorder (VPR) is a video-microscope system used for imaging plankton and other particulate matter in the size range from a few micrometers to several centimeters. The VPR is essentially an underwater microscope. It consists of four video cameras (with magnifying optics) synchronized at 60 fields per second (fps) to a red-filtered 80 W xenon strobe (pulse duration = 1 microsecond). The current lens on each camera can be adjusted to provide a field of view between 5 mm and 10 cm.
Generic Instrument Description	The Video Plankton Recorder (VPR) is a video-microscope system used for imaging plankton and other particulate matter in the size range from a few micrometers to several centimeters. The VPR is essentially an underwater microscope. It consists of four video cameras (with magnifying optics) synchronized at 60 fields per second (fps) to a red-filtered 80 W xenon strobe (pulse duration = 1 microsecond). The current lens on each camera can be adjusted to provide a field of view between 5 mm and 10 cm. Use of higher magnification lenses is currently being explored for viewing protozoans (less than 1 micrometer resolution). The four cameras are set for concentric viewing fields so that a range of up to four magnifications can be viewed simultaneously, allowing a wide size range of plankton to be sampled. Depth of field is adjusted by the lens aperture setting, and the volume sampled in each video field ranges from about 1 ml to 1 liter, depending on lens settings. The cameras have been configured for stereoscopic viewing as well.A strobe on the other arm illuminates the imaged volume and flashes 60 times per second, producing 60 images per second of the particles and plankton in the water. The images are then saved internally on a computer hard disk and later plotted. Deployment: Most commonly, the VPR is mounted in a frame and lowered into the water from the stern of the ship. Sometimes, a CTD also is mounted next to the VPR to collect depth, temperature, and salinity information at the same time as each video image. The instrument is lowered down through the water to a maximum depth of 350 meters to generate a profile of plankton/particle abundance and taxon group along with temperature and salinity. In addition to the towed configuration for mapping plankton distributions, it is possible to deploy the VPR in a fixed position (on a mooring) for viewing plankton swimming behaviors in two or three dimensions. The VPR instrument system has been used in both configurations, and deployment on ROVs has been proposed. This definition was taken from the WHOI Ocean Instruments Web site and from a US GLOBEC Newsletter.

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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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