Salinity, SF6 and chlorophyll-a from bottle cast samples from USCGC Polar Star cruise PS02_2002 from the Southern Ocean, south of New Zealand in 2002 (SOFeX project)

Website: https://www.bco-dmo.org/dataset/2816
Version: 27 February 2007
Version Date: 2007-02-27

Project
» Southern Ocean Iron Experiment (SOFeX)

Programs
» Ocean Carbon and Biogeochemistry (OCB)
» Iron Synthesis (FeSynth)

Contributors	Affiliation	Role
Buesseler, Kenneth O.	Woods Hole Oceanographic Institution (WHOI)	Principal Investigator
Chandler, Cynthia L.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

salinity, SF6 and chlorophyll-a from bottle cast samples

Methods & Sampling

dates: 14 February 2002 to 18 February 2002 (20020214-20020218)
location: N: -65.239 S: -66.573 W: -172.943 E: -172.125
project/cruise: SOFeX/USCGC Polar Star (WAGB-10) cruise: PS02

Methodology: bottle cast (BC) samples were collected with the WHOI logger system;
details are available (here)

PI Note: SF6 data are preliminary from Leah Houghton and Laura Goldson

Data Processing Description

Change history: YYMMDD
060510: original data received from Ken Buesseler (WHOI);
070208: added to OCB database by Cyndy Chandler, OCB DMO, (cchandler@whoi.edu)
070227: cchandler, OCB DMO, added yrDay, lat and lon from event log

OCB DMO Note:
070208: use event to retrieve geospatial- temporal- data from event log

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Data Files

File
bottle_BC.csv (Comma Separated Values (.csv), 2.82 KB) MD5:b80daee05a8a85c3553026fe99fb01ea Primary data file for dataset ID 2816

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Parameters

Parameter	Description	Units
event	unique sampling event composite of day, month, year and time (GMT)	DDMMYY_hhmm
station	station location number	alpha_numeric
yrDay	day of year sampling began	DoY.ddd
lat	latitude, negative denotes South	decimal degrees
lon	longitude, negative denotes West	decimal degrees
bot	Niskin bottle number	dimensionless
depth_n	depth, nominal; target depth	meters
depth	depth, calculated from pressure (from the WHOI logger system)	meters
temp	temperature, from CTD, ITS-90 (from the WHOI logger system)	degrees Celsius
sal_CTD	salinity, from CTD, PSS-78 (PSU) (from the WHOI logger system)	dimensionless
sal_bot	salinity, bottle sample (PSU) board salinometer w/o drift correction	dimensionless
SF6	SF6 (preliminary)	femtomolar
Chl_a	chlorophyll-a from on board fluorometer	micrograms per liter

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Instruments

Dataset-specific Instrument Name	CTD Seabird 19
Generic Instrument Name	CTD Sea-Bird SEACAT 19
Dataset-specific Description	bottle cast (BC) samples were collected using 10L bottles on Kevlar with the Polar Star CTD logger on end of line
Generic Instrument Description	The Sea-Bird SBE 19 SEACAT Recorder measures conductivity, temperature, and pressure (depth). The SEACAT is self-powered and self-contained and can be deployed in profiling or moored mode. The SBE 19 SEACAT was replaced in 2001 by the 19plus. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Niskin Bottle
Generic Instrument Name	Niskin bottle
Dataset-specific Description	used with the WHOI logger system
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

PS02_2002

Website	https://www.bco-dmo.org/deployment/57825
Platform	USCGC Polar Star
Report	http://ocb.whoi.edu/SOFeX/CRUISES/proj_description.pdf
Start Date	2002-02-11
End Date	2002-02-21
Description	Cruise dates provided by David Forcucci, USCG Science Liaison Brief cruise plan description: Three ships were involved in the SOFeX experiment. Each ship operated in the study area at a different time to afford the longest observation time. The designations SOFeX-N and SOFeX-S are sometimes used to distinguish between two iron enriched patches - one in low silicate waters north of the polar front (SOFEX-N), and the other in high silicate waters south of the polar front (SOFEX-S). All three ships, Melville (MV), Revelle (RR) and Polar Star (PS), worked in SOFEX-S, but only the Revelle and Melville worked in the SOFeX N patch and shuttled between the two patches. The USCGC Polar Star was the third of the three vessels to occupy the SOFeX study area in 2002. The main focus of the scientific party aboard the Polar Star was to assess how much carbon was removed from the iron fertilized patches. The cruise report includes a more complete description of the Polar Star cruise and a cruise logbook includes daily entries filed by the Chief Scientist aboard each vessel. **Methods & Sampling** dates: 14 February 2002 to 18 February 2002 (20020214-20020218) location: N: -65.239 S: -66.573 W: -172.943 E: -172.125 project/cruise: SOFeX/USCGC Polar Star (WAGB-10) cruise: PS02 Methodology: bottle cast (BC) samples were collected with the WHOI logger system; details are available (here) PI Note: SF6 data are preliminary from Leah Houghton and Laura Goldson **Processing Description** Change history: YYMMDD 060510: original data received from Ken Buesseler (WHOI); 070208: added to OCB database by Cyndy Chandler, OCB DMO, (cchandler@whoi.edu) 070227: cchandler, OCB DMO, added yrDay, lat and lon from event log OCB DMO Note: 070208: use event to retrieve geospatial- temporal- data from event log

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Project Information

Southern Ocean Iron Experiment (SOFeX)

Website: http://www.mbari.org/expeditions/SOFeX2002/

Coverage: Southern Ocean, south of New Zealand

Before he passed away in 1993, John Martin suggested that an increase in the flow of iron-rich dust to the ocean causes phytoplankton (single celled algae) to grow. The increased photosynthesis removes carbon dioxide from surface waters as the algae create biomass. This carbon dioxide is replaced by carbon dioxide gas that flows into the sea from the atmosphere. Reduced carbon dioxide in the atmosphere cools the planet (CO_2 is a greenhouse gas that warms the earth). The results of this work, funded by the National Science Foundation, the Department of Energy, and the US Coast Guard, will be a much better understanding of how biological processes may regulate climate. (see Related Info: Fe cycle)

A direct test of the 'Martin Hypothesis' that trace concentrations of Fe are responsible for phytoplankton's ability to grow by direct experimental addition of Fe to the surface waters. Consequently the distribution of bioavailable Fe in the surface waters determines large geographical areas primary production and the following flux of fixed organic matter to the deep sea. The aim of the SOFeX project is to investigate the effects of iron fertilization on the productivity of the Southern Ocean. The results of this work will contribute significantly to our understanding of important biogeochemical processes which bear directly on the global carbon cycle,

atmospheric carbon dioxide concentration, and climate control.

The SOFeX-N and SOFeX-S designations are sometimes used to distinguish between two iron enriched patches - one in low silicate waters north of the polar front (SOFEX-N), and the other in high silicate waters south of the polar front (SOFEX-S). All three ships, Melville (MV), Revelle (RR) and Polar Star (PS), worked in SOFEX-S, but only the Revelle and Melville worked in the SOFeX N patch and shuttled between the two patches.

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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.

Iron Synthesis (FeSynth)

Coverage: Global

The two main objectives of the Iron Synthesis program (SCOR Working Group proposal, 2005), are:
1. Data compilation: assembling a common open-access database of the *in situ* iron experiments, beginning with the first period (1993-2002; Ironex-1, Ironex-2, SOIREE, EisenEx, SEEDS-1; SOFeX, SERIES) where primary articles have already been published, to be followed by the 2004 experiments where primary articles are now in progress (EIFEX, SEEDS-2; SAGE, FeeP); similarly for the natural fertilizations S.O.JGOFS (1992), CROZEX (2004/2005) and KEOPS (2005).

2. Modeling and data synthesis of specific aspects of two or more such experiments for various topics such as physical mixing, phytoplankton productivity, overall ecosystem functioning, iron chemistry, CO2 budgeting, nutrient uptake ratios, DMS(P) processes, and combinations of these variables and processes.

SCOR Working Group proposal, 2005. "The Legacy of *in situ* Iron Enrichments: Data Compilation and Modeling".
http://www.scor-int.org/Working_Groups/wg131.htm

See also: SCOR Proceedings Vol. 42 Concepcion, Chile October 2006, pgs: 13-16 2.3.3 Working Group on The Legacy of *in situ* Iron Enrichments: Data Compilation and Modeling.

The first objective of the Iron Synthesis program involves a data recovery effort aimed at assembling a common, open-access database of data and metadata from a series of *in-situ* ocean iron fertilization experiments conducted between 1993 and 2005. Initially, funding for this effort is being provided by the Scientific Committee on Oceanic Research (SCOR) and the U.S. National Science Foundation (NSF).

Through the combined efforts of the principal investigators of the individual projects and the staff of Biological and Chemical Oceanography Data Management Office (BCO-DMO), data currently available primarily through individuals, disparate reports and data agencies, and in multiple formats, are being collected and prepared for addition to the BCO-DMO database from which they will be freely available to the community.

As data are contributed to the BCO-DMO office, they are organized into four overlapping categories:
1. Level 1, basic metadata
(e.g., description of project/study, general location, PI(s), participants);
2. Level 2, detailed metadata and basic shipboard data and routine ship's operations
(e.g., CTDs, underway measurements, sampling event logs);
3. Level 3, detailed metadata and data from specialized observations
(e.g., discrete observations, experimental results, rate measurements) and
4. Level 4, remaining datasets
(e.g., highest level of detailed data available from each study).

Collaboration with BCO-DMO staff began in March of 2008 and initial efforts have been directed toward basic project descriptions, levels 1 and 2 metadata and basic data, with detailed and more detailed data files being incorporated as they become available and are processed.

Related file

Program Documentation

The Iron Synthesis Program is funded jointly by the Scientific Committee on Oceanic Research (SCOR) and the U.S. National Science Foundation (NSF).

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