Underway measurement of Iron (Fe (III)) from R/V Roger Revelle cruise DRFT08RR from the Southern Ocean, south of New Zealand in 2002 (SOFeX project)

Website: https://www.bco-dmo.org/dataset/2936
Version: 19 August 2008
Version Date: 2008-08-19

Project
» Southern Ocean Iron Experiment (SOFeX)

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

Contributors	Affiliation	Role
Johnson, Kenneth S.	Monterey Bay Aquarium Research Institute (MBARI)	Principal Investigator, Contact
Chase, Zanna	Monterey Bay Aquarium Research Institute (MBARI)	Contact
Chandler, Cynthia L.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Table of Contents

- Dataset Description
  - Methods & Sampling
  - Data Processing Description
- Data Files
- Parameters
- Deployments
- Project Information
- Program Information

Dataset Description

Underway measurement of Iron (Fe (III))

Methods & Sampling

dates: 11 January 2002 to 8 February 2002 (20020111-20020208)
location: N: -54.02746 S: -66.66375 W: -172.2364 E: -169.1244
project/cruise: SOFeX/RR

Contact: Ken Johnson or Zanna Chase, Monterey Bay Aquarium Research Institute (MBARI)

Methodology:

Near-surface (~3-5 m) seawater was collected through an all-teflon pumping system deployed off the back (starboard side).
Flowing seawater was acidified briefly to pH 3.3 before being analyzed for Fe(III) by chemiluminescence flow injection analysis using
preconcentration on an 8-HQ column.

Data Processing Description

Change history:
070607: downloaded original data (Revelle_Fe_underway.xls) from SOFeX project data web site.
dataset prepared for OCB database by Dave DuBois (OCB DMO, WHOI)
080819: added to OCB database by Cyndy Chandler, OCB DMO, (cchandler@whoi.edu)

19 August 2008: Prepared for OCB data system by Cyndy Chandler, OCB DMO (WHOI) from notes contributed by Ken Johnson.

Original Excel file downloaded from MBARI:
copy of original Excel file

The investigator contributed an Excel file
with standard survey times to be used for plotting underway data. The original Excel file is also available as a PDF format file.

OCB DMO and PI notes:

There were two comments embedded in the Excel data file:

Date Time Longitude Latitude Iron Fe (III)
20020203 053203 -172.0517 -66.12574 0.251420
NOTE: UW SAMPLES FROM 47 ON WERE COLLECTED IN REUSED (RINSED) SAMPLE BOTTLES

20020122 221801 -170.1094 -66.40685 0.206346
NOTE: discrete#21b-filtered

Plots: (GIF image files) of North and South Survey position and dissolvable iron data

North Survey 0	South Survey 0
North Survey 1	South Survey 1
North Survey 2	South Survey 2
North Survey 3	South Survey 3
	South Survey 4

Plots of selected North Patch data (Iron, SF6, oxygen and fluorometric chlorophyll) showing surface underway data from the return trip to the North patch Feb 7-8, 2002. These plots were contributed
as a PPT file, and have been converted to a single PDF format file.

North Patch data plots »

[table of contents | back to top]

Data Files

File
iron.csv (Comma Separated Values (.csv), 26.61 KB) MD5:b581350ae86b9f49a4b65e7608d2da48 Primary data file for dataset ID 2936

[table of contents | back to top]

Parameters

Parameter	Description	Units
date	date sampling began (UTC)	yyyymmdd
time	time sampling began (UTC)	hhmmss
lon	longitude; negative denotes West	decimal degrees
lat	latitude; negative denotes South	decimal degrees
Fe	iron, Fe (III)	nannomoles per liter

[table of contents | back to top]

Deployments

DRFT08RR

Website	https://www.bco-dmo.org/deployment/57824
Platform	R/V Roger Revelle
Report	http://ocb.whoi.edu/SOFeX/CRUISES/proj_description.pdf
Start Date	2002-01-06
End Date	2002-02-14

Description	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 R/V ROGER REVELLE from Scripps Institution of Oceanography sailed first. The REVELLE team added iron to two areas referred to as 'the North and South patches'. After the iron and an inert chemical tracer (SF6) were added, the REVELLE's primary mission was to map the size and characteristics of the South patch using a SeaSOAR fish towed behind the ship that pumped water up to the ship for sampling and analysis. The REVELLE also collected samples for initial biological shipboard mapping of iron concentrations, nutrients, chlorophyll, and photosynthetic efficiency. A cruise logbook includes daily entries filed by the Chief Scientist aboard each vessel. **Methods & Sampling** dates: 11 January 2002 to 8 February 2002 (20020111-20020208) location: N: -54.02746 S: -66.66375 W: -172.2364 E: -169.1244 project/cruise: SOFeX/RR Contact: Ken Johnson or Zanna Chase, Monterey Bay Aquarium Research Institute (MBARI) Methodology: Near-surface (~3-5 m) seawater was collected through an all-teflon pumping system deployed off the back (starboard side). Flowing seawater was acidified briefly to pH 3.3 before being analyzed for Fe(III) by chemiluminescence flow injection analysis using preconcentration on an 8-HQ column. **Processing Description** Change history: 070607: downloaded original data (Revelle_Fe_underway.xls) from SOFeX project data web site. dataset prepared for OCB database by Dave DuBois (OCB DMO, WHOI) 080819: added to OCB database by Cyndy Chandler, OCB DMO, (cchandler@whoi.edu) 19 August 2008: Prepared for OCB data system by Cyndy Chandler, OCB DMO (WHOI) from notes contributed by Ken Johnson. Original Excel file downloaded from MBARI: http://ocb.whoi.edu/SOFeX/PI-NOTES/data_orig/Revelle_Fe_underway.xls" title="orig file">copy of original Excel file The investigator contributed an http://ocb.whoi.edu/SOFeX/PI-NOTES/data_orig/Revelle_surveys.xls">Excel file with standard survey times to be used for plotting underway data. The original Excel file is also available as a http://ocb.whoi.edu/SOFeX/PI-NOTES/Revelle_surveys.pdf">PDF format file. OCB DMO and PI notes: There were two comments embedded in the Excel data file: Date Time Longitude Latitude Iron Fe (III) 20020203 053203 -172.0517 -66.12574 0.251420 NOTE: UW SAMPLES FROM 47 ON WERE COLLECTED IN REUSED (RINSED) SAMPLE BOTTLES 20020122 221801 -170.1094 -66.40685 0.206346 NOTE: discrete#21b-filtered Plots: (GIF image files) of North and South Survey position and dissolvable iron data http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/N_S_0Fe_plots.gif">North Survey 0 http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/S_S_0Fe_plots.gif">South Survey 0 http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/N_S_1Fe_plots.gif">North Survey 1 http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/S_S_1Fe_plots.gif">South Survey 1 http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/N_S_2Fe_plots.gif">North Survey 2 http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/S_S_2Fe_plots.gif">South Survey 2 http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/N_S_3Fe_plots.gif">North Survey 3 http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/S_S_3Fe_plots.gif">South Survey 3 http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/S_S_4Fe_plots.gif">South Survey 4 Plots of selected North Patch data (Iron, SF6, oxygen and fluorometric chlorophyll) showing surface underway data from the return trip to the North patch Feb 7-8, 2002. These plots were contributed as a PPT file, and have been converted to a single PDF format file. http://ocb.whoi.edu/SOFeX/PI-NOTES/iron_plots/nopatch_fe_sf6_fluo_o2.pdf"> North Patch data plots »

[table of contents | back to top]

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.

[table of contents | back to top]

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 CO_2 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).

[table of contents | back to top]