

# SOFeX Polar Star Cruise sampling event log 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/2810>

**Version:** 30 April 2007

**Version Date:** 2007-04-30

## Project

» [Southern Ocean Iron Experiment](#) (SOFeX)

## Programs

» [Ocean Carbon and Biogeochemistry](#) (OCB)

» [Iron Synthesis](#) (FeSynth)

Contributors	Affiliation	Role
<a href="#">Buesseler, Kenneth O.</a>	Woods Hole Oceanographic Institution (WHOI)	Chief Scientist, Principal Investigator
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## Dataset Description

SOFeX Polar Star Cruise sampling event log

## Methods & Sampling

Methodology: none contributed with data

### Related information:

Descriptions of SOFeX cruise [sampling event types](#)

Brief cruise plan description:

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. A more [complete description](#) of the Polar Star cruise is available and a [cruise logbook](#) includes daily entries filed by the Chief Scientist aboard each vessel.

A comment on the 'patch\_loc' field:

The SOFeX 'patch\_loc' field is usually one of four abbreviation codes indicating the sampling location relative to the 'iron fertilized patches'; N indicates North Patch, S = South Patch, and whether the location is within or outside the patch area or on the edge of the patch. For the Polar Star cruise, it appears that only the relative in/out information was recorded. There were two fertilized patches, one north and

one south of the Antarctic Polar Front Zone (APFZ near 61° S) along 170° W. All of the sampling events for which patch\_loc is recorded were conducted south of 61° S, implying the south patch location.

## Data Processing Description

Change history: YYMMDD

070206: Excel file downloaded from MBARI Polar Star data site;  
original event log contributed by Ken Buesseler (WHOI)  
070208: added to OCB by Cyndy Chandler (cchandler@whoi.edu);  
changes were made to original data and confirmed by PI  
070427: added some patch\_loc data from LVP\_pump data file  
070430: added Transect 1 cast events from Transect 1 CTD profile data

Modifications made by OCB DMO to original version of data:  
position data in event log was compared with ship's position log  
and any missing event log data were taken from ship's position log;  
See OCB DMO [notes file](#) for details.

Cruise dates provided by David Forcucci, USCG Science Liaison

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## Data Files

File
<b>log.csv</b> (Comma Separated Values (.csv), 6.04 KB) MD5:4105497a3a73c9607dbe2f712e865481 Primary data file for dataset ID 2810

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## Parameters

Parameter	Description	Units
event	unique sampling event composite of day, month, year and time (GMT)	DDMMYY_hhmm
date	date sampling began (GMT)	YYYYMMDD
time	time sampling began (GMT)	hhmm
yrDay	day of year sampling began	DoY.ddd
station	station location name	alpha_numeric
ev_type	sampling method abbreviation code	dimensionless
person	individual responsible for event	dimensionless
lat	latitude, negative denotes South	decimal degrees
lon	longitude, negative denotes West	decimal degrees
patch_loc	sampling location relative to patch	dimensionless
activity_and_comments	description of sampling event	dimensionless

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## Deployments

### PS02\_2002

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57825">https://www.bco-dmo.org/deployment/57825</a>
<b>Platform</b>	USCGC Polar Star
<b>Report</b>	<a href="http://ocb.whoi.edu/SOFeX/CRUISES/proj_description.pdf">http://ocb.whoi.edu/SOFeX/CRUISES/proj_description.pdf</a>
<b>Start Date</b>	2002-02-11
<b>End Date</b>	2002-02-21
<b>Description</b>	<p>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.</p> <p><b>Methods &amp; Sampling</b></p> <p>Methodology: none contributed with data Related information: Descriptions of SOFeX cruise sampling event types Brief cruise plan description: 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. A more complete description of the Polar Star cruise is available and a cruise logbook includes daily entries filed by the Chief Scientist aboard each vessel. A comment on the 'patch_loc' field: The SOFeX 'patch_loc' field is usually one of four abbreviation codes indicating the sampling location relative to the 'iron fertilized patches'; N indicates North Patch, S = South Patch, and whether the location is within or outside the patch area or on the edge of the patch. For the Polar Star cruise, it appears that only the relative in/out information was recorded. There were two fertilized patches, one north and one south of the Antarctic Polar Front Zone (APFZ near 61° S) along 170° W. All of the sampling events for which patch_loc is recorded were conducted south of 61° S, implying the south patch location.</p> <p><b>Processing Description</b></p> <p>Change history: YYMMDD 070206: Excel file downloaded from MBARI Polar Star data site; original event log contributed by Ken Buesseler (WHOI) 070208: added to OCB by Cyndy Chandler (<a href="mailto:cchandler@whoi.edu">cchandler@whoi.edu</a>); changes were made to original data and confirmed by PI 070427: added some patch_loc data from LVP_pump data file 070430: added Transect 1 cast events from Transect 1 CTD profile data Modifications made by OCB DMO to original version of data: position data in event log was compared with ship's position log and any missing event log data were taken from ship's position log; See OCB DMO <a href="http://ocb.whoi.edu/SOFeX/PI-NOTES/evLog_PS_DMO_notes.html">http://ocb.whoi.edu/SOFeX/PI-NOTES/evLog_PS_DMO_notes.html</a>"&gt;notes file for details. Cruise dates provided by David Forcucci, USCG Science Liaison</p>

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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<sub>2</sub> 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 CO<sub>2</sub> 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, SOREE, 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, CO<sub>2</sub> 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](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).



## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-9987501</a>

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