

SOFeX project CTD profile data from R/V Melville, R/V Roger Revelle, USCGC Polar Star cruises COOK19MV, DRFT08RR, PS02_2002 from the Southern Ocean, south of New Zealand in 2002 (SOFeX project)

Website: <https://www.bco-dmo.org/dataset/2851>

Version:

Version Date: 2007-02-01

Project

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

Programs

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

» [Iron Synthesis](#) (FeSynth)

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Dataset Description

SOFeX project CTD profile data

Methods & Sampling

Methodology: data were collected with SeaBird 911 CTD profiler

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Parameters

Parameter	Description	Units
event	unique sampling event number from event log (day of year and time (UTC))	doYhhmm
date	date sampling began (UTC)	YYYYMMDD
time	time sampling began (UTC)	hhmm

time_L	time, local (GMT +13)	hhmm
lon	longitude, negative denotes West	decimal degrees
lat	latitude, negative denotes South	decimal degrees
seafloor	seafloor depth	meters
Pmax	pressure, maximum in profile	meters
station	station location number	dimensionless
cast	CTD cast number per cruise	dimensionless
press	pressure, from CTD	decibars
depth	depth, calculated from pressure	meters
temp	temperature, from CTD, ITS-90 (from primary T0 sensor)	degrees Celsius
potemp	potential temperature, ITS-90 (from primary T0,C0 sensors)	degrees Celsius
sal	salinity, from CTD, PSS-78 (PSU) (from primary T0,C0 sensor)	dimensionless
sigma_0	sigma theta (potential density) (from primary T0,C0 sensors)	kilograms/meter ³
O2_ml_L	oxygen, dissolved	ml/liter
O2_sat	oxygen saturation	ml/liter
O2_satP	oxygen saturation, percent	percent
trans	transmissivity (CST-492D)	percent
fluor	fluorescence, chelsea FIC	unknown ??
PAR	Photosynthetically Available Radiation irradiance	unknown ??
SPAR	surface PAR irradiance	unknown ??
cond	conductivity	milliSiemens/centimeter
bat	unknown; likely this is Beam Attenuation from the Chelsea/Seatech/Wetlab Cstar sensor in 1/m units	unknown ??
SvW	unknown; possibly sound velocity in water, wilson [m/s]	unknown ??
sta	station identifier	dimensionless
ev_type	event type descriptor string	dimensionless
oxygen_ctd	oxygen, dissolved from SBE CTD (is this O2_umol_kg ??)	Mm/Kg
V2	unknown, possibly altimeter ??	unknown ??
V3	unknown, zeroed, possibly SPAR	unknown ??
yrDay	day of year sampling began	decimal day of year
sigma_t	sigma-T (density)	kilograms/meter ³
beam_att	Beam attenuation Chelsea/Seatech	1/meter
alt	altimeter	meters
temp_S	temperature, from CTD, ITS-90	degrees Celsius
sal_S	salinity, from CTD, PSS-78 (PSU)	dimensionless
potemp_S	potential temperature, ITS-90	degrees Celsius
sigma_t_S	sigma-T (density)	kilograms/meter ³
sigma_0_S	sigma theta (potential density)	kilograms/meter ³
cond_S	conductivity, from CTD, secondary sensor	milliSiemens/centimeter

Instruments

Dataset-specific Instrument Name	CTD Seabird 911
Generic Instrument Name	CTD Sea-Bird 911
Generic Instrument Description	The Sea-Bird SBE 911 is a type of CTD instrument package. The SBE 911 includes the SBE 9 Underwater Unit and the SBE 11 Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 and SBE 11 is called a SBE 911. The SBE 9 uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 and SBE 4). The SBE 9 CTD can be configured with auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). More information from Sea-Bird Electronics.

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Deployments

COOK19MV

Website	https://www.bco-dmo.org/deployment/57826
Platform	R/V Melville
Report	http://ocb.whoi.edu/SOFeX/CRUISES/proj_description.pdf
Start Date	2002-01-19
End Date	2002-02-26
Description	<p>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 MELVILLE sailed several weeks after the R/V REVELLE to arrive in the study area just as the 'patches' were forming in response to iron fertilization. The MELVILLE's team planned to make detailed measurements of phytoplankton physiology and rate processes, and to sample daily for phytoplankton growth rates and biomass, soluble and particulate iron and zooplankton biomass. A cruise logbook includes daily entries filed by the Chief Scientist aboard each vessel.</p> <p>Methods & Sampling dates: 21 January 2002 to 21 February 2002 (20020121-20020221) location: N: -52.385 S: -66.611 W: -175.220 E: -166.946 project/cruise: SOFeX/MV</p> <p>Processing Description DMO notes: original version prepared from Scripps standard CTD (SIO CTD) casts Added to OCB: 07 February 2006 by Cyndy Chandler (cchandler@whoi.edu) all units information taken from bottle .BTL header records http://ocb.whoi.edu/SOFeX/PI-NOTES/ctd-SIO_MV.html">Methodology 10 February 2006: Prepared for OCB data system by and Cyndy Chandler, OCB DMO (WHOI). Data were processed using the standard set of Seabird utilities, to generate final 1-decibar pressure sorted downtrace files for all CTD casts. All final processed *.asc CTD files were downloaded by the OCB DMO in February 2006 from the SOFeX web site at MBARI: http://www.mbari.org/SOFeX/Melville_Data/CTD/Melville_CTD.htm The date, time, latitude and longitude position information were taken from the CTD header records in the *.BTL files, and therefore disagree slightly with the entires for those CTD cast events in the cruise event http://ocb.whoi.edu/jg/serv/OCB/SOFeX/Melville/log.html0">Activity Log Final CTD cast header record from a .BTL file: http://ocb.whoi.edu/SOFeX/PI-NOTES/SIO_MV_002.BTL">SIO-CTD cast 2 Note: Temp is T90 (ITS-90 scale confirmed from .BTL file headers) only data from the primary temperature and conductivity sensors was kept for the final CTD data Final CTD cast configuration (con report) files were not provided with .ASC files.</p>

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	<p>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.</p> <p>Methods & Sampling dates: 10 January 2002 to 10 February 2002 (20020110-20020210) location: N: -54.093 S: -66.602 W: -172.153 E: -169.242 project/cruise: SOFeX/</p> <p>Processing Description Change history: YYMMDD 060110: original version prepared from Scripps standard CTD (SIO CTD) casts 060119: added to OCB database by Cyndy Chandler, OCB DMO, (cchandler@whoi.edu) 070327: dates and position information corrected to match Seabird header records. http://ocb.whoi.edu/SOFeX/PI-NOTES/ctd-SIO_RR.html">Methodology 10 January 2006: Prepared for OCB data system by Terry McKee (PO Dept, WHOI) and Cyndy Chandler, OCB DMO (WHOI). Data were processed using the standard set of Seabird utilities, to generate final 1-decibar pressure sorted downtrace files for all CTD casts. All final processed *.asc CTD files were downloaded by the OCB DMO in December 2005 from the SOFeX web site: http://www.mbari.org/SOFeX/Revelle_Data/Revelle_Station_Data/Revelle_SIO... The event number, date, time, latitude and longitude position information were taken from the *.hdr CTD header files. Dates and positions as initially entered in the database were incorrect. This information was corrected in the 27 March 2007 version of the database. Final CTD station header record: http://ocb.whoi.edu/SOFeX/PI-NOTES/SX002C01_hdr.txt">SIO-CTD station 2 Final CTD station configuration (con report) files were not provided with .asc files. Also, note there is no data file for station 31. PI note: the following SIO CTD casts from Revelle have bad oxygen data. Please consult this list to avoid using bad data. SX020C01 SX021C01 SX021C02 SX022C01 SX024C01 SX024C03 SX024C04 SX026C04 SX027C01 SX027C02 SX028C01 SX028C02 SX028C03 SX029C01 Note that the following SIO CTD casts from Revelle have bad transmissometer data: SX002C01 SX003C01 SX004C01 SX005C01 SX006C01 SX007C01 SX008C01 SX009C01 SX009C04 SX010C01 SX010C02 SX011C02 SX011C03 SX012C02 SX015C01 SX016C01 SX017C01 SX018C01 SX019C01 SX019C02 SX019C03 SX019C04 SX020C01 SX027C01 SX028C02</p>

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	<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>Methods & Sampling dates: 12 February 2002 to 20 February 2002 (20020212-20020220) location: N: -65.854 S: -74.120 W: 172.924 E: -172.315 project/cruise: SOFeX/USCGC Polar Star (WAGB-10) cruise: PS02 Methodology: data were collected with SeaBird 911 CTD profiler</p> <p>Processing Description Change history: YYMMDD 060206: original raw data downloaded from SOFeX project Web site 070423: data reprocessed by Terry McKee (PO Dept., WHOI) 070501: added to OCB database by Cyndy Chandler, OCB DMO, (cchandler@whoi.edu) CTD event, date, time, lon and lat agree with cruise event log; OCB DMO Notes: http://ocb.whoi.edu/SOFeX/PI-NOTES/ctd_processing_PS.html">detailed data processing notes Data were processed from all sensors and a _S appended to a parameter name indicates the secondary sensor as opposed to the primary sensor of that type.</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 (CO₂ 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, 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, 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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