Trace Metal clean rosette bottle hydrographic and nutrient data 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/2935
Version: 9 January 2006
Version Date: 2006-01-09

Project
» Southern Ocean Iron Experiment (SOFeX)

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

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Dataset Description

Trace Metal Clean Rosette bottle hydrographic and nutrient data

Methods & Sampling

dates: 11 January 2002 to 10 February 2002 (20020111-20020210)
location: N: -54.093 S: -66.602 W: -172.038 E: -169.242
project/cruise: SOFeX/RR

Nutrients were run at MBARI on an Alpkem RFA.
Some vials thawed during transit and produced bad numbers; these have been excluded

Data Processing Description

Change history: YYMMDD
060110: downloaded original TMR CTD cast data from SOFeX project data web site;
added to OCB database by Cyndy Chandler, OCB DMO, (cchandler@whoi.edu);
all units information taken from original .xls file;

10 January 2006: Prepared for OCB data system by Terry McKee (PO Dept, WHOI) and Cyndy Chandler, OCB

DMO (WHOI).

The TM_bottle data object was prepared from an excel file of
merged CTD and nutrient data file for the MBARI TM Rosette on Revelle.
Contact Zanna Chase (zanna@mbari.org) with questions about the original data.

original file: was downloaded in December 2005 from the
SOFeX data web site:
merged_TM_CTD_nut.xls

Note: cond units are S/m;
Temp is T90 (ITS-90 scale confirmed from .btl file);
Potemp is also T90;
PO4, Si, NO3 and NO2 are all uM, micromolar

The event number, date, time, latitude
and longitude position information were taken from the CTD header records.
For TMR1 station 7, the latitude may have been entered incorrectly during data acquisition
(55 °W) **but was not changed** to be consistent with the
cruise Activity Log (56 °W).

Final TMR-CTD station *.btl file header record showing history of processing steps:

TMR-CTD station 7

MATLAB data processing scripts:
Physical properties of seawater function was used to compute potential density:
PhyPropSW sw_pden.m

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Data Files

File
TM_bottle.csv (Comma Separated Values (.csv), 26.60 KB) MD5:12eefd3df7312ae30c2b1406b07a40f6 Primary data file for dataset ID 2935

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Parameters

Parameter	Description	Units
event	unique sampling event composite of date and time	YYYYMMDDhhmm
date	date sampling began	YYYYMMDD
time	time sampling began	hhmm
lon	longitude, negative denotes West	decimal degrees
lat	latitude, negative denotes South	decimal degrees

sta	station identifier	dimensionless
bot	TM Rosette bottle number	dimensionless
depth	depth, calculated from pressure	meters
press	pressure, from CTD Strain Gauge	decibars
temp	temperature, from CTD, ITS-90	degrees Celsius
sal	salinity, from CTD, PSS-78 (PSU)	dimensionless
sigma_0	sigma theta (potential density) (from primary T0,C0 sensors)	kilograms/meter^3
potemp	potential temperature, ITS-90 (from primary T0,C0 sensors)	degrees Celsius
cond	conductivity, from CTD (from primary C0 sensor)	Siemens/meter
fluor	fluorescence, from CTD profiler	V ?? voltage
PO4	Phosphate	microMolar
Si	Silicon	microMolar
NO3	Nitrate	microMolar
NO2	Nitrite	microMolar

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Instruments

Dataset-specific Instrument Name	Trace Metal Bottle
Generic Instrument Name	Trace Metal Bottle
Generic Instrument Description	Trace metal (TM) clean rosette bottle used for collecting trace metal clean seawater samples.

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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 10 February 2002 (20020111-20020210) location: N: -54.093 S: -66.602 W: -172.038 E: -169.242 project/cruise: SOFeX/RR Nutrients were run at MBARI on an Alpkem RFA. Some vials thawed during transit and produced bad numbers; these have been excluded **Processing Description** Change history: YYMMDD 060110: downloaded original TMR CTD cast data from SOFeX project data web site; added to OCB database by Cyndy Chandler, OCB DMO, (cchandler@whoi.edu); all units information taken from original .xls file; 10 January 2006: Prepared for OCB data system by Terry McKee (PO Dept, WHOI) and Cyndy Chandler, OCB DMO (WHOI). The TM_bottle data object was prepared from an excel file of merged CTD and nutrient data file for the MBARI TM Rosette on Revelle. Contact Zanna Chase (zanna@mbari.org) with questions about the original data. original file: was downloaded in December 2005 from the SOFeX data web site: http://www.mbari.org/SOFeX/REVELLE_data.htm">merged_TM_CTD_nut.xls Note: cond units are S/m; Temp is T90 (ITS-90 scale confirmed from .btl file); Potemp is also T90; PO4, Si, NO3 and NO2 are all uM, micromolar The event number, date, time, latitude and longitude position information were taken from the CTD header records. For TMR1 station 7, the latitude may have been entered incorrectly during data acquisition (55 °W) but was not changed to be consistent with the cruise http://ocb.whoi.edu/jg/serv/OCB/SOFeX/Revelle/log.html0">Activity Log (56 °W). Final TMR-CTD station *.btl file header record showing history of processing steps: http://ocb.whoi.edu/SOFeX/PI-NOTES/SX007T01_btl_hdr.txt">TMR-CTD station 7 MATLAB data processing scripts: Physical properties of seawater function was used to compute potential density: http://ocb.whoi.edu/datasys/PhyPropSW/sw_pden.m">PhyPropSW sw_pden.m

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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 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).

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