13C Dissolved Inorganic Carbon (DIC) values from Sediment Traps from R/V Tangaroa cruise 61TG_3052 in the Southern Ocean in 1999 (SOIREE project)

Website: https://www.bco-dmo.org/dataset/2863
Version: 20August2009
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Project
» Southern Ocean Iron Release Experiment (SOIREE)

Program
» Iron Synthesis (FeSynth)

Contributors	Affiliation	Role
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Dataset Description

SOIREE Sediment Traps - 13C DIC

Methods & Sampling

See SOIREE Preliminary Voyage Report

Method notes:
1. All extractions done on 250ml with SOMMA automated acid addition device.
Evolved gas carried in N2 stream to cold trap, and then purified cryogenically from water
DIC yields measured manometrically, 13C-DIC run at 5V by dual-inlet Finnagin Delta-S
MS vs. working standard calibrated against NBS19 calcite.

2. Salinities from CTD - average of 2 meter bin about bottle depth - used for density
calculation for DIC concentrations.

3. Rau G.H., Riebesell U. and Wolf-Gladrow D., 1996, A model of photosynthetic 13C
fractionation by marine phytoplankton based on diffusive molecular CO2 uptake,
MEPS 133, 275-285.

13CO2=13DIC+23.644-(9701.5/Tkelvin)

Difference Bakker-Trull (umol/kg)/Average: -3.7
Difference Bakker-Trull (umol/kg)/SD: 5.24

Data Processing Description

See SOIREE Preliminary Voyage Report

BCO-DMO Processing Notes
Generated from original file SOIREE_Export_final.xls, Tab: 13C DIC
provided on the Deep-Sea Research II 48 (2001) accompanying CD-Rom

BCO-DMO Edits
- parameter names modified to conform to BCO-DMO convention
- date_UTC, time_UTC, lat, lon added from SOIREE_Stations_CTDSampling.xls
- Blank rows in original sheet removed
- 'nd' added to blank cells
- Made column header record one line
- Added 'T' to CTD cast for consistency with other spreadsheets
- Made Date, and Day and Patch Location 3 columns and added to each record
- Formatted Date (NZST) to YYYYMMDD
- Changed 'NaN' to 'nd'

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Data Files

File
traps_13CDIC.csv (Comma Separated Values (.csv), 2.71 KB) MD5:be8c520082a0fa7e47294caed1021b38 Primary data file for dataset ID 2863

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Parameters

Parameter	Description	Units
Date_NZST	date NZST	YYYYMMDD
lon	longitude, negative denotes West	decimal degrees
lat	latitude, negative denotes South	decimal degrees
date_UTC	UTC Date	YYYYMMDD
time_UTC	UTC time	HHMM
depth	Sample depth	meters

Sample_Bottle	Sample Bottle Number	integer
Day	SOIREE Experiment Day	Text
Patch	Patch Location (In/Out)	Text
CTD_cast	CTD Station/Cast Id	Text
sal	CTD Salinity (PSS-78)	dimensionless
Temp_In_situ	In situ temperature	degrees celsius
DIC	DIC	umol/kg
C13_minus_DIC_vs_PDB	13C minus DIC vs PDB	(tbd)
C13_minus_CO2_Rau_etal_97	13C minus CO2 Rau etal 97	(tbd)
B_Depth	Bottle Depth (??)	meters
DIC_Bakker_and_Watson	Bakker and Watson DIC	umol/kg
Notes	Notes	text
DIC_Difference_Bakker_minus_Trull	DIC Difference Bakker minus Trull	umol/kg

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Instruments

Dataset-specific Instrument Name	CTD Seabird 911
Generic Instrument Name	CTD Sea-Bird 911
Dataset-specific Description	NIWA's Seabird 911plus CTD and related instrumentation
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.

Dataset-specific Instrument Name	Sediment Trap
Generic Instrument Name	Sediment Trap
Dataset-specific Description	MULTI-trap dimensions: Length (L, m): 0.58 Trap length with baffles inserted; L without baffles: 0.525 m AR without baffles: 7.50 Trap volume without baffles: 2.021 litres Inside diameter (Di, m): 0.07 Outside diameter (Do, m): 0.08 Aspect ratio (AR): 8.29 Aspect ratio with salt (AR): 7.29 Basal brine added to a height of 1-trap diameter (7 cm) Collection area (A, m2): 0.00385 Trap volume (V, m3): 0.00223 Trap volume (V, litres): 2.232 Baffle length (Lb, m): 0.08 Baffle diameter (Dib, m): 0.01 Baffle aspect ratio (ARb): 5.77
Generic Instrument Description	Sediment traps are specially designed containers deployed in the water column for periods of time to collect particles from the water column falling toward the sea floor. In general a sediment trap has a jar at the bottom to collect the sample and a broad funnel-shaped opening at the top with baffles to keep out very large objects and help prevent the funnel from clogging. This designation is used when the specific type of sediment trap was not specified by the contributing investigator.

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Deployments

61TG_3052

Website	https://www.bco-dmo.org/deployment/57827
Platform	R/V Tangaroa
Report	http://bcodata.whoi.edu/Fe_Synthesis/SOIREE/SOIREE_cruisereport.pdf
Start Date	1999-01-31
End Date	1999-03-01
Description	Cruise to the Southern Ocean as part of the Fe Sythesis project whose aim was to maintain a coherent patch of iron-enriched seawater for the duration of SOIREE and to interpret any iron-mediated effects on the patch by conducting measurements and performing experiments during this period.

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Project Information

Southern Ocean Iron Release Experiment (SOIREE)

Coverage: Southern Ocean

Project in the Southern Ocean aimed at maintaining a coherent patch of iron-enriched seawater for the duration of project and to interpret any iron-mediated effects on the patch by conducting measurements and performing experiments during this period of the project.

The Southern Ocean Iron RElease Experiment (SOIREE), was the first in situ iron fertilization experiment performed in the polar waters of the Southern Ocean. SOIREE was an interdisciplinary study involving participants from six countries, and took place in February 1999 south of the Polar Front in the Australasian-Pacific sector of the Southern Ocean.

Approximately 3800 kg of acidified FeSO4.7H2O and 165 g of the tracer sulphur hexafluoride (SF6) were added to a 65-m deep surface mixed layer over an area of ~50 km2. Initially, mean dissolved iron concentrations were ~2.7 nM, but decreased to ambient levels within days, requiring subsequent additions of 1550-1750 kg of acidified FeSO4.7H2O on days 3, 5 and 7 of the experiment.

During the 13-day site occupation, there were iron-mediated increases in phytoplankton growth rates, with marked increases in chlorophyll a (up to 2 µgl-1) and production rates (up to 1.3 gCm-2d-1). These resulted in subsequent changes in the pelagic ecosystem structure, and in the cycling of carbon, silica and sulphur, such as a 10% drawdown of surface CO2.

The SOIREE bloom persisted for >40 days following our departure from the site, as observed via SeaWiFS remotely sensed observations of Ocean Colour.

BCO-DMO Note:
All original data and metadata provided on a CD-Rom accompanying the Deep-Sea Research II 48 (2001) volume. The CD-Rom contains the main SOIREE datasets and ancillary information including the pre-experiment 'desktop' database study for site-selection, and satellite images of the SOIREE bloom.

Related files

SOIREE Preliminary Voyage Report
SOIREE Introduction and Summary, Deep-Sea Research II 48 (2001) 2425-2438
SOIREE Cruise Track

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Program Information

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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