

# Size-fractionated Th, POC/PON, and <sup>13</sup>Corg isotope results 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/2867>

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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 - Size-Fractionated Th, POC/PON, <sup>13</sup>Corg results

## Methods & Sampling

See [SOIREE Preliminary Voyage Report](#)

## Notes

A. CHN

1. Both silver and QMA samples were analysed by punching a sub-sample using a 4.16mm punch. These were then acidified with 20ul of 50% HCl in silver cups, dried, reweighed to estimate carbonate loss (squat-all) and combusted in our Carlo-Erba.

2. The number of punches taken for each sample varied according to how much material it had. The spreadsheet calculates the umol C on the TOTAL filter based on the # of punches, punch area and effective filtration area. To get the effective filtration area for a silver filter I measured the diameter that material covered to be 22.88mm. For the QMA I took it to be 140mm.

3. For the 2 overloaded samples 41C and 105C, I (Trull) used the weight ratios to calculate the total umol C that must have been on the filter. The tare of empty petri-dish with lid and blank silver filter was 8.91639g. Estimating the total material weight by either using

Charette's initial weight and subtracting this tare, or using Trull's final weight (minus the same tare) and adding back in your and my sub-aliquots agrees to better than 3mg (105C) and 1.5mg (41C) in comparison to ~400mg totals, suggesting errors of under 1% from the tare correction.

4. Measured QMA and Silver filter blanks were small (single determinations, and not true field blanks)

### B. 13Corg

1. Samples prepared exactly as for CHN. Blank determinations again from single blank determinations. Standardisation to NBS22 Oil, same as for SizeFractionatedPumped Particles - see that sheet.

2. Blank corrections from single Ag and QMA samples

Ag filter blank 1 punch 1 0.03 below detect 1.0  
QMA-Blnk 2 punches 2 0.01 below detect 5.1

brass punch area(mm2)  
13.59

Agfilter area (mm2) QMA filter area  
411.14 15393.35

fraction sampled fraction sampled  
by one Ag punch by oneQMA punch  
0.03 0

SOIREE Size-Fractionated Th, POC/PON, 13Corg results (Trull, Charette)  
13Corg data reported in Trull and Armand, DSR-II.

## Data Processing Description

See [SOIREE Preliminary Voyage Report](#)

### BCO-DMO Processing Notes

Generated from original file SOIREE\_Export\_final.xls, Tab: SizeFractionatedPumpedParticles provided on the Deep-Sea Research II 48 (2001) accompanying CD-Rom

### BCO-DMO Edits

- parameter names modified to conform to BCO-DMO convention
- Blank rows in original sheet removed
- 'nd' added to blank cells
- Made column header record one line
- date.UTC, time.UTC, lat/lon inserted manually from Master Station list

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## Data Files

File
<b>traps_SizeFracPPs.csv</b> (Comma Separated Values (.csv), 5.97 KB) MD5:b33a92d01814718e389fe345657ac352
Primary data file for dataset ID 2867

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## Parameters

Parameter	Description	Units
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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
Site	Site Id	text
station	Station Id Determined by SDN 28 Aug 2000 based on POC/CTD stations	text
volume_filtered	volume_filtered	liters
sample	sample number	integer
name	Sample name	text
size_microns	size in microns	microns
Trull_punches_or_wgt	number of punches or sample weight	mg
Trull_tot_wgt	Trull total weight	mg
Trull_umol_C_measured	Trull umol C measured	umol
Trull_C_to_N_ratio	Trull C/N ratio	dimensionless ratio
Trull_umol_C_on_filter	Trull umol C on filter	umol
Trull_umol_C_blank_corr	Trull umol C blank corr	umol
Trull_umol_C_per_litre	Trull umol C per litre	umol/liter

Trull_20_to_5_ratio	Trull 20/5 ratio	dimensionless ratio
Trull_Sum_POC_uM_all_fractions	Trull Sum POC uM all fractions	microM
Charette_POC_QMA_only	Charette POC QMA only	microM
Charette_Trull_POC_comparison	Charette Trull POC comparison	microM
Trull_13Corg_measured	Trull 13Corg measured	(tbd)
Trull_13Corg_blnk_corr	Trull 13Corg blnk corr	(tbd)
Trull_13Corg_NBS22std	Trull 13Corg NBS22std	(tbd)

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## Instruments

<b>Dataset-specific Instrument Name</b>	Sediment Trap
<b>Generic Instrument Name</b>	Sediment Trap
<b>Dataset-specific Description</b>	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, m <sup>2</sup> ): 0.00385 Trap volume (V, m <sup>3</sup> ): 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
<b>Generic Instrument Description</b>	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

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57827">https://www.bco-dmo.org/deployment/57827</a>
<b>Platform</b>	R/V Tangaroa
<b>Report</b>	<a href="http://bcodata.whoi.edu/Fe_Synthesis/SOIREE/SOIREE_cruisereport.pdf">http://bcodata.whoi.edu/Fe_Synthesis/SOIREE/SOIREE_cruisereport.pdf</a>
<b>Start Date</b>	1999-01-31
<b>End Date</b>	1999-03-01
<b>Description</b>	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 FeSO<sub>4</sub>.7H<sub>2</sub>O and 165 g of the tracer sulphur hexafluoride (SF<sub>6</sub>) were added to a 65-m deep surface mixed layer over an area of ~50 km<sup>2</sup>. 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 FeSO<sub>4</sub>.7H<sub>2</sub>O 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 µg l<sup>-1</sup>) and production rates (up to 1.3 gCm<sup>-2</sup>d<sup>-1</sup>). 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 CO<sub>2</sub>.

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.

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## 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, 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).



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