

# Sulphur Hexafluoride (SF6) concentrations from CTD in casts from R/V Tangaroa cruise 61TG\_3052 in the Southern Ocean in 1999 (SOIREE project)

**Website:** <https://www.bco-dmo.org/dataset/2836>

**Version:** 14August2009

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## Project

» [Southern Ocean Iron Release Experiment](#) (SOIREE)

## Program

» [Iron Synthesis](#) (FeSynth)

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## Dataset Description

SOIREE SF6 Data from CTD In Casts

### **Comments preserved from the original file:**

*SOIREE SF6 profiles*

*SF6 (fmol/l)*

*ALL SOIREE IN Casts*

*Station T1151 Sal/temp data suspect on 2nd+3rd casts*

## Methods & Sampling

See [SOIREE Preliminary Voyage Report](#)

See also:

ANALYTICAL SYSTEM FOR DISCRETE SF6 ANALYSIS DESCRIBED IN:  
LAW, C.S., WATSON, A.J. & LIDDICOAT, M.I. 1994. Automated vacuum analysis of Sulphur hexafluoride in seawater; derivation of the atmospheric trend (1970-1993) and potential as a transient tracer. Marine Chemistry, 48 :57-69.

ANALYTICAL SYSTEM FOR UNDERWAY SF6 ANALYSIS DESCRIBED IN:  
LAW, C.S., WATSON, A.J., LIDDICOAT, M.I. & T. STANTON. 1998. Sulphur hexafluoride as a tracer of biogeochemical and physical processes in

an open-ocean iron fertilisation experiment. Deep-Sea Res. II, 45(6):977-994.

## Data Processing Description

See [SOIREE Preliminary Voyage Report](#)

## BCO-DMO Processing Notes

Generated from original file CTD\_SF6.xls  
provided on the Deep-Sea Research II 48 (2001) accompanying CD-Rom

## BCO-DMO Edits

- Parameter names modified to conform to BCO-DMO convention
- removed all out casts data - See SOIREE\_CTD\_SF6\_OutCasts for out cast data
- Added station column and populated it with station from a single header line in original and labeled as event
- added '#' to comments preserved from original file
- deleted blank lines and redundant station and column header lines
- padded Pot Density to 3 decimal places and other data to 2 decimal places
- date/time and lat/lon added from SOIREE\_Stations\_CTDSampling.xls

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## Data Files

File
<b>SF6_ctdin.csv</b> (Comma Separated Values (.csv), 14.11 KB) MD5:0bf1da29acdeee4dff8c0db2894a0689 Primary data file for dataset ID 2836

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## Parameters

Parameter	Description	Units
station	Station Id (Text String)	text
lon	longitude, negative denotes West	decimal degrees
lat	latitude, negative denotes South	decimal degrees
date.UTC	UTC Date	YYYYMMDD
time.UTC	UTC time	HHMM
press	CTD Pressure	decibars
temp	CTD Temperature (ITS-90)	degrees celsius
sal	CTD Salinity (PSS-78)	dimensionless
sigma_0	Potential Density	kilograms/meter <sup>3</sup>
SF6	SF6	fmol/l

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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  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  and 165 g of the tracer sulphur hexafluoride ( $\text{SF}_6$ ) were added to a 65-m deep surface mixed layer over an area of  $\sim 50 \text{ km}^2$ . Initially, mean dissolved iron concentrations were  $\sim 2.7 \text{ nM}$ , but decreased to ambient levels within days, requiring subsequent additions of 1550-1750 kg of acidified  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  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  $2 \mu\text{g l}^{-1}$ ) and production rates (up to  $1.3 \text{ gC m}^{-2} \text{ d}^{-1}$ ). 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  $\text{CO}_2$ .

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,  $\text{CO}_2$  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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