

# Surface water CO<sub>2</sub> concentrations from R/V Tangaroa cruise 61TG\_3052 in the Southern Ocean in 1999 (SOIREE project)

**Website:** <https://www.bco-dmo.org/dataset/2843>

**Version:** 03Feb2010

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## Project

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

## Program

» [Iron Synthesis](#) (FeSynth)

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## Dataset Description

SOIREE Surface water CO<sub>2</sub> Data

Note: These xCO<sub>2</sub>, pCO<sub>2</sub> and fCO<sub>2</sub> have been calculated with standards calibrated against NOAA standards and are expected to be final data.

## Methods & Sampling

See [SOIREE Preliminary Voyage Report](#)

## Data Processing Description

See [SOIREE Preliminary Voyage Report](#)

## BCO-DMO Processing Notes

Generated from original file eqout.dat provided on the Deep-Sea Research II 48 (2001) accompanying CD-Rom

## BCO-DMO Edits

- padded DateDec to 6 decimal places
- padded Lat/Lon to 5 decimal places
- padded all other fields to 2 decimal places
- columns organized to BCO-DMO convention
- 'NaN' changed to 'nd'
- column headers changed to BCO-DMO convention

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## Data Files

File
<b>co2_surf.csv</b> (Comma Separated Values (.csv), 483.73 KB) MD5:cafd6c1efbf8a4b030608768b5e41df1 Primary data file for dataset ID 2843

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## Parameters

Parameter	Description	Units
DateDec	Decimal days Days in February 1999 (GMT) with 1 February 1999 0:00 = 1.0000	DD.xx
lon	longitude, negative denotes West	decimal degrees
lat	latitude, negative denotes South	decimal degrees
xCO2	xCO2 in dry sample	umol/mol or ppm
pCO2	pCO2 (in water or air)	uatm
fCO2	fCO2 (in water or air)	uatm
fCO2_corr	fCO2 corrected to a constant temperature of 2.5C	uatm
TempCorr	Corrected equilibrator temperature	degrees celsius
SeaSurfTemp	Sea Surface Temperature (corrected after DAS data, CTD at 8 m depth, CTD in fish factory and machineroom temperature)	degrees celsius
sal	Sea Surface Salinity	dimensionless
WindSpd	Wind Speed from the Data Acquisition System (DAS)	meters/sec
AtmPress	Atmospheric Pressure from the Data Acquisition System (DAS)	bar

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## Instruments

<b>Dataset-specific Instrument Name</b>	Licor 6262 analyser
<b>Generic Instrument Name</b>	LI-COR LI-6262 Gas Analyzer
<b>Generic Instrument Description</b>	The LI-6262 CO <sub>2</sub> /H <sub>2</sub> O Gas Analyzer measures CO <sub>2</sub> flux in the environment. It was manufactured by LI-COR Biosciences Inc. (licor.com) from 1990 through 2005 and serial Numbers for this model have the prefix of IRG3-XXXX. The LI-6262 is a differential, non-dispersive, infrared (NDIR) gas analyzer. The CO <sub>2</sub> and H <sub>2</sub> O measurements are based on the difference in absorption of infrared (IR) radiation passing through two gas sampling cells. The reference cell is used for a gas of known CO <sub>2</sub> or H <sub>2</sub> O concentration, and the sample cell is used for a gas of unknown concentration. Infrared radiation is transmitted through both cell paths, and the output of the analyzer is proportional to the difference in absorption between the two (LI-6262 CO <sub>2</sub> /H <sub>2</sub> O Analyzer Operating and Service Manual, Publication Number 9003-59, March, 1996, pg 18).

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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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