Scientific sampling event log from NOAA Ship Ronald H. Brown cruise RB-08-02 in the Southwest Atlantic sector of the Southern Ocean near South Georgia Island in 2008 (SO_GasEx project)

Website: https://www.bco-dmo.org/dataset/2924
Version: 05 Jan 2010
Version Date: 2010-01-05

Project
» Southern Ocean Gas Exchange Experiment (SO_GasEx)

Programs
» Ocean Carbon and Biogeochemistry (OCB)
» United States Surface Ocean Lower Atmosphere Study (U.S. SOLAS)

Contributors	Affiliation	Role
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Dataset Description

SO-GasEx Scientific sampling event log

Methods & Sampling

Generated aboard ship by members of the science party

Original data were contributed by PI as a single sheet Excel file: GASEX_Event_Log_BH.xls

Data Processing Description

DMO notes for event log

Duplicate Events in Original Event Log

22 duplicate event numbers have been identified in the original event log.
The duplicate events were corrected by adding one minute to the event time for the non-CTD event.
For reference, the duplicate events are listed in the file: SO-GasEx_Event_Log_DuplicateEvents.xls.

Modifications to Original Event Log

data column headers changed to be consistent with BCO-DMO vocabulary
"Event #" changed to "event", format remains the same
date reformatted to YYYYMMDD
time reformatted to HHMM
lat/lon decimal degrees padded to 6 decimal places
"OP ID" changed to "ev_code", format remains the same
"submitted by" changed to "person", format remains the same
"Event (be as descriptive as necessary)" changed to "activities_and_comments"

Note: some event fields were truncated due to excessive length (>120 chars)
Truncated event fields indicated by "[+++]" at end of activities_and_comments field
See below for complete activities_and_comments entry for truncated events

Complete activities_and_comments are also available in the original spreadsheet
(see link to original in Acquisition description)

Modification to data values:

090301.CLC. all positive longitude values changed to negative (West);
all incorrect longitude values were associated with DES type events

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event	date	time	longitude	latitude	ev_code
0640107	20080304	0107	47.775000	-50.698330	DES
0862007	20080326	2007	37.429910	-51.289290	DES
0870205	20080327	0205	37.428160	-51.428160	DES
0872149	20080327	2149	37.391970	-51.228610	DES
0880137	20080328	0137	37.314960	-51.318600	DES
0881536	20080328	1536	37.299140	-51.320470	DES
0882156	20080328	2156	37.307540	-51.315550	DES
0890307	20080329	0307	37.268260	-51.268260	DES
0900308	20080330	0308	37.298430	-51.311650	DES
0901353	20080330	1353	37.324940	-51.309600	DES
0910138	20080331	0138	37.350060	-51.303200	DES
0920144	20080401	0144	37.363990	-51.281180	DES
0921950	20080401	1950	37.457140	-51.374990	DES

PI notes for event log

Event Codes

DEP=depart
CTD=hydrocast
SUS=super sucker
OPT= optical cast
UWY=underway system
BOP=buoy operation
DES=discrete sample from underway line

SUR=survey using underway systems
INJ=tracer injection

Complete activities_and_comments entries for truncated events

event	date	time	lon	lat	ev_code	person	activities_and_comments
0631700	20080303	1700	-58.329333	-50.806550	INJ	Sullivan	start filling ~4800 L aluminum dosing tank for for tracer gases with ship's service seawater (from tap outboard of the starboard crane which is forward of the tank)
0641246	20080304	1246	-50.839000	-50.848000	UWY	Drapeau	started underway measurements of T, S, Chl a fluorescence, optical backscattering, acid labile backscattering (PIC), particulate light absorption and attenuation, dissolved light absorption and attenuation
0641527	20080304	1527	-43.167000	-50.333000	DES	Lance	Discrete sampling of underway line in main lab for fluorometric chlorlophyll, Ap (particulate absorption), trial PE exp (C-14 uptake vs. light gradient)
0652030	20080305	2030	nd	nd	INJ	Sullivan	start flow of SF6 through dosing tank (headspace recirculation flow ~3 L/min; SF6 delivery pressure 40 psi, SF6 flow ~0.10-0.13 L/min)
0672352	20080307	2352	nd	nd	INJ	Sullivan	finish adding ~8.5 L 3He to water in dosing tank. During 3He dosing, do two test tows of the lead fish for dispensing. On one tow a pressure transducer showed that the lead fish was 6-7 meters deep.
0680000	20080308	0000	nd	nd	INJ	Sullivan	replace dosing top with a dispensing top and balloon. The balloon will be filled with water as the dosed water is dispensed, thus avoiding a gaseous headspace above the dosed water.
0770030	20080317	0030	nd	nd	INJ	Sullivan	Start recirculating headspace of dosing tank and adding SF6 (~150-200 ml/min) to the recirculation stream. Monitor flows/bubbling for ~1.5 hrs
0780740	20080318	0740	nd	nd	INJ	Sullivan	SF6 gas cylinder is observed to be empty. Switch the pair of 3-way valves to isolate the recirculation loop and headspace from the gas pump and turn off the gas pump.
0791030	20080319	1030	nd	nd	INJ	Sullivan	Add a second (KNF Neuberger) gas circulating pump to the recirculation loop. The two pumps are run in parallel, with a loop of tubing and two 3-way valves to bypass the dosing tank. Increase the pressure delivered by the SF6 gas cylinder through a needle valve from 40 to 50 psi, to offset the increased back pressure from the output of the two pumps pushing through the 'fizzy' tube.
0802200	20080320	2200	nd	nd	INJ	Sullivan	Turn the two 3-way valves so that the gas pumps are connected to the bypass loop. Add seawater to the tank and dosing top so that there is ~0.7 L of gaseous headspace in the dosing top.
0802249	20080320	2249	nd	nd	INJ	Sullivan	Isolate the dosing tank headspace by turning the 3-way valves and turning off the gas recirculation pumps. While the gas recirculation was ongoing, the foam/bubbles reached the ~80% full level of the 1L dosing top. With bubbling stopped, there remains ~0.65 L headspace.
0811159	20080321	1159	-38.430000	-51.150000	INJ	Sullivan	Water-filled balloon in "headspace" of dosing tank bursts. Stop water flow out of dosing tank; continue augmenting water flow for ~5 minutes.

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Data Files

File
EventLog.csv (Comma Separated Values (.csv), 55.04 KB) MD5:608d290dd0a29ab9eb27049324e39d3a Primary data file for dataset ID 2924

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Parameters

Parameter	Description	Units
date	Date UTC	YYYYMMDD
time	Time UTC	HHMM
lat	latitude, negative denotes South	decimal degrees
lon	longitude, negative denotes West	decimal degrees
event	Unique event number	YDAHHMM
person	last name of person who submitted event	text
ev_code	3 letter event code for event op id (see Dataset/Processing decsription/PI Notes for codes)	text
activities_and_comments	free field text description of eventNOTE: [+++} at end of activities_and_comments indicates additional text in field See Dataset/Processing description/PI_Notes for complete text of event	text

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Deployments

RB-08-02

Website	https://www.bco-dmo.org/deployment/57846
Platform	NOAA Ship Ronald H. Brown
Report	http://bcodata.whoi.edu/SO-GasEx/SO_GasEx_Cruise_Report.pdf
Start Date	2008-02-29
End Date	2008-04-12
Description	The Southern Ocean GasEx experiment was conducted aboard the NOAA ship Ronald H. Brown with 31 scientists representing 22 institutions, companies and government labs. The cruise departed Punta Arenas, Chile on 29 February, 2008 and transited approximately 5 days to the nominal study region at 50°S, 40°W in the Atlantic sector of the Southern Ocean. The scientific work concentrated on quantifying gas transfer velocities using deliberately injected tracers, measuring CO2 and DMS fluxes directly in the marine air boundary layer, and elucidating the physical, chemical, and biological processes controlling air-sea fluxes with measurements in the upper-ocean and marine air. The oceanic studies used a Lagrangian approach to study the evolution of chemical and biological properties over the course of the experiment using shipboard and autonomous drifting instruments. The first tracer patch was created and studied for approximately 6 days before the ship was diverted from the study site, 350 miles to the south, to wait near South Georgia Island for calmer seas. After more than 4 days away, we returned to the study area and managed to find some remnants of the tracer patch. After collecting one final set of water column samples and recovering the two drifting buoys deployed with the patch, we relocated to the northwest, closer to the area where the first patch was started. A second tracer patch was created and studied for approximately 15 days before we had to break off the experiment and transit to Montevideo, Uruguay for the completion of the cruise.

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Project Information

Southern Ocean Gas Exchange Experiment (SO_GasEx)

Website: http://so-gasex.org/

Coverage: Southwest Atlantic sector of the Southern Ocean (nominally at 50°S, 40°W, near South Georgia Island)

The Southern Ocean Gas Exchange Experiment (SO-GasEx; also known as GasEx III) took place in the Southwest Atlantic sector of the Southern Ocean (nominally at 50°S, 40°W, near South Georgia Island) in austral fall of 2008 (February 29-April 12, 2008) on the NOAA ship *Ronald H. Brown*. SO-GasEX is funded by NOAA, NSF and NASA.

The research objectives for Southern Ocean GasEx are to answer the following questions:

- What are the gas transfer velocities at high winds?
- What is the effect of fetch on the gas transfer?
- How do other non-direct wind effects influence gas transfer?
- How do changing pCO2 and DMS levels affect the air-sea CO2 and DMS flux, respectively in the same locale?
- Are there better predictors of gas exchange in the Southern Ocean other than wind?
- What is the near surface horizontal and vertical variability in turbulence, pCO2, and other relevant biochemical and physical parameters?
- How do biological processes influence pCO2 and gas exchange?
- Do the different disparate estimates of fluxes agree, and if not why?
- With the results from Southern Ocean GasEx, can we reconcile the current discrepancy between model based CO2 flux estimates and observation based estimates?

Related files

SO-GasEx cruise report
SO-GasEx Science Plan
SO-GasEx Implementation Plan

The SO-GasEx cruise report and Science and Implementation plans, may also be available at the SO-GasEx science Web page.

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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 CO2 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.

United States Surface Ocean Lower Atmosphere Study (U.S. SOLAS)

Website: http://www.us-solas.org/

Coverage: Global

The Surface Ocean Lower Atmosphere Study (SOLAS) program is designed to enable researchers from different disciplines to interact and investigate the multitude of processes and interactions between the coupled ocean and atmosphere.

Oceanographers and atmospheric scientists are working together to improve understanding of the fate, transport, and feedbacks of climate relevant compounds, and also weather and hazards that are affected by processes at the surface ocean.

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Physical, chemical, and biological research near the ocean-atmosphere interface must be performed in synergy to extend our current knowledge to adequately understand and forecast changes on short and long time frames and over local and global spatial scales.

The findings obtained from SOLAS are used to improve knowledge at process scale that will lead to better quantification of fluxes of climate relevant compounds such as CO2, sulfur and nitrogen compounds, hydrocarbons and halocarbons, as well as dust, energy and momentum. This activity facilitates a fundamental understanding to assist the societal needs for climate change, environmental health, weather prediction, and national security.

The US SOLAS program is a component of the International SOLAS program where collaborations are forged with investigators around the world to examine SOLAS issues ubiquitous to the world's oceans and atmosphere.

Â» International SOLAS Web site

Science Implementation Strategy Reports

US-SOLAS (4 MB PDF file)
Other SOLAS reports are available for download from the US SOLAS Web site

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Funding

Funding Source	Award
National Oceanic and Atmospheric Administration (NOAA)	unknown SO_GasEx NOAA
National Aeronautics & Space Administration (NASA)	unknown SO_GasEx NASA
National Science Foundation (NSF)	unknown SO_GasEx NSF

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