

MAPCO2 buoy data deployed on 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/3290>

Version: 07 Jan 2010

Version Date: 2010-01-07

Project

» [Southern Ocean Gas Exchange Experiment](#) (SO_GasEx)

Programs

» [Ocean Carbon and Biogeochemistry](#) (OCB)

» [United States Surface Ocean Lower Atmosphere Study](#) (U.S. SOLAS)

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Dataset Description

SO-GasEx MAPCO2 Buoy data
Autonomous Multi-parameter Measurements from the MAPCO2
Drifting Buoy During the SO GasEx Experiment

Methods & Sampling

For MAPCO2 Buoy Information See: [SO-GasEx cruise report, Section 5.5.1 pgs 30-33](#)

The SO-GasEx MAPCO2 buoy contained a MAPCO2 non-dispersive infrared analyzer based system for measuring the CO2 concentrations of the surface water and atmosphere every 30 minutes. A Gill sonic anemometer measured the wind speed and direction at approximately 0.9m above the water surface. A 10

minute average reading was recorded every 30 minutes. A SeaBird 37 Microcat sensor measured the temperature and conductivity of the water at approximately 1m depth every 15 minutes. All of these data, together with the GPS location of the buoy, were transmitted via Iridium satellite to NOAA/PMEL four times per day.

Data Processing Description

For MAPCO2 Buoy Information See: [SO-GasEx cruise report, Section 5.5.1 pgs 30-33](#)

BCO-DMO Processing Notes

- Generated from original multi sheet file gasex_buoy.xlsx

BCO-DMO Edits

- DeploymentId added to each data record as Deployment_1, etc.
- single date/time field converted to separate fields and formatted to BCO-DMO convention
- any blank fields changed to 'nd' (no data)
- data parameter names reformatted to BCO-DMO convention

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Data Files

File
MAPCO2_Buoy.csv (Comma Separated Values (.csv), 82.91 KB) MD5:9308ac062ab2f5200ebc056efc24bd92
Primary data file for dataset ID 3290

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Parameters

Parameter	Description	Units
DeploymentId	MAPCO2 Buoy Deployment Id	text
date	Date (UTC)	YYYYMMDD
time	Time (UTC)	HHMM
lon	buoy longitude position in decimal degrees (West is negative)	decimal degrees
lat	buoy latitude position in decimal degrees (South is negative)	decimal degrees
sal	Salinity	dimensionless
SST	Sea Surface Temperature	degrees celcius
dry_xCO2_water	dry xCO2 water	ppm
dry_xCO2_air	dry xCO2 air	ppm
Atm_Press	Atm Press	kPa
Atm_Pressure	Atm Pressure	atm
Wind_Direction	Wind Direction	degrees
Wind_Speed_at_1m	Wind Speed at 1m	m/s

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Instruments

Dataset-specific Instrument Name	MAPCO2 Drifting Buoy
Generic Instrument Name	MAPCO2 Drifting Buoy
Dataset-specific Description	For SO-GasEx MAPCO2 Buoy Configuration See: SO-GasEx MAPCO2 Metadata Report The SO-GasEx MAPCO2 buoy contained a MAPCO2 non-dispersive infrared analyzer based system for measuring the CO2 concentrations of the surface water and atmosphere every 30 minutes. A Gill sonic anemometer measured the wind speed and direction at approximately 0.9m above the water surface. A 10 minute average reading was recorded every 30 minutes. A SeaBird 37 Microcat sensor measured the temperature and conductivity of the water at approximately 1m depth every 15 minutes. All of these data, together with the GPS location of the buoy, were transmitted via Iridium satellite to NOAA/PMEL four times per day.
Generic Instrument Description	The Moored Autonomous pCO2 (MAPCO2) surface drifting buoy designed by NOAA/PMEL is a low profile, high payload buoy. It was used in the SO GasEx project as a drogued drifter instrumented with a variety of autonomous instruments capable of making a coordinated set of physical, geochemical, and biological measurements at high temporal resolutions. These measurements provide a key component in the study of processes controlling air-sea CO2 exchange.

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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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