Discrete analysis of new production - Nitrogen isotope N15 from NOAA Ship Ronald H. Brown 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/3305
Version: 17 Feb 2010
Version Date: 2010-02-17

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
Strutton, Peter	Oregon State University (OSU-CEOAS)	Principal Investigator
Hales, Burke	Oregon State University (OSU-CEOAS)	Contact
Gegg, Stephen R.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

Discrete analysis of new production (NO3 uptake)

Methods & Sampling

See: SO-GasEx cruise report, Section 5.8.2 pgs 56-57

Operation description:
Discrete analysis of new production (NO3 uptake) on CTD casts (hydrography).

Sampling times and locations:
Sampled all evening CTD casts (20 total). See CTD cast logs and bottle files for specific times, locations, and bottles for each cast. See event log for times and locations when sampled underway seawater line.

Overall sampling strategy:
Collected one sample from each of six depths between SFC and 50m.
Full set of duplicates done on CTD25 and SFC only duplicates done on CTD46.
Nominal depths were 5m, 10m, 15m, 25m, 35m, 50m although this varied.
Nominal light levels as a % of SFC were 85%, 40%, 27%, 11%, 4% and 1%.

Analytical method:
Water samples were drawn into 1.17L polycarbonate bottles, no filling tube. Sample bottles and caps were rinsed three times. Samples were usually collected close to local midnight and kept in the dark and cool (outside air temperatures) until ~4am local. Samples were spiked with 200uL of ~10mM K15NO3, roughly 1.6 to 2.0 uM NO3 per bottle or a ~10% enrichment of NO3 over ambient. Samples were placed in the on deck incubator at local dawn (~4:30am local) and incubated with surface running seawater (4-5degC) for 24 hours. Samples were then filtered at <20kPa vacuum onto combusted (450C for 12 hrs) Whatman GFFs. Filters were dried for 12-24 hrs at 23C, <30% humidity, and stored, folded, in cryovials or aluminum foil (Fred Meyer) envelopes. Samples were transported to OSU, then analyzed for 15N at the UCSB Marine Science Institute Analytical Lab.

Instrument details:
Contact UCSB MSI Analytical Lab for details.

Data Processing Description

See: SO-GasEx cruise report, Section 5.8.2 pgs 56-57

BCO-DMO Processing Notes
- Generated from original file N15_NewProd_data_submitted.xls

BCO-DMO Edits
- Parameters formatted to BCO-DMO convention
- Blank cells filled with 'nd'
- event, station, date, time, lon, lat inserted from CTD headers file

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Data Files

File
NewProd.csv (Comma Separated Values (.csv), 7.72 KB) MD5:fb7cd126e1223f694c52fb08bd738794 Primary data file for dataset ID 3305

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Parameters

Parameter	Description	Units
event	Unique event number	DDDHHMM
station	SO-GasEx CTD Station Id	integer
date	Date (UTC)	YYYYMMDD
time	Time (UTC)	HHMM
lon	Station longitude (West is negative)	decimal degrees
lat	Station latitude (South is negative)	decimal degrees
Sample_Number	Sample Number	integer
Niskin_bottle_number	Niskin bottle number	integer
light_depth	light depth	meters
New_production	New production	mmol m-3 day-1

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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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