CDOM Absorption Spectra from CTD casts 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/3291
Version: 13 Jan 2010
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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 CDOM Absorption Spectra from CTDs
CDOM absorption spectra from 250-700nm;
CDOM absorption at 440 nm;
slope of absorption spectra

Methods & Sampling

See: SO-GasEx cruise report, Section 5.7.8 ppgs 52-53

CDOM Absorption Spectra from CTDs
Operation description:
Multiple-wavelength absorption measurements using WPI UltraPath spectral absorbance system with 200cm pathlength liquid waveguide.

Sampling times and locations:
Samples collected from regular CTD casts, at nominal depths of 5, 10, 20, 30, 50, and 100m.

Data products:
CDOM absorption spectra from 250-700nm
CDOM absorption at 440 nm
slope of absorption spectra

Data are presented in a separate file for each CTD cast.
Each file is identified by the CTD cast number.
Data are presented as an array of absorption (ag, units of 1/m) for each wavelength between 250-700 nm, at each of the sampled depths.
Notation is ag_xm where x is the nominal depth of the samples.
Also provided in each sheet are the CDOM absorption at 440 nm (1/m) and slopes of the absorption spectra (1/m/nm) for each depth.

Analytical method:
Samples filtered through 0.2µ nucleopore filters prior to measurement. Milli-Q water used as reference with salinity-based offsets (refractive index) correction applied. Sample temperatures were equilibrated to ambient temperature (as was Milli-Q). Absorption measured using a WPI ultrapath spectrophotometer. ag calculated as 2.303*A/r where A is the measured absorbance and r is the pathlength in meters (2.03 m in this case). ag data are corrected for scattering using A at 700 nm.

Instrument details:
World Precision Insturments (WPI) UltraPath spectral absorbance system with 200cm liquid waveguide cell, TIDAS-2 diode array spectrometer and D2H Deuterium-Halogen light source. See WPI web-page for details.

Data Processing Description

See: SO-GasEx cruise report, Section 5.7.8 ppgs 52-53

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

BCO-DMO Edits
- multiple sheet .xls file converted to multiple .xls files, 1 per CTD lowering
- header file of corresponding CTD lowering generated and includes lat/lon of lowering
- one global parameter header record generated that covers all lowerings
- any blank fields changed to 'nd' (no data)
- Slope and a_440 data moved to bottom of wavelength data

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Data Files

File
CDOM_Absorp.csv (Comma Separated Values (.csv), 1.81 MB) MD5:d66538e1478041abff9fcd94517c6ab9 Primary data file for dataset ID 3291

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Parameters

Parameter	Description	Units
event	event number as YDAHHMM	YDAHHMM
station	station	integer
date	Date (UTC)	YYYYMMDD
time	Time (UTC)	HHMM
lon	longitude (West is negative)	decimal degrees
lat	latitude (South is negative)	decimal degrees
Pmax	Pmax	decibars
Wavelength	CDOM absorption spectra from 250-700nm; CDOM absorption at 440 nm; slope of absorption spectra	nano meters
ag_5m	array of absorption (ag; units of 1/m) for each wavelength at 5meters	1/m
ag_10m	array of absorption (ag; units of 1/m) for each wavelength at 10meters	1/m
ag_15m	array of absorption (ag; units of 1/m) for each wavelength at 15meters	1/m
ag_19m	array of absorption (ag; units of 1/m) for each wavelength at 19meters	1/m
ag_25m	array of absorption (ag; units of 1/m) for each wavelength at 25meters	1/m
ag_30m	array of absorption (ag; units of 1/m) for each wavelength at 30meters	1/m
ag_35m	array of absorption (ag; units of 1/m) for each wavelength at 35meters	1/m
ag_50m	array of absorption (ag; units of 1/m) for each wavelength at 50meters	1/m
ag_60m	array of absorption (ag; units of 1/m) for each wavelength at 60meters	1/m
ag_75m	array of absorption (ag; units of 1/m) for each wavelength at 75meters	1/m
ag_95m	array of absorption (ag; units of 1/m) for each wavelength at 95meters	1/m
ag_100m	array of absorption (ag; units of 1/m) for each wavelength at 100meters	1/m
ag_125m	array of absorption (ag; units of 1/m) for each wavelength at 125meters	1/m
ag_200m	array of absorption (ag; units of 1/m) for each wavelength at 200meters	1/m
ag_500m	array of absorption (ag; units of 1/m) for each wavelength at 500meters	1/m
ag_1500m	array of absorption (ag; units of 1/m) for each wavelength at 1500meters	1/m

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Instruments

Dataset-specific Instrument Name	Spectrometer
Generic Instrument Name	Spectrometer-WPI UltraPath
Dataset-specific Description	The spectrometer was a WPI UltraPath spectral absorbance system configured with a 200cm pathlength liquid waveguide cell TIDAS-2 diode array spectrometer and D2H Deuterium-Halogen light source
Generic Instrument Description	A spectrometer is an optical instrument used to measure properties of light over a specific portion of the electromagnetic spectrum. The World Precision Instruments (WPI) UltraPath is a high-performance spectral absorbency system developed by WPI under a collaborative agreement with NASA (Stennis Space Center) for the spectroscopic determination of colored dissolved organic matter (CDOM) in seawater and fresh water environments. It was designed for use in the laboratory and in the natural environment. (manufacturer site: www.wpiinc.com)

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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.

Oceanographers and atmospheric scientists are working together to improve understanding of the fate, transport, and feedbacks of climate relevant compounds.

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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