CTD salinometer calibrations 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/3128
Version: 26 July 2010
Version Date: 2010-07-26

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 Salinity calibrations from CTD profiles

Methods & Sampling

See: SO-GasEx cruise report, Section 5.7 ppgs 36-46

Sample CTD Header File:
* Sea-Bird SBE 9 Data File:
* FileName = C:GasExdatage03.hex
* Software Version Seasave V 7.14c
* Temperature SN = 4211
* Conductivity SN = 2887
* Number of Bytes Per Scan = 34
* Number of Voltage Words = 4
* Number of Scans Averaged by the Deck Unit = 1
* Append System Time to Every Scan

* System UpLoad Time = Mar 10 2008 14:51:02
** Cruise: GasEx 2008
** Ship: NOAA RONALD H. BROWN
** Station/Cast Number: 03
** Nominal Latitude: 50 43.876
** Nominal Longitude: 38 33.285
# nquan = 12
# nvalues = 75194
# units = specified
# name 0 = timeS: Time, Elapsed [seconds]
# name 1 = prDM: Pressure, Digiquartz [db]
# name 2 = depSM: Depth [salt water, m]
# name 3 = t068C: Temperature [ITS-68, deg C]
# name 4 = t168C: Temperature, 2 [ITS-68, deg C]
# name 5 = c0mS/cm: Conductivity [mS/cm]
# name 6 = c1mS/cm: Conductivity, 2 [mS/cm]
# name 7 = sbeox0V: Oxygen Voltage, SBE 43
# name 8 = sbeox0Mm/Kg: Oxygen, SBE 43 [umol/Kg]
# name 9 = par: PAR/Irradiance, Biospherical/Licor
# name 10 = wetStar: Fluorescence, Wetlab Wetstar [mg/m^3]
# name 11 = flag: 0.000e+00
# span 0 = 0.000, 3133.042
# span 1 = -0.474, 502.611
# span 2 = -0.470, 497.698
# span 3 = 0.5986, 7.8632
# span 4 = 0.6005, 7.2611
# span 5 = 0.038490, 33.003805
# span 6 = 0.058432, 32.964855
# span 7 = 1.8694, 3.9194
# span 8 = 164.630, 390.668
# span 9 = 5.4693e+02, 9.9990e+03
# span 10 = -0.4895, 15.3250
# span 11 = 0.0000e+00, 0.0000e+00
# interval = seconds: 0.0416667
# start_time = Mar 10 2008 14:51:02
# bad_flag = -9.990e-29
# sensor 0 = Frequency 0 temperature, primary, 4211, 08-Nov-07
# sensor 1 = Frequency 1 conductivity, primary, 2887, 18-Oct-07, cpcor = -9.5700e-08
# sensor 2 = Frequency 2 pressure, 209, 09-Jul-07
# sensor 3 = Frequency 3 temperature, secondary, 1455, 13-Nov-07
# sensor 4 = Frequency 4 conductivity, secondary, 2882, 18-Oct-07, cpcor = -9.5700e-08
# sensor 5 = Extrnl Volt 0 Oxygen, SBE, primary, 315, 16-Oct-07p
# sensor 6 = Extrnl Volt 3 userpoly 0, 8756
# sensor 7 = Extrnl Volt 4 irradiance (PAR), primary, 4623, N/A
# sensor 8 = Extrnl Volt 6 WET Labs, WETStar fluorometer, ws3s-418P, 7/9/98
# datcnv_date = May 13 2009 13:16:53, 7.18c
# datcnv_in = C:cygwinhome mckeeSO-GasExge03.hex C:cygwinhome mckeeSO-GasExge03.CON
# datcnv_skipover = 0
# datcnv_ox_hysteresis_correction = no
# datcnv_ox_tau_correction = yes
# file_type = ascii
END

Data Processing Description

See: SO-GasEx cruise report, Section 5.7 ppgs 36-46

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

BCO-DMO Edits

- event, station, date, time, lon, lat inserted form CTD headers file and CTD events in event log
- decimal places padded to 1 or 2 places as appropriate for consistency

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Data Files

File
CTD_Salinity.csv (Comma Separated Values (.csv), 6.70 KB) MD5:002a63c92fd8a5b852190ba1af1f504d Primary data file for dataset ID 3128

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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
station	SO-GasEx CTD Station Id	integer
Niskin_Bottle	Niskin bottle number	integer
sample_bottle	Sample bottle number	integer
conductivity_ratio	Conductivity ratio	dimensionless
Salinity	Salinity	dimensionless

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Instruments

Dataset-specific Instrument Name	CTD Seabird 911plus
Generic Instrument Name	CTD Sea-Bird SBE 911plus
	Instrument Configuration File for SO-GasEx: PSA file: C:GasExacqSeasave.psa Date: 02/23/2008 Instrument configuration file: C:GasExconssec_24_1.con Configuration report for SBE 911plus/917plus CTD ---------- Frequency channels suppressed : 0 Voltage words suppressed : 0 Computer interface : RS-232C Scans to average : 1 Surface PAR voltage added : No NMEA position data added : No Scan time added : Yes 1) Frequency 0, Temperature Serial number : 4211 Calibrated on : 08-Nov-07 G : 4.38706278e-003 H : 6.46536683e-004 I : 2.23272060e-005 J : 1.77872902e-006 F0 : 1000.000 Slope : 1.00000000 Offset : 0.0000 2) Frequency 1, Conductivity Serial number : 2887 Calibrated on : 18-Oct-07 G : -1.00439325e+001 H : 1.36330343e+000 I : -2.56289727e-003 J : 2.54823008e-004 CTcor : 3.2500e-006 CPcor : -9.57000000e-008 Slope : 1.00000000 Offset : 0.00000 3) Frequency 2, Pressure, Digiquartz with TC Serial number : 209 Calibrated on : 09-Jul-07 C1 : -3.920451e+004

Dataset-specific Description	C2 : 6.234560e-001 C3 : 1.350570e-002 D1 : 3.894300e-002 D2 : 0.000000e+000 T1 : 3.046303e+001 T2 : -9.018862e-005 T3 : 4.528890e-006 T4 : 3.309590e-009 T5 : 0.000000e+000 Slope : 0.99985000 Offset : 1.00090 AD590M : 1.144000e-002 AD590B : -8.805040e+000 4) Frequency 3, Temperature, 2 Serial number : 1455 Calibrated on : 13-Nov-07 G : 4.84617647e-003 H : 6.77841857e-004 I : 2.60561588e-005 J : 2.02936086e-006 F0 : 1000.000 Slope : 1.00000000 Offset : 0.0000 5) Frequency 4, Conductivity, 2 Serial number : 2882 Calibrated on : 18-Oct-07 G : -1.02006582e+001 H : 1.39961765e+000 I : 7.01158866e-004 J : 2.20787100e-005 CTcor : 3.2500e-006 CPcor : -9.57000000e-008 Slope : 1.00000000 Offset : 0.00000 6) A/D voltage 0, Oxygen, SBE 43 Serial number : 315 Calibrated on : 16-Oct-07p Equation : Owens-Millard Coefficients for Owens-Millard: Soc : 3.6150e-001 Boc : 0.0000 Offset : -0.5838 Tcor : -0.0001 Pcor : 1.35e-004 Tau : 0.0 Coefficients for Murphy-Larson: Soc : 0.00000e+000 Offset : 0.00000e+000 A : 0.00000e+000 B : 0.00000e+000 C : 0.00000e+000 E : 0.00000e+000 Tau : 2.00000e+000 7) A/D voltage 1, Free 8) A/D voltage 2, Free 9) A/D voltage 3, User Polynomial Serial number : 8756 Calibrated on : Sensor name : Metrox A0 : 12.00000000 A1 : 445.60000000 A2 : 0.00000000 A3 : 0.00000000 10) A/D voltage 4, Free 11) A/D voltage 5, Free 12) A/D voltage 6, Free 13) A/D voltage 7, Free ---------- Pump Control This setting is only applicable to a custom build of the SBE 9plus. Enable pump on / pump off commands: NO ---------- Data Acquisition: Archive data: YES Delay archiving: NO Data archive: C:P18_07data h21731.hex Timeout (seconds) at startup: 20 Timeout (seconds) between scans: 20 ---------- Instrument port configuration: Port = COM1 Baud rate = 19200 Parity = N Data bits = 8 Stop bits = 1 ---------- Water Sampler Data: Water Sampler Type: SBE Carousel Number of bottles: 24 Port: COM2 Enable remote firing: NO Firing sequence: Sequential ---------- Header information: Header Choice = Prompt for Header Information prompt 0 = Cruise: CLIVAR P18 2007 prompt 1 = Ship: NOAA RONALD H. BROWN prompt 2 = Station/Cast Number: prompt 3 = Nominal Latitude: prompt 4 = Nominal Longitude: ---------- TCP/IP - port numbers: Data acquisition: Data port: 49163 Status port: 49165 Command port: 49164 Remote bottle firing: Command port: 49167 Status port: 49168 Remote data publishing: Converted data port: 49161 Raw data port: 49160 ---------- Miscellaneous data for calculations Depth and Average Sound Velocity Latitude when NMEA is not available: 0.00000000 Average Sound Velocity Minimum pressure [db]: 20.00000000 Minimum salinity [psu]: 20.00000000 Pressure window size [db]: 20.00000000 Time window size [s]: 60.00000000 Descent and Acceleration Window size [s]: 2.00000000 Plume Anomaly Theta-B: 0.00000000 Salinity-B 0.00000000 Theta-Z / Salinity-Z 0.00000000 Reference pressure [db] 0.00000000 Oxygen Window size [s]: 2.00000000 Potential Temperature Anomaly A0: 0.00000000 A1: 0.00000000 A1 Multiplier: Salinity ---------- Serial Data Output: Output data to serial port: NO ---------- Mark Variables: Variables: Digits Variable Name [units] ------ ---------- 0 Scan Count 4 Pressure, Digiquartz [db] 5 Temperature [ITS-90, deg C] 5 Salinity [PSU] 4 Oxygen, SBE 43 [umol/Kg] 5 Density [sigma-theta, Kg/m^3] ---------- Shared File Output: Output data to shared file: NO ---------- TCP/IP Output: Raw data: Output raw data to socket: NO XML wrapper and settings: NO Seconds between raw data updates: 0.00000000 Converted data: Output converted data to socket: NO XML format: NO ---------- SBE 11plus Deck Unit Alarms Enable minimum pressure alarm: NO Enable maximum pressure alarm: NO Enable altimeter alarm: NO ---------- SBE 14 Remote Display Enable SBE 14 Remote Display: NO ---------- Options: Prompt to save program setup changes: YES Automatically save program setup changes on exit: NO Confirm instrument configuration change: YES Confirm display setup changes: YES Confirm output file overwrite: YES Check scan length: YES Compare serial numbers: YES Maximized plot may cover Seasave: NO
Generic Instrument Description	The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). more information from Sea-Bird Electronics

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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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