SAMI-CO2 pCO2 temperature and oxygen time series from Air-Sea Interaction Spar (ASIS) buoy in the Labrador Sea, (53.04N, 49.207W), June to August 2004 (CO2Flux_LabradorSea project)

Website: https://www.bco-dmo.org/dataset/630619
Version: 06 January 2016
Version Date: 2016-01-06

Project
» Collaborative research: Air-Sea CO2 Fluxes and Surface Physical Processes in the Labrador Sea (CO2Flux_LabradorSea)

Contributors	Affiliation	Role
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Drennan, William M.	University of Miami Rosenstiel School of Marine and Atmospheric Science (UM-RSMAS)	Co-Principal Investigator
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Dataset Description

SAMI-CO2 pCO_2 & temperature mooring time series collected in the Labrador Sea.

Labrador Sea, deployed at 53.04N, 49.207W, 1 SAMI-CO2 deployed at each depth (1, 5, 10, 20 and 35 meters)

Related files and references:
DeGrandpre, M. D., Hammar, T. R., Smith, S. P., & Sayles, F. L. (1995). In situ measurements of seawater pCO2. Limnology and Oceanography, 40(5), 969–975. doi:10.4319/lo.1995.40.5.0969

Martz, T. R., DeGrandpre, M. D., Strutton, P. G., McGillis, W. R., & Drennan, W. M. (2009). Sea surfacepCO2and carbon export during the Labrador Sea spring-summer bloom: An in situ mass balance approach. Journal of Geophysical Research, 114(C9). doi:10.1029/2008JC005060

Methods & Sampling

Labrador Sea, deployed at 53.04N, 49.207W, 1 SAMI-CO2 deployed at each depth (1, 5, 10, 20 and 35 meters)

Sampling and Analytical Methodology:
The SAMI-CO2s sampled on a 30 minute interval, a non-absorbing blank measurement was taken every 3.5 days.

Data Processing Description

Data Processing:
See DeGrandpre, et.al (1995). The data were interpolated to 30 minute intervals

BCO-DMO Processing Notes
- Generated from original "LabSea June-Aug 2004_SAMI-CO2.xlsx" file contributed by Cory Beatty
- Parameter names edited to conform to BCO-DMO naming convention found at Choosing Parameter Name
- Date reformatted to YYYYMMDD
- Time reformatted to HHMMSS

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Data Files

File
LabSea.csv (Comma Separated Values (.csv), 376.45 KB) MD5:dbdd85b69f6d0383a5b351bc720e5d47 Primary data file for dataset ID 630619

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Related Publications

DeGrandpre, M. D., Hammar, T. R., Smith, S. P., & Sayles, F. L. (1995). In situ measurements of seawater pCO2. Limnology and Oceanography, 40(5), 969–975. doi:10.4319/lo.1995.40.5.0969
Results
,
Methods

Martz, T. R., DeGrandpre, M. D., Strutton, P. G., McGillis, W. R., & Drennan, W. M. (2009). Sea surfacepCO2and carbon export during the Labrador Sea spring-summer bloom: An in situ mass balance approach. Journal of Geophysical Research, 114(C9). doi:10.1029/2008jc005060 https://doi.org/10.1029/2008JC005060
Results

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Parameters

Parameter	Description	Units
Excel_Date	Excel Date	xxxxx.xxxx
Year_Day	Jan 1 = YD1	xxx.xxxx
Date	Date (UTC)	YYYYMMDD
Time	Time (UTC)	HHMMSS
SAMI_52_1m_pCO2	Partial Pressure of Carbon Dioxide – SAMI 52 at 1m	uatm
SAMI_52_1m_Temp	Temperature – SAMI 52 at 1m	oC
SAMI_11_5m_pCO2	Partial Pressure of Carbon Dioxide – SAMI 11 at 5m	uatm
SAMI_11_5m_Temp	Temperature – SAMI 11 at 5m	oC
SAMI_51_10m_pCO2	Partial Pressure of Carbon Dioxide – SAMI 51 at 10m	uatm
SAMI_51_10m_Temp	Temperature – SAMI 51 at 10m	oC
SAMI_12_20m_pCO2	Partial Pressure of Carbon Dioxide – SAMI 12 at 20m	uatm
SAMI_12_20m_Temp	Temperature – SAMI 12 at 20m	oC
SAMI_50_35m_pCO2	Partial Pressure of Carbon Dioxide – SAMI 50 at 35m	uatm
SAMI_50_35m_Temp	Temperature – SAMI 50 at 35m	oC
ASIS_Lat	Latitude Position of ASIS Buoy at time of measurement (South is negative)	decimal degrees
ASIS_Lon	Longitude Position of ASIS Buoy at time of measurement (West is negative)	decimal degrees

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Instruments

Dataset-specific Instrument Name	ASIS-1, ASIS-2
Generic Instrument Name	Air-Sea Interaction Spar (ASIS) Buoy
Dataset-specific Description	During the deployment 2 separate ASIS Buoys were deployed, ASIS-1 & ASIS-2, upon each of which 2 SAMIs were attached. Each buoy had 1 SAMI-CO2 attached at 1 meter and 1 SAMI-CO2 attached at 5 meters depth. The SAMI-CO2 sampled on a 30 minute interval and a non-absorbing blank measurement was taken every 3.5 days. PAR was measured by a Li-COR LI-192 underwater quantum sensor (not calibrated). Oxygen data was obtained using a calibrated Aanderaa O2 sensor (model 4175). Both the PAR and O2 sensors were attached to a SAMI-CO2 sensor. There is no pCO2 record at 1 meter on ASIS-2.
Generic Instrument Description	See: Air-Sea Interaction Spar (ASIS) Buoy

Dataset-specific Instrument Name	SAMI-CO2 pCO2
Generic Instrument Name	pCO2 Sensor
Dataset-specific Description	During the deployment 2 separate ASIS Buoys were deployed, ASIS-1 & ASIS-2, upon each of which 2 SAMIs were attached. Each buoy had 1 SAMI-CO2 attached at 1 meter and 1 SAMI-CO2 attached at 5 meters depth. The SAMI-CO2 sampled on a 30 minute interval and a non-absorbing blank measurement was taken every 3.5 days. PAR was measured by a Li-COR LI-192 underwater quantum sensor (not calibrated). Oxygen data was obtained using a calibrated Aanderaa O2 sensor (model 4175). Both the PAR and O2 sensors were attached to a SAMI-CO2 sensor. There is no pCO2 record at 1 meter on ASIS-2.
Generic Instrument Description	A sensor that measures the partial pressure of CO2 in water (pCO2)

Dataset-specific Instrument Name	SAMI-CO2 pCO2
Generic Instrument Name	Submersible Autonomous Moored Instrument
Dataset-specific Description	During the deployment 2 separate ASIS Buoys were deployed, ASIS-1 & ASIS-2, upon each of which 2 SAMIs were attached. Each buoy had 1 SAMI-CO2 attached at 1 meter and 1 SAMI-CO2 attached at 5 meters depth. The SAMI-CO2 sampled on a 30 minute interval and a non-absorbing blank measurement was taken every 3.5 days. PAR was measured by a Li-COR LI-192 underwater quantum sensor (not calibrated). Oxygen data was obtained using a calibrated Aanderaa O2 sensor (model 4175). Both the PAR and O2 sensors were attached to a SAMI-CO2 sensor. There is no pCO2 record at 1 meter on ASIS-2.
Generic Instrument Description	The Submersible Autonomous Moored Instrument (SAMI) measures and logs levels of dissolved chemicals in sea and fresh water. It is a plastic cylinder about 6 inches wide and 2 feet long that is self-powered and capable of hourly measurements for up to one year. All data collected are logged to an internal memory chip to be downloaded later. SAMI sensors usually are placed a few feet underwater on permanent moorings, while others on floating drifters sample the water wherever the wind and currents carry them. The instruments have been used by researchers around the globe in a variety of studies since 1999. Dr. Mike DeGrandpre, University of Montana, developed the SAMI between 1990 and 1993 during his postdoctoral work at the Woods Hole Oceanographic Institution (Woods Hole, MA, USA). For additional information, see URL: http://www.sunburstsensors.com/ from the manufacturer, Sunburst Sensors, LLC, 1226 West Broadway, Missoula, MT 59802.

Dataset-specific Instrument Name	SAMI-CO2 pCO2 and Temperature
Generic Instrument Name	Water Temperature Sensor
Dataset-specific Description	During the deployment 2 separate ASIS Buoys were deployed, ASIS-1 & ASIS-2, upon each of which 2 SAMIs were attached. Each buoy had 1 SAMI-CO2 attached at 1 meter and 1 SAMI-CO2 attached at 5 meters depth. The SAMI-CO2 sampled on a 30 minute interval and a non-absorbing blank measurement was taken every 3.5 days. PAR was measured by a Li-COR LI-192 underwater quantum sensor (not calibrated). Oxygen data was obtained using a calibrated Aanderaa O2 sensor (model 4175). Both the PAR and O2 sensors were attached to a SAMI-CO2 sensor. There is no pCO2 record at 1 meter on ASIS-2.
Generic Instrument Description	General term for an instrument that measures the temperature of the water with which it is in contact (thermometer).

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Deployments

EN394_ASIS

Website	https://www.bco-dmo.org/deployment/630613
Platform	Air-Sea Interaction Spar (ASIS) Buoy
Start Date	2004-06-12
End Date	2004-08-25
Description	Labrador Sea, deployed at 53.04N, 49.207W, 1 SAMI-CO2 deployed at each depth (1, 5, 10, 20 and 35 meters)

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Project Information

Collaborative research: Air-Sea CO2 Fluxes and Surface Physical Processes in the Labrador Sea (CO2Flux_LabradorSea)

Coverage: Labrador Sea

ABSTRACT
A study of the air-sea flux of carbon dioxide and the surface physical processes controlling it will be conducted during the Labrador Sea spring bloom. The Labrador Sea is highly significant as one of the areas of North Atlantic Deep Water (NADW) formation. During the late spring months, the Labrador Sea experiences a strong plankton bloom, and is an intense sink for carbon dioxide. Deep convection during the subsequent winter mixes the carbon dioxide rich waters throughout the water column. The newly formed NADW is transported southward towards the Antarctic, via a system of deep currents. Given the circulation time scale of order 1000 years, atmospheric gases within the NADW are essentially sequestered. While mid-latitude areas of the global ocean are equally strong sinks of carbon dioxide, gases absorbed into the ocean at these latitudes remain in the near surface waters, and are returned to the atmosphere on the decadal time scale. Hence the gas exchange characteristics in the Labrador Sea are of particular interest because it is one of the few areas of the global ocean that is a long term carbon dioxide sink. The ability to predict and forecast air-sea carbon dioxide fluxes over large areas is also necessary to quantify the adjacent terrestrial carbon budget.

The broader impacts of this work relate to improvement of our ability to predict atmospheric carbon dioxide levels, and to assess how it might change climate under various scenarios. The large uncertainty surrounding the flux of carbon dioxide between the atmosphere and ocean prevent us from determining the partitioning of the sink of anthropogenic carbon dioxide between the ocean and the terrestrial biosphere. This uncertainty also limits our ability to accurately model future atmospheric carbon dioxide levels. The process study we have proposed will improve the accuracy of the global ocean carbon dioxide flux estimates and increase our understanding of the causes of its variability.

The project will involve students as undergraduate and post-graduate research assistants. The University of Miami is a Hispanic Serving Institution and thereby fosters the participation of under-represented groups in science and engineering. The data will be made available through several data bases via the World Wide Web. The project will contribute to the active outreach activities coordinated through the Dean's Office at the University of Miami.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0327274

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