



## CDIAC's Ocean CO<sub>2</sub> Data Program



### Metadata Summary

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**Dataset ID:** R/V Ronald Brown 2011 Underway Data

**Investigator(s) Name:** Wanninkhof, Rik  
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**Dataset Info:** Dataset ID:R/V Ronald Brown 2011 Underway Data

**Submission Initial Submission:** 20121126  
**Dates Revised Submission:** 20121126

**Cruise:** Mooring ID:

**Survey/Experiment Type:**  
**Survey/Experiment Name:** VOS Underway Measurements

**Cruise ID:** RB-11-01, RB-11-02, RB-11-03, RB-11-04  
**Cruise Info:**  
**Section:** PNE 2011, CLIVAR A10 2011, PNE 2011, RB-11-04.

**Geographical Coverage:**  
**Geographical Region:** Atlantic Ocean

**Ports of Call:**  
 Charleston, SC -  
 Cape Town, South Africa -  
 Rio de Janeiro, Brazil -  
 Bridgetown, Barbados -  
 Charleston, SC.

**Bounds:** North West South East

32 -80 -30 20

[Locate](#)



**Temporal Coverage:** Start Date: 20110722 End Date: 20111206

**Vessel:** Vessel Name:R/V Ronald H. Borown  
 Vessel ID:33RO  
 Country:USA  
 Vessel Owner:Department of Commerce's NOAA

**Data Center URL:** <http://cdiac.esd.ornl.gov/>

**Download Data** [Ronald Brown 2011 Underway Data](#)

**Sets:**

**Variable Info:**

Variable Name	Description of Variable
XCO2_WAT	PPM
XCO2_AIR	PPM
EQ_PRE	HPA
EQ_TMP	DEG_C
SST	DEG_C

SSS	
FCO2_WAT	UATM
FCO2_AIR	UATM
DEL_FCO2	UATM

**Method Description:**

**Sampling and Equilibrator Design:**

**Depth of Sea Water Intake:**  
**Location of Sea Water Intake:**  
**Equilibrator Type:** Plexiglass cylinder based on a design by R. Weiss  
**Equilibrator Volume:** 24 L  
**Water Flow Rate:** 11 L/min  
**Headspace Gas Flow Rate:** 0.2  
**Vented:** Yes  
**Drying Method for CO2 in Water:**  
**Additional Information:**

**System Design:**

**Measurement Method:** Infrared absorption of dry gas  
**Manufacturer of Calibration Gas:** NOAA/ESRL - Boulder, CO  
**CO2 Sensor:**

**Measurement Method:**  
**Manufacturer:** LI-COR  
**Model:** 6251  
**Environmental Control:** Air-conditioned laboratory  
**Frequency:**  
**Resolution Water:**  
**Resolution Air:**  
**Uncertainty Water:**  
**Uncertainty Air:**  
**CO2 Sensor Calibration:** The standard gases are directly traceable to the WMO scale. The uncertainty of the standards, based on pre and post cruise calibrations, is less than 0.05 ppm.  
**Manufacturer of CO2 calibration gases:**  
**Method References:**

**CO2 in Marine Air:**

**Measurement:**  
**Location and Height:**

**Sea Surface Temperature:**

**Location:**  
**Manufacturer:**  
**Model:**  
**Accuracy:**  
**Precision:**  
**Calibration:**  
**Other comments:**

**Sea Surface Salinity:**

**Location:**  
**Manufacturer:**  
**Model:**  
**Accuracy:**  
**Precision:**  
**Calibration:**  
**Other comments:**

**Equilibrator Temperature:**

**Location:**  
**Manufacturer:**  
**Model:**  
**Accuracy:**  
**Precision:**  
**Calibration:**  
**Other comments:**

**Equilibrator Pressure:**

**Location:**  
**Manufacturer:**  
**Model:**  
**Accuracy:**  
**Precision:**  
**Calibration:**  
**Other comments:**

**Atmospheric Pressure:**

**Location:**  
**Manufacturer:**  
**Model:**  
**Accuracy:**  
**Precision:**  
**Calibration:**  
**Other comments:**

**Other Sensors:**

**Manufacturer:**  
**Model:**  
**Resolution:**

	<p><b>Uncertainty:</b>  <b>Calibration:</b>  <b>Other Comments:</b></p> <p><b>Accuracy Info:</b>  <b>Method References:</b></p>
<b>Method References:</b>	<p>DOE (1994). Handbook of methods for the analysis of the various parameters of the carbon dioxide system in sea water; version 2. DOE.</p> <p>Feely, R. A., R. Wanninkhof, H. B. Milburn, C. E. Cosca, M. Stapp and P. P. Murphy (1998) A new automated underway system for making high precision pCO<sub>2</sub> measurements onboard research ships. <i>Analytica Chim. Acta</i> 377: 185-191.</p> <p>Ho, D. T., R. Wanninkhof, J. Masters, R. A. Feely and C. E. Cosca (1997). Measurement of underway fCO<sub>2</sub> in the Eastern Equatorial Pacific on NOAA ships BALDRIGE and DISCOVERER, NOAA data report ERL AOML-30, 52 pp. , NTIS Springfield,</p> <p>Wanninkhof, R. and K. Thoning (1993) Measurement of fugacity of CO<sub>2</sub> in surface water using continuous and discrete sampling methods. <i>Mar. Chem.</i> 44(2-4): 189-205.</p> <p>Weiss, R. F. (1970) The solubility of nitrogen, oxygen and argon in water and seawater. <i>Deep-Sea Research</i> 17: 721-735. Weiss, R. F. (1974) Carbon dioxide in water and seawater: the solubility of a non-ideal gas. <i>Mar. Chem.</i> 2: 203-215.</p> <p>Weiss, R. F., R. A. Jahnke and C. D. Keeling (1982) Seasonal effects of temperature and salinity on the partial pressure of CO<sub>2</sub> in seawater. <i>Nature</i> 300: 511-513.</p>
<b>Data Set References:</b>	
<b>Additoional Information:</b>	
<b>Citation:</b>	<p>Wanninkhof, R., R. D. Castle, and J. Shannahoff. 2012. Underway pCO<sub>2</sub> measurements aboard the R/V Ronald H. Brown during the 2011 cruises. <a href="http://cdiac.ornl.gov/ftp/oceans/VOS_Ronald_Brown/RB2011/">http://cdiac.ornl.gov/ftp/oceans/VOS_Ronald_Brown/RB2011/</a>. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy, Oak Ridge, Tennessee. doi: 10.3334/CDIAC/OTG.VOS_RB_2011</p>
<b>Measurement Type:</b>	underway measurement underway data underway measurements
<b>Metadata Source:</b>	<a href="http://cdiac.ornl.gov:8080/xml-oceans/ako/underway/VOS_Ronald_Brown_2011.xml">http://cdiac.ornl.gov:8080/xml-oceans/ako/underway/VOS_Ronald_Brown_2011.xml</a>

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