Dataset Expocode	**33GG20120720**
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Dataset	**Funding Info:** NOAA Climate Program Office; NOAA Ocean Acidification Program **Initial Submission (yyyymmdd):** 20160329 **Revised Submission (yyyymmdd):** 20160329
Campaign/Cruise	**Expocode:** 33GG20120720 **Campaign/Cruise Name:** GU1202_Leg3 **Campaign/Cruise Info:** AOML_SOOP_CO2 **Platform Type:** **CO2 Instrument Type:** Equilibrator-IR or CRDS or GC **Survey Type:** Research Cruise **Vessel Name:** R/V Gordon Gunter **Vessel Owner:** NOAA **Vessel Code:** 33GG
Coverage	**Start Date (yyyymmdd):** 20120721 **End Date (yyyymmdd):** 20120806 **Westernmost Longitude:** 88.6 W **Easternmost Longitude:** 81.7 W **Northernmost Latitude:** 30.4 N **Southernmost Latitude:** 24.0 N **Port of Call:** Pascagoula, MS **Port of Call:** Key West, FL
Variable	**Name:** xCO2_EQU_ppm **Unit:** ppm **Description:** Mole fraction of CO_2 in the equilibrator headspace (dry) at equilibrator temperature (ppm)
Variable	**Name:** xCO2_ATM_ppm **Unit:** ppm **Description:** Mole fraction of CO_2 measured in dry outside air (ppm)
Variable	**Name:** xCO2_ATM_interpolated_ppm **Unit:** ppm **Description:** Mole fraction of CO_2 in outside air associated with each water analysis. These values are interpolated between the bracketing averaged good xCO2_ATM analyses (ppm)

Variable	**Name:** PRES_EQU_hPa **Unit:** hPa **Description:** Barometric pressure in the equilibrator headspace (hPa)
Variable	**Name:** PRES_ATM@SSP_hPa **Unit:** hPa **Description:** Barometric pressure measured outside, corrected to sea level (hPa)
Variable	**Name:** TEMP_EQU_C **Unit:** Degree C **Description:** Water temperature in equilibrator (°C)
Variable	**Name:** SST_C **Unit:** Degree C **Description:** Sea surface temperature (°C)
Variable	**Name:** SAL_permil **Unit:** ppt **Description:** Sea surface salinity on Practical Salinity Scale (o/oo)
Variable	**Name:** fCO2_SW@SST_uatm **Unit:** µatm **Description:** Fugacity of CO2 in sea water at SST and 100% humidity (µatm)
Variable	**Name:** fCO2_ATM_interpolated_uatm **Unit:** µatm **Description:** Fugacity of CO2 in air corresponding to the interpolated xCO2 at SST and 100% humidity (µatm)
Variable	**Name:** dfCO2_uatm **Unit:** µatm **Description:** Sea water fCO2 minus interpolated air fCO2 (µatm)
Variable	**Name:** WOCE_QC_FLAG **Unit:** None **Description:** Quality control flag for fCO2 values (2=good, 3=questionable)
Variable	**Name:** QC_SUBFLAG **Unit:** None **Description:** Quality control subflag for fCO2 values, provides explanation when QC flag=3
Sea Surface Temperature	**Location:** hull mounted, ~3 m below sea surface **Manufacturer:** Furuno **Model:** T2000 **Accuracy:** 0.2 (°C if units not given) **Precision:** 0.1 (°C if units not given) **Calibration:** Factory calibration **Comments:** Manufacturer's Resolution is taken as Precision; Maintained by ship.
Sea Surface Salinity	**Location:** In Chem lab, next to CO2 system **Manufacturer:** Seabird **Model:** SBE 21 **Accuracy:** ± 0.05 o/oo **Precision:** 0.002 o/oo **Calibration:** Factory calibration **Comments:** Manufacturer's Resolution is taken as Precision; Maintained by ship.

Atmospheric Pressure	**Location:** Next to the bridge, ~15 m above the sea surface water **Normalized to Sea Level:** yes **Manufacturer:** RMYoung **Model:** 61201 **Accuracy:** ± 0.5 hPa (hPa if units not given) **Precision:** 0.01 hPa (hPa if units not given) **Calibration:** Factory calibration **Comments:** Manufacturer's Resolution is taken as Precision; Maintained by ship.
Atmospheric CO2	**Measured/Frequency:** Yes, 5 readings in a group every 3 hours **Intake Location:** Bow mast, ~18 meters above sea surface **Drying Method:** Gas stream passes through a thermoelectric condenser (~5 °C) and then through a Perma Pure (Nafion) dryer before reaching the analyzer (90% dry). **Atmospheric CO2 Accuracy:** ± 0.5 µatm in fCO2_ATM **Atmospheric CO2 Precision:** ± 0.01 µatm in fCO2_ATM
Aqueous CO2 Equilibrator Design	**System Manufacturer:** **Intake Depth:** 5 meters **Intake Location:** Bow **Equilibration Type:** Spray head above dynamic pool, no thermal jacket **Equilibrator Volume (L):** 0.95 L (0.4 L water, 0.55 L headspace) **Headspace Gas Flow Rate (ml/min):** 70 - 150 ml/min **Equilibrator Water Flow Rate (L/min):** 1.5 - 2.0 L/min **Equilibrator Vented:** Yes **Equilibration Comments:** Primary equilibrator is vented through a secondary equilibrator. **Drying Method:** Gas stream passes through a thermoelectric condenser (~5 °C) and then through a Perma Pure (Nafion) dryer before reaching the analyzer (90% dry).
Aqueous CO2 Sensor Details	**Measurement Method:** IR **Method details:** details of CO2 sensing (not required) **Manufacturer:** LI-COR **Model:** 7000 **Measured CO2 Values:** xco2(dry) **Measurement Frequency:** Every 140 seconds, except during calibration **Aqueous CO2 Accuracy:** ± 2 µatm in fCO2_SW **Aqueous CO2 Precision:** ± 0.01 µatm in fCO2_SW **Sensor Calibrations:** **Calibration of Calibration Gases:** The analyzer is calibrated every 3 hours with field standards that in turn were calibrated with primary standards that are directly traceable to the WMO scale. The zero gas is ultra-high purity air. **Number Non-Zero Gas Standards:** 3 **Calibration Gases:** Std 1: LL100000, 0.00 ppm, owned by AOML, used every ~3.0 hours. Std 2: JA02267, 247.72 ppm, owned by AOML, used every ~3.0 hours. Std 3: FA02258, 399.25 ppm, owned by AOML, used every ~3.0 hours. Std 4: JA02689, 520.79 ppm, owned by AOML, used every ~3.0 hours. **Comparison to Other CO2 Analyses:** **Comments:** **Method Reference:**

Pierrot, D., C. Neil, K. Sullivan, R. Castle, R. Wanninkhof, H. Lueger, T. Johannessen, A. Olsen, R. A. Feely, and C. E. Cosca (2009), Recommendations for autonomous underway pCO2 measuring systems and data reduction routines, Deep-Sea Res II, 56, 512-522.

Equilibrator Temperature Sensor	**Location:** Inserted into equilibrator ~5 cm below water level **Manufacturer:** Hart **Model:** 1521 **Accuracy:** 0.025 (°C if units not given) **Precision:** 0.001 (°C if units not given) **Calibration:** Factory calibration **Comments:** Resolution is taken as Precision.
Equilibrator Pressure Sensor	**Location:** Attached to equilibrator headspace. Combined with Licor Pressure **Manufacturer:** Licor **Model:** None **Accuracy:** 1.2 (hPa if units not given) **Precision:** 0.02 (hPa if units not given) **Calibration:** Factory calibration **Comments:** Differential pressure reading from Setra-239 attached to the equilibrator headspace was added to the pressure reading from the LICOR analyzer to yield equilibrator pressure. Manufacturer's Resolution is taken as Precision.
Additional Information	**Suggested QC flag from Data Provider:** NA **Additional Comments:** The LICOR water channel was negative so that STDs are ~0.2 ppt and recalculated the CO2 values. SST issues:the seawater temperature was very variable during this cruise (eddies?). When the SST peaked, the equilibrator temp did not follow quite as high, resulting in large Delta Ts (-1 to -2 ° C). This might be an indication that the water flow was not sufficient. The regions where |Delta T| > 1 were flagged 3 - anomalous DT. In addition, because the SST sensor is the Furuno T-2000, the resolution of which is 0.1 ° C, all data have been flagged 3 - questionable SST. Original Data Location: http://www.aoml.noaa.gov/ocd/ocdweb/gunter/gunter_introduction.html **Citation for this Dataset:** **Other References for this Dataset:**