

Dataset Expocode	AG5W20150930
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Dataset	Funding Info: NOAA Climate Program Office - Climate Observation Division Initial Submission (yyyymmdd): 20160129 Revised Submission (yyyymmdd):
Campaign/Cruise	Expocode: AG5W20150930 Campaign/Cruise Name: CB2015_09 Campaign/Cruise Info: VOS Line Cap Blanche Platform Type: CO2 Instrument Type: Equilibrator-IR or CRDS or GC Survey Type: VOS Lines Vessel Name: Cap Blanche Vessel Owner: Hamburg Sud Vessel Code: AG5W
Coverage	Start Date (yyyymmdd): 20150930 End Date (yyyymmdd): 20151012 Westernmost Longitude: 177.6894 E Easternmost Longitude: 118.0223 W Northernmost Latitude: 32.0311 N Southernmost Latitude: 36.5413 S Port of Call: Long Beach, CA Port of Call: New Zealand
Variable	Name: xCO2W_PPM Unit: ppm Description: Mole fraction of CO2 in the equilibrator headspace (dry) at equilibrator temperature (ppm)
Variable	Name: xCO2A_PPM Unit: ppm Description: Mole fraction of CO2 measured in dry outside air (ppm)

Variable	Name: xCO2A_INTERPOLATED_PPM Unit: ppm Description: Mole fraction of CO2 in outside air associated with each water analysis. These values are interpolated between the bracketing averaged good xCO2_ATM analyses (ppm)
Variable	Name: PRES_EQUIL_hPa Unit: hPa Description: Barometric pressure in the equilibrator headspace (hectopascals)
Variable	Name: PRES_SEALEVEL_hPa Unit: hPa Description: Barometric pressure measured outside, corrected to sea level (hectopascals)
Variable	Name: EqTEMP_C Unit: Degree C Description: Water temperature in equilibrator (degrees Celsius)
Variable	Name: SST(TSG)_C Unit: C Description: Sea surface temperature
Variable	Name: SAL(TSG)_PERMIL Unit: ppt Description: Sea surface salinity on Practical Salinity Scale (permil)
Variable	Name: fCO2W@SST_uATM Unit: uATM Description: Fugacity of CO2 in sea water at SST and 100% humidity (microatmospheres)
Variable	Name: fCO2A_uATM Unit: uATM Description: Fugacity of CO2 in air corresponding to the interpolated xCO2 at SST and 100% humidity (microatmospheres)
Variable	Name: dfCO2_uATM Unit: uATM Description: Sea water fCO2 minus interpolated air fCO2 (microatmospheres)
Variable	Name: fCO2_FLAG Unit: None Description: Quality control flag for fCO2 values (2=good, 3=questionable)
Sea Surface Temperature	Location: Ship's bow intake, ~5 meters below water line Manufacturer: Seabird Model: SBE38, serial number 3848581-0383 Accuracy: 0.001 (°C if units not given) Precision: 0.00025 (°C if units not given) Calibration: Yearly factory calibration Comments:
Sea Surface Salinity	Location: Ship's bow intake , ~5 meters below water line Manufacturer: Seabird Model: SBE38, serial number 3848581-0383 Accuracy: .005 Precision: .0005

Calibration: Yearly factory calibration

Comments:

**Atmospheric
Pressure**

Location: Ship's bow, ~10 meters above sealevel

Normalized to Sea Level: yes

Manufacturer: GE

Model: Druck

Accuracy: .15 hPa (hPa if units not given)

Precision: .01 hPa (hPa if units not given)

Calibration: Factory calibration

Comments:

Atmospheric CO2

Measured/Frequency: yes, 6 samples every 3 hours

Intake Location: Ship's bow, ~10 meters above sea level

Drying Method: Thermoelectric condensor; Perma Pure (Naphion); magnesium perchlorate. 90% dry

Atmospheric CO2 Accuracy: .01 ppm

Atmospheric CO2 Precision: 0.2 ppm

**Aqueous CO2
Equilibrator Design**

System Manufacturer: General Oceanics 8050. PMEL system ID: GO7

Intake Depth: ~5m below water line

Intake Location: Ship's bow intake

Equilibration Type: GO8050 Showerhead equilibrator, jacketed

Equilibrator Volume (L): 0.95 L (0.4 L water, 0.55 L headspace)

Headspace Gas Flow Rate (ml/min): 70 - 100 mL/min

Equilibrator Water Flow Rate (L/min): 3 L/min

Equilibrator Vented: Yes

Equilibration Comments:

Drying Method: Thermoelectric condensor; Perma Pure (Naphion); magnesium perchlorate. 90% dry

**Aqueous CO2
Sensor Details**

Measurement Method: IR

Method details: Infrared absorption of dry sample gas

Manufacturer: Licor

Model: Licor 7000, Serial number IRG4-0560

Measured CO2 Values: xCO2(dry)

Measurement Frequency: Every 120 seconds

Aqueous CO2 Accuracy: 1 uatm

Aqueous CO2 Precision: 2 uatm

Sensor Calibrations: The sampling and analyzing methods of the Neill/General Oceanics Underway pCO2 systems are described in detail in: Pierrot, D.; Neill, C.; Sullivan, K.; Castle, R.; Wanninkhof, R.; Luger, H.; Johannessen, T.; Olsen, A.; Feely, R.A.; and Cosca, C.E. (2009). Recommendations for autonomous underway pCO2 measuring systems and data-reduction routines. Deep-Sea Res., II, v. 56, pp. 512-522.

Calibration of Calibration Gases: Mooring

Number Non-Zero Gas Standards: 4

Calibration Gases:

LL83535, 246.77 ppm;

LL108050, 399.22 ppm;

LL108059, 496.103 ppm;

LL154371, 628.59 ppm

Frequency of calibration: every 7 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: Hart Scientific model 1521 digital thermometer, serial number A77488, with an NIST traceable model 5610 thermistor probe, serial number A690613. Accurate to $\pm 0.01^{\circ}\text{C}$.

Manufacturer: Hart Scientific

Model: Hart Scientific model 1521 digital thermometer, serial number A77488, with an NIST traceable model 5610 thermistor probe, serial number A690613.

Accuracy: 0.015 ($^{\circ}\text{C}$ if units not given)

Precision: 0.001 ($^{\circ}\text{C}$ if units not given)

Calibration: Factory calibrated

Comments: Hart Scientific model 1521 digital thermometer, serial number A77488, with an NIST traceable model 5610 thermistor probe, serial number A690613. Accurate to $\pm 0.01^{\circ}\text{C}$.

**Equilibrator
Pressure Sensor**

Location: Inside equilibrator

Manufacturer: Setra

Model: Setra 239 differential pressure transducer

Accuracy: 0.052 (hPa if units not given)

Precision: 0.01 (hPa if units not given)

Calibration: Factory calibrated

Comments: Setra 239 differential pressure transducer, accurate to ± 0.15 hPa. The equilibrator was passively vented to a secondary equilibrator, and the Licor sample output was vented to the laboratory when CO₂ measurements were made, thus equilibrator headspace pressure was assumed to be laboratory pressure. Pressure in the laboratory was measured with a GE Druck barometer, serial number 3013024, with an accuracy of ± 0.01 %fs.

**Additional
Information**

Suggested QC flag from Data Provider: NB

Additional Comments:

Citation for this Dataset:

Cosca, Catherine E.; Feely, Richard A.; Alin, Simone R. (2016). Partial pressure of carbon dioxide (pCO₂), temperature, salinity and other variables collected from surface underway observations using shower head equilibrator, carbon dioxide gas detector, and other instruments from 4 trans-Pacific crossings onboard container ship Cap Blanche in the Pacific Ocean from 2015-03-28 to 2015-12-04 (NCEI Accession 0141304)

Other References for this Dataset:

NCEI Accession 0141304