

Dataset Expocode 08D820180810

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Campaign/Cruise **Expocode:** 08D820180810
Campaign/Cruise Name: VA201809
Campaign/Cruise Info: DiPlamCC
Platform Type:
CO2 Instrument Type: Equilibrator-IR or CRDS or GC
Survey Type: Research Cruise
Vessel Name: Víctor Angelescu
Vessel Owner: Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP)-Argentina
Vessel Code: 08D8

Coverage **Start Date (yyyymmdd):** 20180810
End Date (yyyymmdd): 20180810
Westernmost Longitude: 57.5 W
Easternmost Longitude: 57.1 W
Northernmost Latitude: 38 S
Southernmost Latitude: 38.4 S
Port of Call: Mar del Plata

Variable **Name:** xCO2_EQU_ppm
Unit: ppm
Description: Mole fraction of CO2 in the equilibrator headspace (dry) at equilibrator temperature (ppm)

Variable **Name:** xCO2_ATM_ppm
Unit: ppm

Description: Mole fraction of CO₂ measured in dry outside air (ppm)

Variable

Name: xCO₂_ATM_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_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: In the machine room, about 1.5 m after the intake which is directly through the ship's hull, before the SW pump.

Manufacturer: Seabird, Inc.

Model: SBE 38

Accuracy: 0.001 (°C if units not given)

Precision: 0.0003 (°C if units not given)

Calibration: Factory calibration

Comments: Manufacturer's Resolution is taken as Precision.

Sea Surface Salinity

Location: Near the pCO₂ System.

Manufacturer: Seabird
Model: SBE 45
Accuracy: ± 0.005 o/oo
Precision: 0.0002 o/oo
Calibration: Factory calibration
Comments: Manufacturer's Resolution is taken as Precision.

Atmospheric Pressure

Location: It is located on the bridge visor, on the bow
Normalized to Sea Level: Yes
Manufacturer: Vaisala
Model: PTB210A1A1B
Accuracy: 0.25 (hPa if units not given)
Precision: 0.01 (hPa if units not given)
Calibration: march 2017
Comments: Located in the Deck box inside a room connected to the pressure port by a flexible tube

Atmospheric CO2

Measured/Frequency: Yes
Intake Location: lighth mast at the bow on the starboard side
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 μ atm in fCO2_ATM
Atmospheric CO2 Precision: ± 0.01 μ atm in fCO2_ATM

Aqueous CO2 Equilibrator Design

System Manufacturer:
Intake Depth: 5 meters
Intake Location: Bow
Equilibration Type: Spray head above dynamic pool
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 μ atm in fCO2_SW
Aqueous CO2 Precision: ± 0.01 μ atm in fCO2_SW
Sensor Calibrations:
Calibration of Calibration Gases: The analyzer is calibrated every 5 hours with field standards that in turn were calibrated with primary standards that are directly traceable to the WMO X2007 scale. The zero gas is ultra-high purity air.
Number Non-Zero Gas Standards: 3
Calibration Gases:

Std 1: EKZTPF4, 0.00 ppm, owned by INIDEP, used every ~4.5 hours.
Std 2: AOL3540, 201.26 ppm, owned by INIDEP, used every ~3.0 hours.
Std 3: AO5260H, 399.68 ppm, owned by INIDEP, used every ~3.0 hours.
Std 4: AOCCEL7, 598.18 ppm, owned by INIDEP, used every ~4.5 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: 1523

Accuracy: 0.015 (°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. The differential pressure reading from Setra 239, which is attached to the equilibrator headspace, is added to the pressure reading from the LICOR analyzer, which is measured by an external Setra 270 connected to the exit of the analyzer.

Manufacturer: Setra

Model: 270

Accuracy: 0.15 (hPa if units not given)

Precision: 0.015 (hPa if units not given)

Calibration: Factory calibration

Comments: Manufacturer's Resolution is taken as Precision.

**Additional
Information**

Suggested QC flag from Data Provider: NA

Additional Comments: The analytical system operated well during this cruise. SBE38 and SBE45 were started late and stopped early. Data flagged 4 Filter changed in the middle of the cruise. Flow was stopped for a while. DeltaT changed during the cruise probably because of the filter getting loaded and flow slowing down. Time offset calculated to be 2.50 at the beginning. That value was used. . Full unprocessed data files from analytical instrument including flow information and TSG data at time of sampling can be obtained upon request to INIDEP.

Citation for this Dataset:

Other References for this Dataset: