

<b>Dataset Expocode</b>	<b>08D820180810</b>
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<b>Dataset</b>	<b>Funding Info:</b> Programa Dinámica del Plancton Marino y Cambio Climático (DiPlaMCC) -INIDEP; Pier2Peer-GOA-ON <b>Initial Submission (yyyymmdd):</b> 20210114 <b>Revised Submission (yyyymmdd):</b>
<b>Campaign/Cruise</b>	<b>Expocode:</b> 08D820180810 <b>Campaign/Cruise Name:</b> VA201809 <b>Campaign/Cruise Info:</b> DiPlaMCC <b>Platform Type:</b> <b>CO2 Instrument Type:</b> Equilibrator-IR or CRDS or GC <b>Survey Type:</b> Research Cruise <b>Vessel Name:</b> Víctor Angelescu <b>Vessel Owner:</b> Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP)-Argentina <b>Vessel Code:</b> 08D8
<b>Coverage</b>	<b>Start Date (yyyymmdd):</b> 20180810 <b>End Date (yyyymmdd):</b> 20180810 <b>Westernmost Longitude:</b> 57.5 W <b>Easternmost Longitude:</b> 57.1 W <b>Northernmost Latitude:</b> 38 S <b>Southernmost Latitude:</b> 38.4 S <b>Port of Call:</b> Mar del Plata
<b>Variable</b>	<b>Name:</b> xCO2_EQU_ppm <b>Unit:</b> ppm <b>Description:</b> Mole fraction of CO2 in the equilibrator headspace (dry) at equilibrator temperature (ppm)
<b>Variable</b>	<b>Name:</b> xCO2_ATM_ppm <b>Unit:</b> ppm

**Description:** Mole fraction of CO<sub>2</sub> measured in dry outside air (ppm)

**Variable**

**Name:** xCO<sub>2</sub>\_ATM\_interpolated\_ppm

**Unit:** ppm

**Description:** Mole fraction of CO<sub>2</sub> in outside air associated with each water analysis. These values are interpolated between the bracketing averaged good xCO<sub>2</sub>\_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:** fCO<sub>2</sub>\_SW@SST\_uatm

**Unit:** μatm

**Description:** Fugacity of CO<sub>2</sub> in sea water at SST and 100% humidity (μatm)

**Variable**

**Name:** fCO<sub>2</sub>\_ATM\_interpolated\_uatm

**Unit:** μatm

**Description:** Fugacity of CO<sub>2</sub> in air corresponding to the interpolated xCO<sub>2</sub> at SST and 100% humidity (μatm)

**Variable**

**Name:** dfCO<sub>2</sub>\_uatm

**Unit:** μatm

**Description:** Sea water fCO<sub>2</sub> minus interpolated air fCO<sub>2</sub> (μatm)

**Variable**

**Name:** WOCE\_QC\_FLAG

**Unit:** None

**Description:** Quality control flag for fCO<sub>2</sub> values (2=good, 3=questionable)

**Variable**

**Name:** QC\_SUBFLAG

**Unit:** None

**Description:** Quality control subflag for fCO<sub>2</sub> 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 pCO<sub>2</sub> System.

**Manufacturer:** Seabird  
**Model:** SBE 45  
**Accuracy:**  $\pm 0.005$  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:** light mast at the bow on the starboard side  
**Drying Method:** Gas stream passes through a thermoelectric condenser ( $\sim 5^\circ\text{C}$ ) and then through a Perma Pure (Nafion) dryer before reaching the analyzer (90% dry).  
**Atmospheric CO2 Accuracy:**  $\pm 0.5$   $\mu\text{atm}$  in fCO<sub>2</sub>\_ATM  
**Atmospheric CO2 Precision:**  $\pm 0.01$   $\mu\text{atm}$  in fCO<sub>2</sub>\_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 ( $\sim 5^\circ\text{C}$ ) 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 CO<sub>2</sub> sensing (not required)  
**Manufacturer:** LI-COR  
**Model:** 7000  
**Measured CO2 Values:** xCO<sub>2</sub>(dry)  
**Measurement Frequency:** Every 140 seconds, except during calibration  
**Aqueous CO2 Accuracy:**  $\pm 2$   $\mu\text{atm}$  in fCO<sub>2</sub>\_SW  
**Aqueous CO2 Precision:**  $\pm 0.01$   $\mu\text{atm}$  in fCO<sub>2</sub>\_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 pCO<sub>2</sub> 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:**