

Cruise: SKO1501
Ship: Skogafoss
Expo Code: AGFO20141217
Dates: December 12th, 2014 – January 15th, 2015
Chief Scientist: Dr. Denis Pierrot
Equipment: TSG-Flow thru system
Total number of stations: 9
Location: Iceland to Argentina

Sample Collection

The discrete samples were collected from the TSG-flow thru system onboard the ship of opportunity Skogafoss by Benjamin Rumeau. The date and time listed in the data file are UTC when each sample bottle was collected.

DIC:

9 locations, 9 samples each 500-ml, no duplicate samples.
Sample_ID#: 61, etc.; Sample bottle number
PI: Dr. Rik Wanninkhof
Analyzed by: Charles Featherstone

pH:

9 locations, 9 samples each 500-ml, no duplicate samples.
Sample_ID#: 61, etc.; Sample bottle number
PI: Dr. Rik Wanninkhof
Analyzed by: Charles Featherstone

Talk:

9 locations, 9 samples each 500-ml, no duplicate samples.
Sample_ID#: 61, etc.; Sample bottle number
PI: Dr. Rik Wanninkhof
Analyzed by: Dr. Leticia Barbero, Dr. Denis Pierrot and Charles Featherstone

Sample Analysis

DIC:

Instrument ID	Date	Certified CRM ($\mu\text{mol/kg}$)	CRM Value ($\mu\text{mol/kg}$)	CRM Offset ($\mu\text{mol/kg}$)	Blank (Counts)	Avg. Sample Analysis Time
AOML 4	03/05/2015	2016.65	2020.35	3.70	30.0	16

Analysis date: 03/05/2015
Coulometer used: DICE-CM5015- AOML 4
Blanks: 18.2, 30.0 counts/min
CRM # 0758 was used and with an assigned value of (includes both DIC and salinity):

Batch 129, c: 2016.65 $\mu\text{mol/kg}$, S: 33.361

CRM values measured: AOML 4: offset 3.70 $\mu\text{mol/kg}$ (2020.35 $\mu\text{mol/kg}$).

Average run time, minimum run time, maximum run time: 16, 11 and 19 min.

Reproducibility: (# samples and average difference): No duplicate samples were collected.

CRM, salinity and HgCl_2 correction applied: Salinity correction was applied using TSG salinity.

Remarks

The volume correction was applied due to added HgCl_2 (Measured DIC*1.00037).
The first CRM of each cell was used for a CRM correction.

The DIC instruments were stable: the gas loop and CRM values did not change significantly throughout the life span of each cell. The end blank (AOML 4 =33.4) slightly higher at the end of sample analysis.

The blank on AOML 4 (03/05/2015) was raised from 18.2 to 30.0 before running the CRM.

The samples were analyzed using the DICE (AOML 4) and a new coulometer from UIC, Inc. CM5015 with CM5011 emulation software.

pH:

Analysis date: 03/05/2015

Spectrophotometer used: HP Agilent 8453

Reproducibility: (# samples and average difference): No duplicates were collected.

Remarks

The equations of Liu et al, 2011 formulated using the purified m-cresol purple indicator was used to determine pH of the samples. pH samples were analyzed at 20⁰C at Full Scale (pH 0-14).

Temperature for each sample was measured before analysis using a Hart Scientific Fluke 1523 reference thermometer.

Approximately 80 mL of sample was extracted from each DIC sample bottle by syringe before DIC analysis to determine the pH.

TAlk:

The results posted are analyses from the same sample bottles used for DIC and pH.

Analysis dates: 03/10/2015

Titration system used: Open cell

CRM batch: 129, S = 33.361, certified TA = 2237.32 $\mu\text{mol/kg}$

2 CRM samples were run on the cell, before and after the seawater samples. The TA for the water samples was corrected using the averaged ratios between the certified and measured values of the 2 CRMs run on the cell. The following table shows the CRM measurements for the cell.

Cell System	Date	Time	Bottle #	TA	ΔCRM
2	3/10/2015	09:59:22	533	2214.91	
2	3/10/2015	16:26:57	601	2214.36	0.55

Reproducibility: No duplicates were collected.

Remarks

The system behaved well during the analyses.

Comments

The latitude, longitude, date, and time reported with the DIC, pH and TAlk measurements were taken from the sample field log. The field log values are provided for reference; no post-cruise assurance of accuracy has been done to this data.

Exact salinity values were not recorded at the time of sampling. Values have been extracted from the TSG values available in the underway pCO₂ file. The salinity used is an average of the values measured between the start and end time of sampling, which ranged from 10 to 45 minutes. Thus, salinity is approximated. However, based on the actual salinity values measured and the standard deviations during the sampling periods, the averaged salinity is considered appropriate for the DIC, and TA calculations.

The Sample ID is the sample station, cast number and Niskin bottle number for the discrete samples.

UPDATE:

Between March and June of 2021, all of the data for the discrete samples was put into a uniform format. The supporting information was checked for accuracy, especially the expocode, date, time, and positions.

Additionally, pH results were recalculated to 20 and 25 degrees Celsius.