Cruise: EQNX_20150428
Ship: Equinox
Expocode: MLCE20150428
Dates: April 28th, 2015 – May 6th, 2015
Chief Scientist: Dr. Denis Pierrot
Equipment: TSG-Flow thru system
Total number of stations: 35
Location: Ft. Lauderdale, FL to Lisbon, Portugal

Sample Collection

The discrete samples were collected from the TSG-flow thru system onboard the ship of opportunity Royal Caribbean Equinox by Dr. Denis Pierrot. The date and time listed in the data file are UTC when each sample bottle was collected.

DIC:
35 locations, 40 samples each 500-ml, 5 duplicate samples.
Sample_ID#: 301, etc.; Sample bottle number
PI: Dr. Rik Wanninkhof
Analyzed by: Robert Castle

TAlk:
35 locations, 40 samples each 500-ml, 5 duplicate samples.
Sample_ID#: 301, etc.; Sample bottle number
PI: Dr. Rik Wanninkhof
Analyzed by: Dr. Leticia Barbero and Dr. Denis Pierrot

Sample Analysis
DIC:

Instrument ID	Date	Certified CRM (µmol/kg)	CRM Value (µmol/kg)	CRM Offset (µmol/kg)	Blank (Counts)	Avg. Sample Analysis Time
AOML 3	07/26/2015	2031.53	2031.34	0.19	30.0	8
AOML 3	07/26/2015	2031.53	2030.74	0.79	24.0	10

Analysis date: 07/26/2015
Coulometer used: DICE–CM5015- AOML 3
Blanks: 12.0 counts/min and raised to 30.0 counts/min before CRM analysis
CRM # 889 was used and with an assigned value of (includes both DIC and salinity):
Batch 144, c: 2031.53 µmol/kg, S: 33.571
CRM values measured: AOML 3: offset 0.19 µmol/kg (2031.34 µmol/kg).
Average run time, minimum run time, maximum run time: 8, 8 and 10 min.

Analysis date: 07/26/2015
Coulometer used: DICE–CM5015- AOML 3
Blanks: 12.0 counts/min and raised to 24.0 counts/min before CRM analysis
CRM # 889 was used and with an assigned value of (includes both DIC and salinity):
Batch 144, c: 2031.53 µmol/kg, S: 33.571
CRM values measured: AOML 3: offset 0.79 µmol/kg (2030.74 µmol/kg).
Average run time, minimum run time, maximum run time: 10, 9 and 12 min.

Reproducibility: (# samples and average difference): 5 sets of duplicate samples, average difference 1.96 µmol/kg (0.00-4.34), average STDEV of 1.39 (0.00-3.07).

Instrument ID	Sample ID	Bottle #	Corrected DIC (µmol/kg)	Average	Difference	STDEV
AOML3	1	1	2034.70			
AOML3	2	2	2039.04	2036.87	4.34	3.07
AOML3	6	6	2063.58			
AOML3	7	7	2064.88	2064.23	1.30	0.92
AOML3	19	19	2087.01			
AOML3	20	20	2087.01	2087.01	0.00	0.00
AOML3	28	28	2093.09			
AOML3	29	29	2093.63	2093.36	0.54	0.38
AOML3	30	30	2094.18			
AOML3	31	31	2097.82	2096.00	3.64	2.57
Average					1.96	1.39

CRM, salinity and HgCl2 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 samples were analyzed using the DICE (AOML 3) and a new coulometer from UIC, Inc. CM5015 with CM5011 emulation software.

Duplicates were sampled 3 to 5 minutes apart from the ships TSG flow thru system.

TAlk:

The results posted are duplicate analyses from the same sample bottles used for DIC.
Analysis dates: 07/29/2015 – 07/30/2015
Titration system used: Open cell
CRM batch: 129, S = 33.361, certified TA = 2237.32 µmol/kg

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

Cell System	Date	Time	Bottle #	TA	|ΔCRM|
1	07/29/15	11:03:14	289	2227.13	
1	07/29/15	17:57:49	868	2232.75	6.62
1	07/30/15	10:55:22	43	2224.34	
1	07/30/15	19:55:07	95	2227.56	3.22
2	07/29/15	11:06:02	289	2218.82	
2	07/29/15	17:56:47	868	2222.51	3.69
2	07/30/15	10:49:05	43	2219.71	
2	07/30/15	19:48:25	95	2221.13	1.42
				Average	3.49
				Std. Dev.	1.73

Reproducibility: 5 sets of duplicate samples were run in the same cell, with an average absolute difference of 1.67 µmol/kg (0.31-3.32), and a Standard Deviation of 1.10.

Bottle #	System	Date	Time	S	TA	|Difference|	Comments
1	1	6/2/2014	16:07:29	35.218	2370.61	3.32	
2	1	6/2/2014	17:01:03	35.218	2373.93		
6	1	6/3/2014	15:42:16	33.372	2396.51	1.23	
7	1	6/3/2014	16:07:07	33.372	2395.28		

19	1	6/4/2014	12:52:22	32.532	2388.41	0.31
20	1	6/4/2014	13:39:37	32.532	2388.10	
28	1	3/6/2014	16:58:56	32.892	2361.64	1.88
29	1	3/6/2014	17:21:40	32.892	2359.76	
30	1	3/6/2014	16:58:56	32.892	2368.39	1.59
31	1	3/6/2014	17:21:40	32.892	2366.80	

Average	1.67
Std. Dev.	1.10

Remarks

The two systems behaved correctly during the analyses.
Duplicates were sampled 3 to 5 minutes apart from the ships TSG flow thru system.

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.

The Sample ID is the sample bottle number for these underway 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.
The ship code in the Expocode was corrected (EQNX => MLCE).