Cruise: HB1502
Ship: R/V H. Bigelow
Expo Code: 33HH20150519
Dates: May 19th, 2015 – June 3rd, 2015
Chief Scientist:
Equipment: CTD rosette
Total number of stations: 69
Location: U.S. Mid-Atlantic and New England coastal region

The samples were run for Dr. Jon Hare of the NEFSC as part of our coastal ocean acidification monitoring project.

Sample Collection

The discrete samples were collected from Niskin bottles attached to a 24 bottle configured rosette and the flow thru system onboard the ship by Christopher Taylor. The date and time listed in the data file are UTC when each sample bottle was collected.

DIC:
69 locations, 75 samples each 500-ml, 6 sets of duplicate samples.
Sample_ID#: 140112, etc.; Station, cast number and Niskin bottle number
PI: Dr. Rik Wanninkhof
Analyzed by: Robert Castle

TAlk:
69 locations, 75 samples each 500-ml, 6 sets of duplicate samples.
Sample_ID#: 140112, etc.; Station, cast number and Niskin 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	07/25/2015	2031.53	2032.83	1.30	20.0	11
AOML 4	07/25/2015	2031.53	2029.38	2.15	12.0	10

Analysis date: July 25th, 2015
Coulometer used: DICE–CM5015- AOML 3
Blanks: 18.7 and 20.0 counts/min
CRM # 40 was used and with an assigned value of (include both DIC and salinity): Batch 144, c: 2031.53 µmol/kg, S: 33.571
CRM value measured: AOML 3: offset 1.30 µmol/kg (2032.83 µmol/kg).

Average run time, minimum run time, maximum run time: 11, 8 and 17 min.

Analysis date: July 25th, 2015
Coulometer used: DICE–CM5015- AOML 4
Blanks: 12 counts/min
CRM # 99 was used and with an assigned value of (include both DIC and salinity): Batch 144, c: 2031.53 µmol/kg, S: 33.571
CRM value measured: AOML 4: offset 2.15 µmol/kg (2029.38 µmol/kg).
Average run time, minimum run time, maximum run time: 10, 8 and 16 min.

Reproducibility: (# samples and average difference): 6 sets of duplicate samples, average difference 0.83 µmol/kg (0.14-1.85), average STDEV of 0.59 (0.10-1.31).

Instrument	Sample ID	DIC (umol/kg)	Average	STDEV	Difference
AOML3	70212	2074.04			
AOML3	70212	2073.74	2073.89	0.21	0.30
AOML3	140403	2182.90			
AOML3	140403	2181.06	2181.98	1.31	1.85
AOML4	250612	2030.15			
AOML4	250612	2031.79	2030.97	1.16	1.63
AOML3	381002	2084.15			
AOML3	381002	2084.85	2084.50	0.49	0.69
AOML3	671406	2055.42			
AOML3	671406	2055.28	2055.35	0.10	0.14
AOML3	801602	2054.56			
AOML3	801602	2054.92	2054.74	0.26	0.36
Average				0.59	0.83

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 samples were analyzed using the DICE (AOML 3 and 4) and a new coulometer from UIC, Inc. CM5015 with CM5011 emulation software.

TAlk:

The results posted are duplicate analyses from the same sample bottles used for DIC and pH.
Analysis dates: 07/30/2015 – 07/31/2015
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	7/30/2015	10:55:22	43	2224.34	
1	7/30/2015	19:55:07	95	2227.56	3.22
1	7/31/2015	12:09:47	400	2224.23	
1	7/31/2015	18:31:24	340	2225.89	1.66
2	7/30/2015	10:49:05	43	2219.71	
2	7/30/2015	19:48:25	95	2221.13	1.42
2	7/31/2015	11:57:45	400	2215.57	
2	7/31/2015	18:44:09	340	2220.23	4.66
				Average	2.74
				Std. Dev.	1.51

Reproducibility: 6 sets of duplicate samples were run, with an average absolute difference of 2.36 µmol/kg (0.42-3.81), and a Standard Deviation of 1.33.

Bottle #	System	Date	Time	S	TA	|Difference|	Comments
3	2	7/30/2015	12:35:11	35.843	2360.33	3.81	
4	2	7/30/2015	13:09:46	35.843	2364.14		
5	2	7/30/2015	13:37:21	35.0463	2314.34	2.07	

8	1	7/30/2015	14:07:09	35.0463	2316.41	
11	1	7/30/2015	14:52:13	34.2722	2284.73	0.42
12	1	7/30/2015	15:12:35	34.2722	2285.15	
19	2	7/30/2015	16:02:51	33.9325	2259.66	3.40
22	1	7/30/2015	16:51:18	33.9325	2263.06	
33	2	7/30/2015	18:20:26	33.007	2225.54	2.11
35	2	7/30/2015	18:43:50	33.007	2227.65	
39	2	7/30/2015	19:24:20	32.8594	2213.00	2.86
42	1	7/31/2015	12:27:34	32.8594	2215.86	
					Average	2.36
					Std. Dev.	1.33

Remarks

The two systems behaved well during the analyses. The fact that the duplicates were run on different systems/days did not appear to have a significant impact on results.

Comments

The latitude, longitude and salinity reported with the DIC and TAlk measurements were taken from the Niskin bottle 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 station, cast number and Niskin bottle number for the discrete samples.

The DIC instruments were stable: the gas loop and CRM values did not change significantly through out the life span of each cell. Also cells from separate days gave calibration values of similar magnitude.

The blank (AOML 3) on 07-25-2015 was raised from 18.7 to 20 mid way thru analysis.

The Niskin bottles are approximately one half meter above the CTD sensors on the rosette. Therefore, Temp and Sal are bin-averaged CTD values representing the next shallower depth from that recorded by the CTD (CTD Depth) at the time the Niskin bottles were fired with the exception of the surface values, which are the same as the CTD Depth values (as per the log sheet).

The carbon data has been merged with nutrient data from the same cruise, provided by Dr. Jon Hare's group.

The following nutrient columns have been added :

Date_UTC, Depth_station, Depth_sampling, CTDPRS, CTDOXY, CTDOXYMOL, SILCAT, NITRIT+NITRAT, AMMONIA, PHSPHT and Chlorophyll Fluorescence(µg/L)

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.