Supplementary Material

1 Supplementary Data

Supplementary data are included within the supplementary tables presented herein.

2 Supplementary Figures and Tables

Below we provide supplementary data tables of our measured (Table S1) and modeled (Table S2) data. A summary of regression statistics for DIC isotopes ($\delta^{13}C$, $\Delta^{14}C$) vs salinity and potential density are provided in Tables S3-5. Finally, we provide two multi-panel figures of these least squares linear regressions for all stations.

2.1 Supplementary Tables

Supplementary Table 1: Summary of measured data from the CCGS *Amundsen* in July 2019. Temperature, potential temperature, salinity, potential density anomaly, and dissolved oxygen data are from sensors on the CTD rosette. Nitrate measurements were conducted at Université Laval (±1 µmol/kg). Dissolved inorganic carbon (DIC) and total alkalinity (TA) concentrations had errors of ± 7.76 µmol/kg (n = 24) and ± 14.27 µmol/kg (n = 24), respectively. DIC $\delta^{13}C$ values (‰) measured at the Ján Veizer Stable Isotope Laboratory with an external precision of ±0.1‰. Fraction modern, $\Delta^{14}C$, and ^{14}C ages measured at the Keck Carbon Cycle AMS facility at the University of California. True DIC $\Delta^{14}C$ sample bottle replicates indicated by (†).

Station	Latitude °N	Longitude °W	Depth m	Temp °C	θ °C	Salinity	σ_0 Kg/m^3	Nitrate µmol/kg	DO µmol/kg	A_T µmol/kg	DIC µmol/kg	$\delta^{13}C$ ‰	UCIAMS #	Fraction Modern	±	$\Delta^{14}C$ ‰	± ‰	^{14}C Age Years	± Years
193	66 46.18	59 20.41	787	1.00	1.03	34.50	27.64	643	194	2275	2210	-0.12	236301	1.0004	0.0012	-7.9	1.2	0	15
193	66 46.18	59 20.41	592	1.48	1.46	34.50	27.61	628	207	2261	2206	-0.13	236302	1.0135	0.0013	5.1	1.3	Modern	
193†	66 46.18	59 20.41	393	2.97	2.75	34.55	27.53	557	239	2277	2180	0.01	236303	1.0270	0.0013	18.5	1.3	Modern	
													236304	1.0238	0.0013	15.3	1.3	Modern	
193	66 46.18	59 20.41	196	4.35	4.65	34.61	27.44	499	264	2279	2155	0.07	236305	1.0257	0.0013	17.2	1.3	Modern	
193	66 46.18	59 20.41	98	-0.85	-0.81	33.57	26.99	227	316	2234	2133	0.47	236306	1.0291	0.0013	20.5	1.3	Modern	
193	66 46.18	59 20.41	48	-1.26	-1.35	33.16	26.67	332	285	2233	2152	0.21	236307	1.0246	0.0013	16.0	1.3	Modern	
193	66 46.18	59 20.41	18	2.80	3.29	32.83	26.17	21	349	2199	2015	1.47	236308	1.0242	0.0014	15.7	1.4	Modern	
193	66 46.18	59 20.41	3	-0.07	-0.28	30.40	24.40	9	360	2106	1979	1.06	236312	1.0161	0.0016	7.6	1.6	Modern	
196	66 59.21	56 03.57	97	1.38	1.43	33.75	27.01	220	308	2234	2119	0.46	236313	1.0290	0.0014	20.4	1.4	Modern	
196	66 59.21	56 03.57	48	1.68	1.70	33.68	26.93	180	311	2234	2114	0.43	236314	1.0255	0.0016	17.0	1.6	Modern	
196	66 59.21	56 03.57	18	2.56	3.39	33.59	26.80	79	323	2233	2081	0.70	236315	1.0314	0.0014	22.9	1.4	Modern	
196†	66 59.21	56 03.57	4	3.98	3.80	33.49	26.59	4	331	2198	2052	1.03	236316	1.0272	0.0014	18.7	1.4	Modern	
													236317	1.0285	0.0013	20.0	1.3	Modern	
BB15	68 27.08	55 53.99	394	3.67	3.65	34.57	27.48	544	246	2305	2171	-0.13	236318	1.0247	0.0015	16.2	1.5	Modern	
BB15	68 27.08	55 53.99	197	3.02	3.00	34.36	27.37	520	252	2284	2164	-0.09	236319	1.0277	0.0014	19.2	1.4	Modern	
BB15	68 27.08	55 53.99	98	0.92	0.85	33.92	27.18	436	267	2252	2158	-0.22	236320	1.0257	0.0014	17.2	1.4	Modern	
BB15	68 27.08	55 53.99	48	-0.18	-0.22	33.62	27.00	70	348	2251	2089	0.35	236321	1.0279	0.0017	19.4	1.7	Modern	
BB15	68 27.08	55 53.99	18	5.05	5.35	33.54	26.51	0	316	2259	2015	1.31	236322	1.0270	0.0016	18.5	1.6	Modern	
BB15	68 27.08	55 53.99	3	5.76	5.59	33.54	26.43	0	305	2256	2021	1.32	236323	1.0245	0.0020	15.9	2.0	Modern	
BB18	70 05.40	52 44.40	396	1.85	1.82	34.26	27.39	549	232	2284	2182	-0.30	240010	1.0247	0.0017	16.2	1.7	Modern	
BB18	70 05.40	52 44.40	196	1.28	1.29	34.03	27.24	507	250	2266	2173	-0.22	240011	1.0254	0.0016	16.9	1.6	Modern	
BB18	70 05.40	52 44.40	98	0.68	0.70	33.72	27.04	446	268	2242	2141	-0.18	240012	1.0262	0.0017	17.6	1.7	Modern	
BB18	70 05.40	52 44.40	48	0.86	0.89	33.32	26.70	349	279	2225	2114	0.05	240013	1.0301	0.0016	21.6	1.6	Modern	
BB18†	70 05.40	52 44.40	19	1.21	1.43	32.70	26.18	265	302	2192	2038	0.30	240014	1.0280	0.0016	19.4	1.6	Modern	
													240019	1.0283	0.0018	19.7	1.8	Modern	
BB18	70 05.40	52 44.40	3	4.39	NaN	31.06	24.61	0	381	2092	1814	1.90	240020	1.0266	0.0016	18.1	1.6	Modern	
227†	70 47.81	56 59.27	394	2.16	2.13	34.51	27.57	603	215	2284	2192	-0.39	237416	1.0230	0.0017	14.5	1.7	Modern	
													237417	1.0229	0.0017	14.4	1.7	Modern	
227	70 47.81	56 59.27	197	1.76	1.82	34.22	27.36	542	240	2243	2167	-0.28	237418	1.0274	0.0015	18.8	1.5	Modern	
227	70 47.81	56 59.27	98	0.21	0.32	33.83	27.15	461	265	2246	2160	-0.09	237419	1.0263	0.0016	17.7	1.6	Modern	
227	70 47.81	56 59.27	48	-0.61	-0.66	33.63	27.02	313	296	2241	2138	0.44	237420	1.0293	0.0016	20.8	1.6	Modern	

227	70 47.81	56 59.27	19	5.40	5.47	33.34	26.32	0	309	2230	2062	1.41	237421	1.0272	0.0014	18.6	1.4	Modern	
227	70 47.81	56 59.27	4	5.41	5.46	33.34	26.31	0	309	2282	2020	1.40	237422	1.0288	0.0016	20.2	1.6	Modern	
224	70 25.20	62 56.71	1969	-0.30	-0.40	34.50	27.72	857	111	2287	2276	-0.68	237436	0.9181	0.0013	-89.5	1.3	685	15
224	70 25.20	62 56.71	1773	-0.26	-0.35	34.49	27.71	841	116	2292	2270	-0.43	237437	0.9210	0.0013	-86.7	1.3	660	15
224	70 25.20	62 56.71	1576	-0.12	-0.20	34.49	27.70	816	122	2281	2263	-0.43	237438	0.9257	0.0013	-82.0	1.3	620	15
224	70 25.20	62 56.71	1380	0.15	0.08	34.49	27.69	779	136	2285	2250	-0.52	237439	0.9344	0.0015	-73.4	1.5	545	15
224	70 25.20	62 56.71	1183	0.49	0.44	34.49	27.67	711	161	2281	2230	-0.43	237440	0.9554	0.0014	-52.6	1.4	365	15
224†	70 25.20	62 56.71	986	0.80	0.75	34.49	27.65	662	186	2276	2217	-0.27	237441	0.9857	0.0015	-22.5	1.5	115	15
													237442	0.9862	0.0015	-22.0	1.5	110	15
224†	70 26.44	62 56.71	789	1.30	1.28	34.52	27.64	644	194	2276	2211	-0.11	237423	1.0013	0.0015	-7.0	1.5	Modern	
													237425	1.0046	0.0015	-3.7	1.5	Modern	
224	70 26.44	62 56.71	592	1.69	1.77	34.52	27.61	612	210	2284	2200	-0.11	237426	1.0159	0.0014	7.5	1.4	Modern	
224	70 26.44	62 56.71	394	1.87	1.84	34.43	27.53	576	224	2281	2191	-0.14	237427	1.0282	0.0015	19.6	1.5	Modern	
224	70 26.44	62 56.71	197	-0.61	-0.50	33.78	27.15	459	262	2252	2172	-0.08	237428	1.0266	0.0014	18.1	1.4	Modern	
224	70 26.44	62 56.71	98	-1.67	-1.69	33.13	26.66	335	301	2248	2155	0.26	237429	1.0238	0.0013	15.3	1.3	Modern	
224	70 26.44	62 56.71	48	-1.66	-1.66	32.90	26.47	229	322	2243	2148	0.39	237430	1.0165	0.0015	8.1	1.5	Modern	
224	70 26.44	62 56.71	19	-1.36	-1.34	32.41	26.07	180	346	2236	2133	0.34	240021	1.0162	0.0018	7.7	1.8	Modern	
224	70 26.44	62 56.71	3	0.00	NaN	29.68	23.81	3	362	2096	1962	0.69	237432	1.0172	0.0015	8.7	1.5	Modern	
BB2†	72 44.94	66 59.69	2262	-0.30	-0.42	34.50	27.72	NaN	112	2285	2279	-0.29	236333	0.9169	0.0013	-90.7	1.3	695	15
													236334	0.9184	0.0012	-89.2	1.2	685	15
BB2	72 44.94	66 59.69	1968	-0.30	-0.40	34.49	27.72	830	117	2302	2273	-0.27	236335	0.9186	0.0013	-89.1	1.3	680	15
BB2	72 44.94	66 59.69	1772	-0.23	-0.31	34.49	27.71	819	120	2285	2256	-0.36	236338	0.9234	0.0011	-84.3	1.1	640	15
BB2	72 44.94	66 59.69	1576	-0.03	-0.10	34.49	27.70	791	127	2298	2258	-0.30	236339	0.9279	0.0012	-79.9	1.2	600	15
BB2	72 44.94	66 59.69	1380	0.36	0.27	34.49	27.68	735	148	2284	2239	-0.25	236340	0.9432	0.0013	-64.6	1.3	470	15
BB2	72 44.94	66 59.69	1183	0.71	0.65	34.49	27.66	671	175	2285	2209	-0.16	236341	0.9726	0.0012	-35.4	1.2	225	15
BB2	72 44.94	66 59.69	986	1.18	1.13	34.51	27.64	651	188	2285	2212	-0.17	236342	0.9892	0.0013	-19.0	1.3	85	15
BB2	72 45.03	66 59.69	789	1.74	1.69	34.53	27.62	621	206	2284	2208	-0.09	236324	1.0142	0.0014	5.7	1.4	Modern	
BB2	72 45.03	66 59.69	592	1.41	1.36	34.43	27.56	578	215	2274	2205	-0.03	236325	1.0291	0.0014	20.6	1.4	Modern	
BB2	72 45.03	66 59.69	394	1.40	1.38	34.36	27.51	599	199	2270	2199	-0.13	236326	1.0281	0.0013	19.6	1.3	Modern	
BB2	72 45.03	66 59.69	197	0.19	0.37	34.00	27.29	519	236	2268	2157	-0.01	236327	1.0295	0.0014	21.0	1.4	Modern	
BB2	72 45.03	66 59.69	98	-1.37	-1.39	33.42	26.89	365	286	2242	2147	0.26	236328	1.0295	0.0013	20.9	1.3	Modern	
BB2	72 45.03	66 59.69	48	-1.68	-1.68	33.04	26.58	293	303	2249	2164	0.24	236329	1.0184	0.0015	10.0	1.5	Modern	
BB2	72 45.03	66 59.69	19	-0.92	-0.47	31.94	25.67	7	385	2228	2098	0.92	236330	1.0142	0.0013	5.8	1.3	Modern	
BB2†	72 45.03	66 59.69	3	2.23	NaN	29.81	23.80	0	336	2069	1937	1.14	236331	1.0153	0.0015	6.8	1.5	Modern	
													236332	1.0130	0.0014	4.6	1.4	Modern	
204†	73 16.11	57 59.97	789	1.27	1.24	34.50	27.63	0	198	2259	2201	-0.15	237455	1.0058	0.0015	-2.5	1.5	Modern	
													237456	1.0032	0.0016	-5.1	1.6	Modern	
204	73 16.11	57 59.97	592	1.49	1.46	34.49	27.60	0	204	2270	2204	-0.04	237457	1.0161	0.0017	7.7	1.7	Modern	
204	73 16.11	57 59.97	396	1.55	1.53	34.40	27.53	282	210	2263	2194	-0.01	237458	1.0180	0.0015	9.6	1.5	Modern	
204	73 16.11	57 59.97	196	0.74	0.71	34.03	27.28	428	233	2258	2180	-0.09	237459	1.0268	0.0015	18.2	1.5	Modern	
204	73 16.11	57 59.97	98	-0.46	-0.47	33.69	27.07	508	264	2233	2179	0.14	237460	1.0301	0.0015	21.6	1.5	Modern	
204	73 16.11	57 59.97	45	-0.84	-0.85	33.39	26.84	597	291	2240	2139	0.37	237461	1.0255	0.0015	17.0	1.5	Modern	
204†	73 16.11	57 59.97	18	2.77	2.65	32.81	26.15	609	364	2193	1996	1.73	237462	1.0238	0.0014	15.3	1.4	Modern	
													237463	1.0230	0.0014	14.5	1.4	Modern	
204	73 16.11	57 59.97	4	7.30	7.69	32.17	25.15	629	298	2180	2001	1.35	237464	1.0227	0.0015	14.2	1.5	Modern	
210†	75 25.16	61 33.60	1063	1.33	1.27	34.51	27.63	645	188	2327	2214	-0.19	237446	1.0021	0.0015	-6.2	1.5	Modern	
													237447	1.0036	0.0014	-4.8	1.4	Modern	
210	75 25.16	61 33.60	789	1.46	1.42	34.52	27.63	652	188	2273	2213	-0.12	237448	1.0028	0.0015	-5.5	1.5	Modern	
210	75 25.16	61 33.60	591	1.73	1.71	34.52	27.61	643	193	2291	2209	-0.10	237449	1.0073	0.0015	-1.1	1.5	Modern	
210	75 25.16	61 33.60	394	1.85	1.83	34.42	27.52	626	202	2272	2200	-0.16	237450	1.0178	0.0015	9.3	1.5	Modern	
210	75 25.16	61 33.60	197	0.41	0.32	33.98	27.26	518	236	2255	2176	-0.06	237451	1.0285	0.0016	20.0	1.6	Modern	
210	75 25.16	61 33.60	98	-0.46	-0.43	33.68	27.06	431	259	2250	2156	0.11	237454	1.0238	0.0016	15.3	1.6	Modern	

210	75 25.16	61 33.60	48	-0.90	-0.94	33.45	26.90	372	277	2241	2138	0.20	237443	1.0260	0.0015	17.5	1.5	Modern
210	75 25.16	61 33.60	18	0.01	0.32	33.13	26.60	0	384	2247	2060	1.11	237444	1.0253	0.0015	16.8	1.5	Modern
210	75 25.16	61 33.60	3	9.47	9.34	32.94	25.43	0	279	2218	2034	1.52	237445	1.0244	0.0015	15.9	1.5	Modern
108†	76 15.47	74 35.95	436	-0.06	-0.08	34.34	27.57	468	256	2295	2176	0.07	236343	1.0388	0.0014	30.1	1.4	Modern
													236344	1.0380	0.0014	29.4	1.4	Modern
108	76 15.47	74 35.95	256	-0.07	-0.07	34.25	27.50	473	255	2280	2178	-0.10	236345	1.0368	0.0013	28.2	1.3	Modern
108	76 15.47	74 35.95	226	-0.41	-0.42	33.94	27.27	461	258	2262	2159	-0.11	236346	1.0329	0.0013	24.3	1.3	Modern
108	76 15.47	74 35.95	137	-1.28	-1.29	32.92	26.49	286	308	2245	2144	0.24	236347	1.0121	0.0013	3.7	1.3	Modern
108	76 15.47	74 35.95	39	-1.53	-1.55	32.36	26.01	232	324	2242	2133	0.22	236348	1.0147	0.0014	6.3	1.4	Modern
108	76 15.47	74 35.95	18	1.76	1.37	31.58	25.45	1	357	2195	2017	1.17	236349	1.0078	0.0013	-0.6	1.3	Modern
108	76 15.47	74 35.95	4	3.12	NaN	31.14	NaN	0	348	2158	1979	1.42	236350	1.0029	0.0016	-5.4	1.6	Modern
323	74 09.57	80 28.23	740	0.59	0.56	34.46	27.64	574	207	2282	2137	0.00	240002	1.0161	0.0016	7.7	1.6	Modern
323	74 09.57	80 28.23	592	0.86	0.80	34.46	27.62	578	217	2279	2203	-0.09	239998	1.0181	0.0016	9.6	1.6	Modern
323	74 09.57	80 28.23	394	0.87	0.81	34.35	27.53	550	228	2275	2190	-0.08	239999	1.0315	0.0016	22.9	1.6	Modern
323	74 09.57	80 28.23	196	-1.06	-1.05	33.75	27.14	436	272	2262	2178	0.07	240000	1.0260	0.0016	17.5	1.6	Modern
323	74 09.57	80 28.23	98	-1.34	-1.33	32.91	26.47	400	289	2240	2157	0.18	240001	1.0203	0.0015	11.8	1.5	Modern
323	74 09.57	80 28.23	48	-1.66	-1.66	32.57	26.20	308	315	2244	2171	0.37	240003	1.0067	0.0017	-1.7	1.7	Modern
323†	74 09.57	80 28.23	19	-1.01	-0.97	32.16	25.85	32	384	2207	2040	0.71	240007	1.0109	0.0016	2.5	1.6	Modern
													240008	1.0077	0.0017	-0.6	1.7	Modern

Supplementary Table 2: Modeled anthropogenic carbon (C_{anth}) concentrations calculated from the ΔC^* proxy based on calculations presented by Lee et al., (2003). Bomb $\Delta^{14}C$ and Natural (measured – bomb) $\Delta^{14}C$ signatures presented calculated from the potential alkalinity (Palk) method presented by Rubin and Key., (2002).

Station	Latitude (°N)	Longitude (°W)	Depth (m)	DIC_{anth} (µmol/kg)	$\Delta^{14}C_{canth}$ (‰)	$\Delta^{14}C_{bomb}$ (‰)	$\Delta^{14}C_{natural}$ (‰)
193	66 46.18	59 20.41	787	0.0	-7.9	46.6	-54.6
193	66 46.18	59 20.41	592	15.9	12.4	45.9	-33.6
193	66 46.18	59 20.41	393	25.4	28.8	68.4	-39.6
193	66 46.18	59 20.41	196	40.0	36.5	64.7	-28.2
193	66 46.18	59 20.41	98	9.7	25.2	85.0	-59.8
193	66 46.18	59 20.41	48	0.0	16.0	109.6	-93.6
193	66 46.18	59 20.41	18	0.0	15.7	88.5	-72.8
193	66 46.18	59 20.41	3	0.0	7.6	158.5	-150.9
196	66 59.21	56 03.57	97	19.7	30.0	73.1	-43.1
196	66 59.21	56 03.57	48	24.4	28.9	72.9	-44.0
196	66 59.21	56 03.57	18	22.8	34.2	80.5	-46.3
196	66 59.21	56 03.57	4	32.9	35.9	47.3	-11.3
BB15	68 27.08	55 53.99	394	18.5	24.9	92.5	-67.6
BB15	68 27.08	55 53.99	197	18.4	27.9	88.5	-60.6
BB15	68 27.08	55 53.99	98	11.0	22.4	81.8	-59.4
BB15	68 27.08	55 53.99	48	0.0	19.4	93.6	-74.2
BB15	68 27.08	55 53.99	18	0.0	18.5	104.4	-85.9
BB15	68 27.08	55 53.99	3	0.0	15.9	98.4	-82.4
BB18	70 05.40	52 44.40	396	6.4	19.2	93.2	-74.1
BB18	70 05.40	52 44.40	196	11.9	22.5	90.2	-67.7
BB18	70 05.40	52 44.40	98	0.0	17.6	85.5	-67.9
BB18	70 05.40	52 44.40	48	0.0	21.6	97.1	-75.5
BB18	70 05.40	52 44.40	19	0.0	19.6	101.0	-81.4
BB18	70 05.40	52 44.40	3	0.0	18.1	103.3	-85.2
227	70 47.81	56 59.27	394	6.0	17.2	76.3	-59.1
227	70 47.81	56 59.27	197	16.8	26.8	58.3	-31.5
227	70 47.81	56 59.27	98	7.0	21.0	82.7	-61.7
227	70 47.81	56 59.27	48	0.0	20.8	90.1	-69.4
227	70 47.81	56 59.27	19	34.5	36.0	87.9	-51.9
227	70 47.81	56 59.27	4	0.0	20.2	142.4	-122.2
224	70 25.20	62 56.71	1969	0.0	-89.5	0.0	-89.5
224	70 25.20	−62 56.71	1773	0.0	-86.7	0.0	-86.7
224	70 25.20	−62 56.71	1576	0.0	-82.0	0.0	-82.0
224	70 25.20	−62 56.71	1380	0.0	-73.4	0.0	-73.4
224	70 25.20	−62 56.71	1183	0.0	-52.6	10.1	-62.7
224	70 25.20	−62 56.71	986	0.0	-22.3	34.6	-56.8
224	70 26.44	−62 58.89	789	5.6	-2.8	49.1	-52.0
224	70 26.44	−62 58.89	592	7.5	10.9	68.6	-57.7
224	70 26.44	−62 58.89	394	9.6	24.1	82.5	-58.4
224	70 26.44	−62 58.89	197	0.0	18.1	92.6	-74.5
224	70 26.44	−62 58.89	98	0.0	15.3	126.2	-110.9
224	70 26.44	−62 58.89	48	16.4	15.8	127.1	-111.3

224	70 26.44	−62 58.89	19	31.7	22.9	152.8	-129.9
224	70 26.44	−62 58.89	3	0.0	8.7	204.3	-195.6
BB2	72 44.94	66 59.69	2262	0.0	-90.0	0.0	-90.0
BB2	72 44.94	66 59.69	1968	0.0	-89.1	0.0	-89.1
BB2	72 44.94	66 59.69	1772	0.0	-84.3	0.0	-84.3
BB2	72 44.94	66 59.69	1576	0.0	-79.9	1.9	-81.8
BB2	72 44.94	66 59.69	1380	0.0	-64.6	1.5	-66.1
BB2	72 44.94	66 59.69	1183	0.0	-35.4	30.3	-65.7
BB2	72 44.94	66 59.69	986	0.0	-19.0	45.2	-64.2
BB2	72 45.03	66 59.69	789	11.2	10.9	66.5	-55.6
BB2	72 45.03	66 59.69	592	13.7	27.0	77.1	-50.2
BB2	72 45.03	66 59.69	394	0.0	19.6	77.4	-57.8
BB2	72 45.03	66 59.69	197	0.0	21.0	98.3	-77.4
BB2	72 45.03	66 59.69	98	0.0	20.9	107.1	-86.2
BB2	72 45.03	66 59.69	48	14.9	17.0	127.2	-110.2
BB2	72 45.03	66 59.69	19	41.7	26.2	172.2	-146.0
BB2	72 45.03	66 59.69	3	0.0	5.7	160.7	-155.0
204	73 16.11	57 59.97	789	0.0	-3.8	35.2	-39.1
204	73 16.11	57 59.97	592	8.5	11.6	57.6	-46.0
204	73 16.11	57 59.97	396	8.1	13.3	57.4	-44.1
204	73 16.11	57 59.97	196	0.0	18.2	83.0	-64.7
204	73 16.11	57 59.97	98	21.0	31.5	82.4	-50.9
204	73 16.11	57 59.97	45	0.0	17.0	100.4	-83.4
204	73 16.11	57 59.97	18	0.0	14.9	82.9	-68.0
204	73 16.11	57 59.97	4	28.6	28.9	113.2	-84.3
210	75 25.16	61 33.60	1063	0.0	-5.5	99.2	-104.7
210	75 25.16	61 33.60	789	0.0	-5.5	46.4	-52.0
210	75 25.16	61 33.60	591	0.0	-1.1	67.9	-69.0
210	75 25.16	61 33.60	394	7.8	12.9	65.6	-52.7
210	75 25.16	61 33.60	197	0.0	20.0	85.1	-65.1
210	75 25.16	61 33.60	98	0.0	15.3	93.4	-78.1
210	75 25.16	61 33.60	48	0.0	17.5	100.4	-82.9
210	75 25.16	61 33.60	18	0.0	16.8	117.8	-101.0
210	75 25.16	61 33.60	3	45.9	39.3	100.6	-61.2
108	76 15.47	74 35.95	436	0.0	29.8	109.9	-80.1
108	76 15.47	74 35.95	256	0.0	28.2	99.4	-71.2
108	76 15.47	74 35.95	226	0.0	24.3	97.8	-73.5
108	76 15.47	74 35.95	137	9.4	8.2	125.8	-117.7
108	76 15.47	74 35.95	39	14.0	12.9	162.1	-149.1
108	76 15.47	74 35.95	18	0.0	-0.6	157.1	-157.6
108	76 15.47	74 35.95	4	0.0	-5.4	145.4	-150.8
323	74 09.57	80 28.23	740	0.0	7.7	70.1	-62.4
323	74 09.57	80 28.23	592	0.0	9.6	69.4	-59.8
323	74 09.57	80 28.23	394	0.0	22.9	84.7	-61.8
323	74 09.57	80 28.23	196	0.0	17.5	103.0	-85.5
323	74 09.57	80 28.23	98	13.1	18.0	131.2	-113.2
323	74 09.57	80 28.23	48	41.5	17.8	144.3	-126.5
323	74 09.57	80 28.23	19	0.0	1.0	129.8	-128.8

Supplementary Table 3: Potential density anomaly (kg m^{-3}) versus DIC $\delta^{13}C$ (‰) least squares linear regression statistics for slope coefficients, y-intercepts, coefficients of determination (R^2) and p-values.

Station	Slope	±Slope Error	y-intercept	±y-intercept error	R^2	p-value
193	-0.42	0.13	11.6	3.6	0.617	0.047
196	-1.47	0.22	40.1	5.9	0.957	0.045
BB15	-1.57	0.22	42.7	6.0	0.925	0.005
BB18	-0.80	0.07	21.4	6.0	0.971	0.002
227	-1.52	0.12	41.5	3.2	0.976	0.001
224	-0.32	0.05	8.5	1.5	0.743	<0.001
BB2	-0.39	0.03	10.7	0.9	0.919	<0.001
204	-0.74	0.16	20.3	4.3	0.782	0.011
210	-0.82	0.11	22.5	2.9	0.895	<0.001
108	-0.53	0.10	14.4	2.6	0.851	0.005
323	-0.44	0.04	11.9	1.0	0.958	<0.001

Supplementary Table 4: Potential density anomaly (kg m^{-3}) versus DIC $\Delta^{14}C$ (‰) least squares linear regression statistics for slope coefficients, y-intercepts, coefficients of determination (R^2) and p-values.

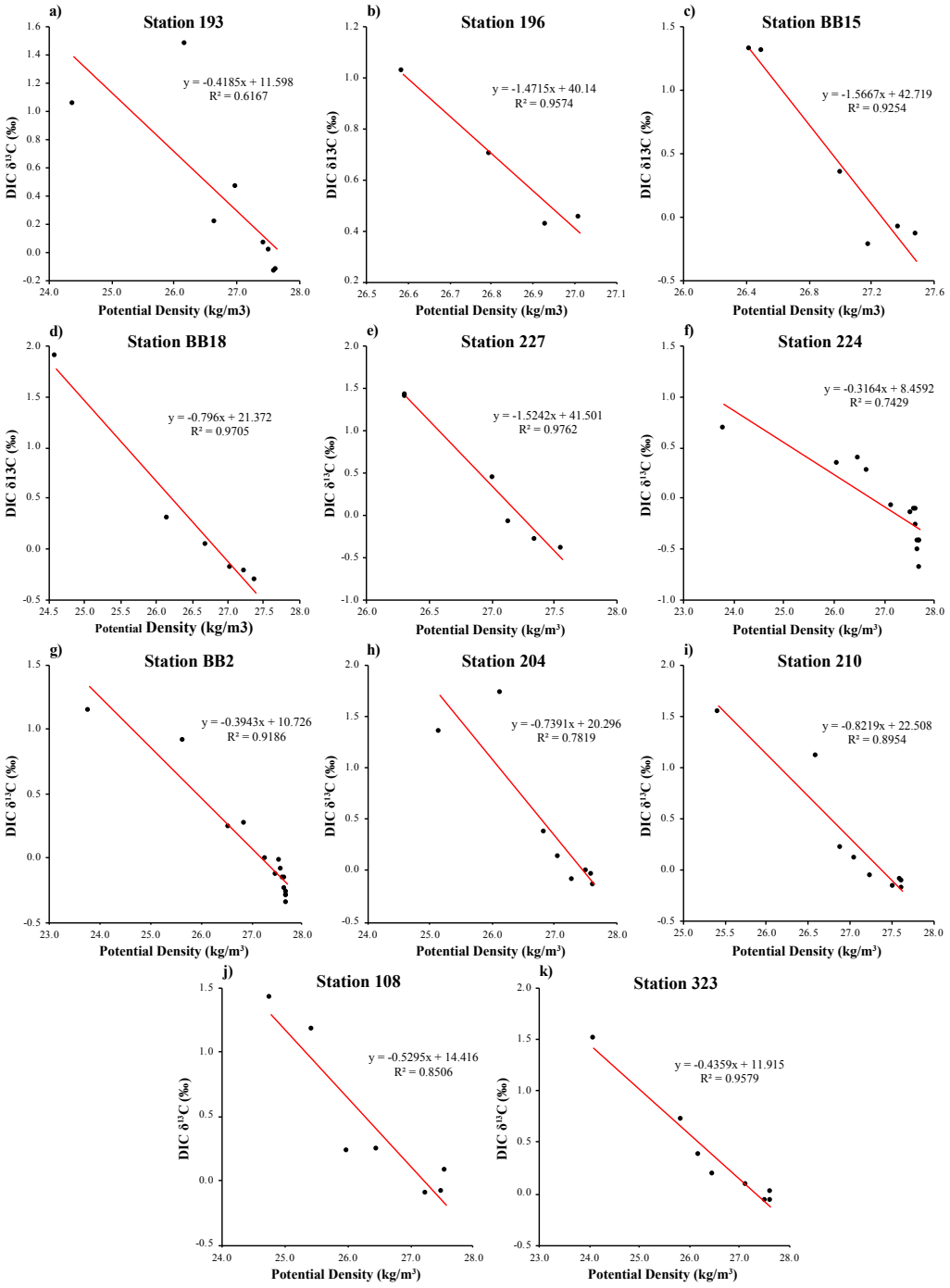
Station	Slope	±Slope Error	y-intercept	±y-intercept error	R^2	p-value
193	-0.73	3.45	30.9	92.7	0.007	0.483
196	-1.62	9.15	63.3	245.5	0.015	0.820
BB15	0.34	1.70	8.6	45.9	0.010	0.374
BB18	-0.49	0.92	31.3	24.5	0.066	0.936
227	-2.53	1.70	86.7	45.9	0.357	0.674
224	-18.90	10.18	488.4	275.8	0.223	0.124
BB2	-17.35	10.60	447.0	287.7	0.171	0.170
204	-3.55	3.48	107.9	93.6	0.148	0.667
210	-8.74	4.37	245.7	118.3	0.364	0.156
108	13.00	1.80	-331.4	47.7	0.912	0.005
323	7.56	3.98	-193.6	107.2	0.419	0.072

Supplementary Table 5: Salinity versus DIC $\delta^{13}C$ (‰) least squares linear regression statistics for slope coefficients, y-intercepts, coefficients of determination (R^2) and p-values.

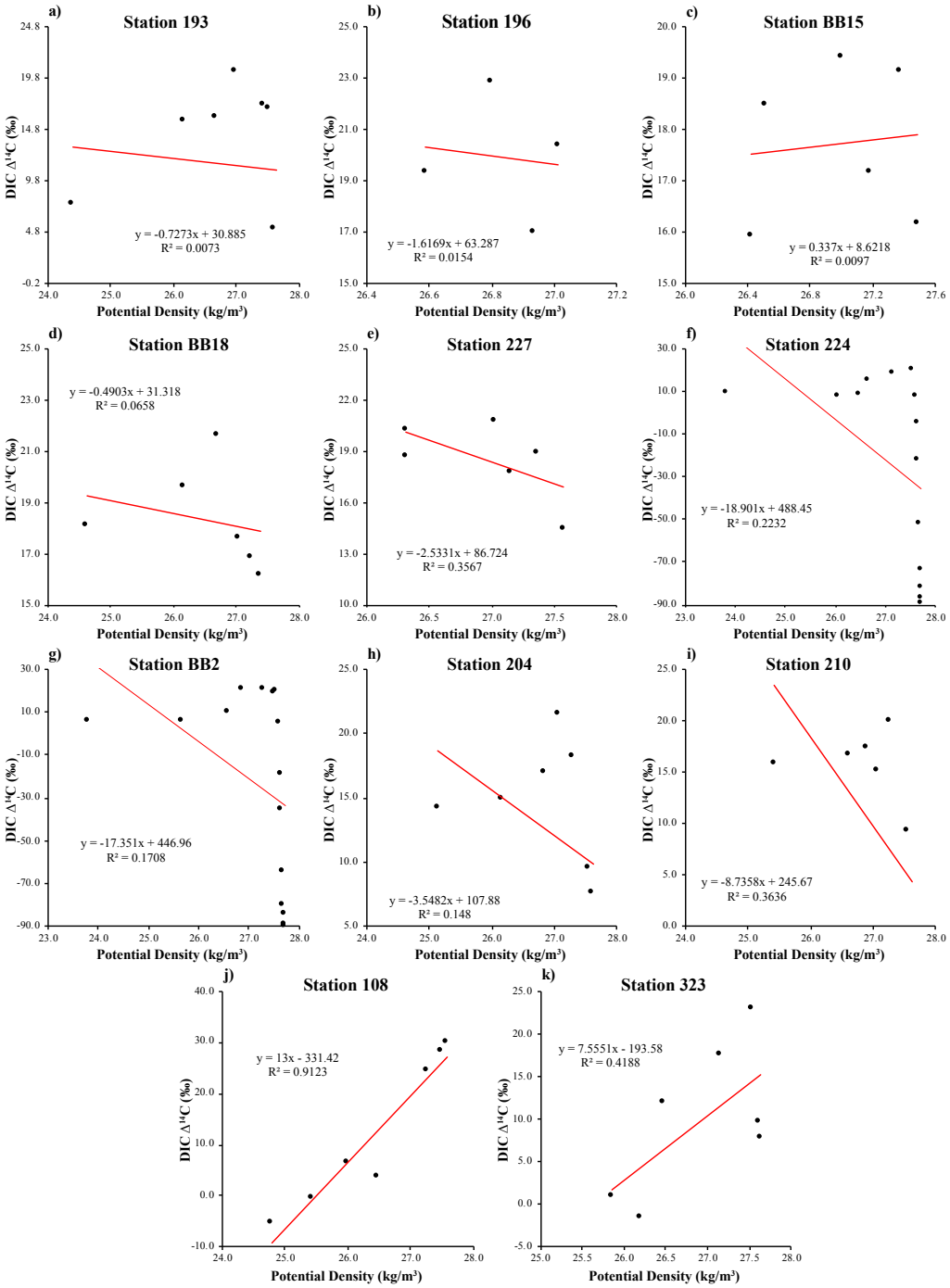
Station	Depth	Slope	±Slope Error	y-intercept	±y-intercept error	R^2	p-value
193	Surface	-0.18	0.27	6.7	8.7	0.190	0.564
	Mid-Depth	1.63	0.39	-56.2	13.5	0.896	0.053
196	Surface	-2.30	0.60	77.8	20.3	0.879	0.063
BB15	Surface	-3.87	1.27	131.0	42.8	0.822	0.093
BB18	Surface	-0.83	0.14	27.9	4.6	0.946	0.027
227	Surface	-3.43	0.70	116.1	23.5	0.923	0.039
224	Surface	-0.11	0.02	3.9	0.7	0.928	0.037
	Mid-Depth	-0.05	0.04	1.6	1.3	0.480	0.307
	Deep-Depth	-22.58	29.70	778.5	1024.3	0.126	0.489
BB2	Surface	-0.25	0.09	8.8	2.9	0.800	0.106
	Mid-Depth	-0.13	0.15	4.5	5.1	0.290	0.461
	Deep-Depth	6.28	3.48	-217.0	120.1	0.395	0.131
204	Surface	-0.90	0.50	30.7	16.4	0.622	0.211
	Mid-Depth	0.01	0.20	-0.3	7.0	0.001	0.974
210	Surface	-2.03	0.34	68.2	11.3	0.947	0.027
	Mid-Depth	-0.15	0.10	5.0	3.3	0.441	0.222
108	Surface	-0.99	0.34	32.3	10.9	0.893	0.212
	Mid-Depth	-0.19	0.12	6.5	4.0	0.569	0.246
323	Surface	-0.40	0.06	13.5	1.9	0.959	0.021
	Mid-Depth	-0.17	0.09	5.9	3.2	0.625	0.209

2.2 Supplementary Figures

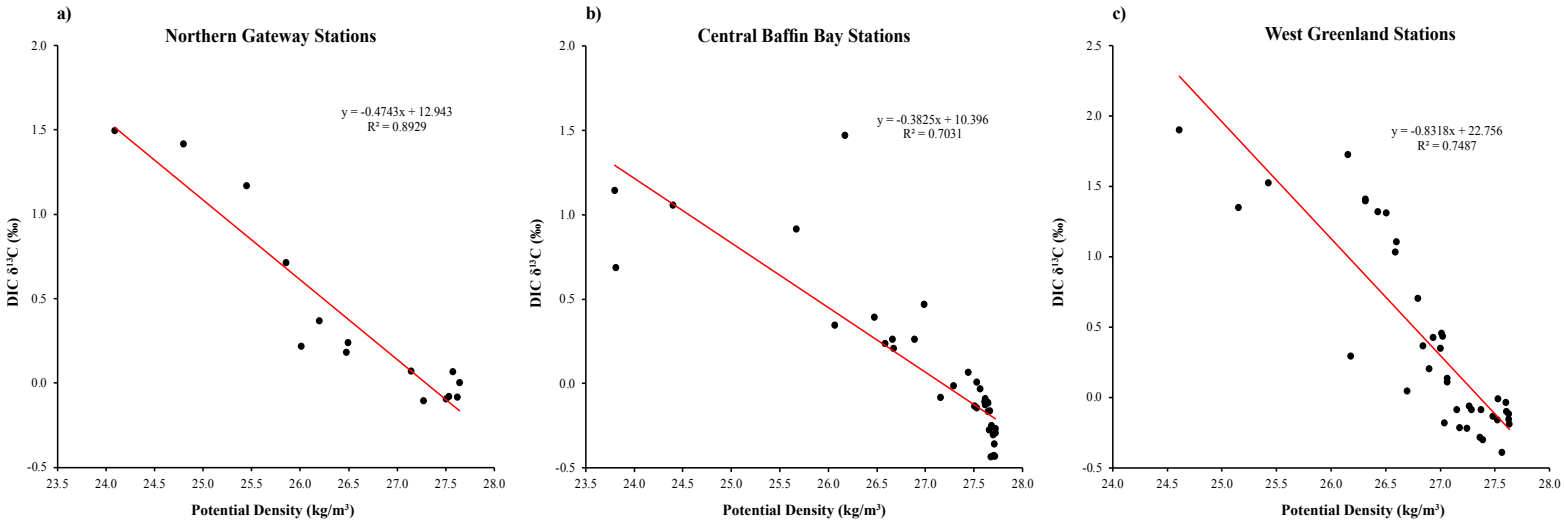
Supplementary Figure 1: Regressions of potential density anomaly versus DIC $\delta^{13}C$ for Baffin Bay stations. Lines are Least squares fit linear regression. Line equations and coefficients of determination (R^2) values are listed next to the trendline.



Supplementary Figure 2: Regressions of potential density anomaly versus DIC $\Delta^{14}C$ for Baffin Bay stations. Lines are Least squares fit linear regression. Line equations and coefficients of determination (R^2) values are listed next to the trendline.



Supplementary Figure 3: Regressions of potential density anomaly versus DIC $\delta^{13}C$ for distinct regions in Baffin Bay; Northern Gateway stations consist of 108 and 323, Central Baffin Bay stations consist of 193, BB2, and 224, and West Greenland stations consist of 196, BB15, BB18, 227, 204, and 210. Lines are Least squares fit linear regression. Line equations and coefficients of determination (R^2) values are listed next to the trendline.



Supplementary Figure 4: Regressions of salinity versus DIC $\delta^{13}C$ for Baffin Bay stations for surface, mid-depth and deep sample data. Depth-specific regressions are shown for; surface (0 – 100m), mid-depth (100 – 800m), and deep (>800m). Lines are Least squares fit linear regression. Line equations and coefficients of determination (R^2) values are listed next to each trendline.