Supplementary Data

Perturbing phytoplankton: A tale of isotopic fractionation in two coccolithophore species

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Treatment	Treatment	AVG HCO3- (µmol Kg-1]	AVG CO32- (µmol Kg-1]	AVG pCO2 (µatm]	AVG CO2 (µmol kg-1]	AVG pH (NBS)	AVG Omega	TPC raw µg	POC raw µg	13C-TPC	13C-POC
200A	**200**	1010.30	83.60	248.00	8.60	8.14	2.04	299.9	154.9	-18.6	-25.8
	200	1010.30	83.60	248.00	8.60	8.14	2.04	298.1	149.7	-18.5	-26.3
200B	**200**	1087.75	55.15	421.25	14.60	7.93	1.35	295.0	180.6	-19.0	-25.0
	200	1087.75	55.15	421.25	14.60	7.93	1.35	292.5	167.0	-18.5	-25.4
280A	**280**	1425.25	117.90	327.15	11.40	8.15	2.88	283.1	133.7	-18.6	-26.4
	280	1425.25	117.90	327.15	11.40	8.15	2.88	279.8	159.2	-18.7	-25.6
280B	**280**	1445.20	105.45	371.00	12.75	8.10	2.57	420.8	263.7	-18.7	-23.3
	280	1445.20	105.45	371.00	12.75	8.10	2.57	413.7	217.5	-18.5	-21.9
380A	**380**	1908.10	153.25	450.90	15.65	8.14	3.74	450.7	288.3	-18.5	-22.9
	380	1908.10	153.25	450.90	15.65	8.14	3.74	449.3	269.5	-18.4	-23.1
380B	**380**	1939.15	141.55	497.80	17.30	8.10	3.45	356.5	220.0	-18.3	-23.2
	380	1939.15	141.55	497.80	17.30	8.10	3.45	355.5	224.5	-17.9	-23.6
950A	**950**	4889.95	353.70	1126.00	44.35	8.09	8.63	472.6	347.9	-18.6	-22.5
	950	4889.95	353.70	1126.00	44.35	8.09	8.63	473.0	312.5	-18.5	-22.6
950B	**950**	4878.60	361.40	1237.50	43.00	8.10	8.82	470.7	239.9	-18.8	-23.6
	950	4878.60	361.40	1237.50	43.00	8.10	8.82	456.4	359.3	-18.4	-22.1
1400A	**1400**	7183.55	486.70	1993.90	69.25	8.06	11.87	452.2	291.2	-18.2	-22.6
	1400	7183.55	486.70	1993.90	69.25	8.06	11.87	444.9	206.9	-18.5	-29.5
1400B	**1400**	7159.20	503.55	1907.45	66.25	8.08	12.28	445.2	263.4	-18.9	-23.2
	1400	7159.20	503.55	1907.45	66.25	8.08	12.28	449.2	282.7	-18.6	-23.2

Red=10 or more % difference
Blue=remarks

Gephyrocapsa oceanica TPC, POC, POC, stable carbon isotopes, PON

PONtpc raw µg	PONpoc raw µg	Blank TPC µg	Blank POC µg	Blank PON µg	TPC µg	POC µg	PONtpc µg	PONpoc µg	TPC pg ml-1	POC pg ml-1	PONtpc pg ml-1	PONpoc pg ml-1
21.2	18.5	3.2		2.3	297.3	152.7	19.8	16.9	849500.0	436214.3	56642.9	48285.7
21.1	18.5	3.0		2.4	295.5	147.5	19.7	16.9	844357.1	421357.1	56357.1	48285.7
19.8	20.8	2.2		0.4	292.4	178.4	18.4	19.2	835500.0	509642.9	52642.9	54857.1
20.8	19.7	1.9		0.4	289.9	164.8	19.4	18.1	828357.1	470785.7	55500.0	51714.3
20.4	16.8		1.3	0.6	280.5	131.5	19.0	15.2	801500.0	375642.9	54357.1	43428.6
20.2	18.8		1.7	0.5	277.2	157.0	18.8	17.2	792071.4	448500.0	53785.7	49142.9
27.6	24.6		2.9	2.6	418.2	261.5	26.2	23.0	1194928.6	747071.4	74928.6	65714.3
27.3	21.5		3.0	2.7	411.1	215.3	25.9	19.9	1174642.9	615071.4	74071.4	56857.1
28.0	25.1				448.1	286.1	26.6	23.5	1280357.1	817357.1	76071.4	67142.9
28.0	24.1	2.6		1.4	446.7	267.3	26.6	22.5	1276357.1	763642.9	76071.4	64285.7
24.0	22.4		2.2	1.6	353.9	217.8	22.6	20.8	1011214.3	622214.3	64642.9	59428.6
23.2	22.3				352.9	222.3	21.8	20.7	1008357.1	635071.4	62357.1	59142.9
30.8	30.3				470.0	345.7	29.4	28.7	1342928.6	987642.9	84071.4	82000.0
30.6	26.6				470.4	310.3	29.2	25.0	1344071.4	886500.0	83500.0	71428.6
30.8	23.2				468.1	237.7	29.4	21.6	1337500.0	679071.4	84071.4	61714.3
30.0	29.6				453.8	357.1	28.6	28.0	1296642.9	1020214.3	81785.7	80000.0
29.5	25.8				449.6	289.0	28.1	24.2	1284642.9	825642.9	80357.1	69142.9
29.4	26.4				442.3	204.7	28.0	24.8	1263785.7	584785.7	80071.4	70857.1
28.6	23.0				442.6	261.2	27.2	21.4	1264642.9	746214.3	77785.7	61142.9
28.9	26.1				446.6	280.5	27.5	24.5	1276071.4	801357.1	78642.9	70000.0

Cells ml-1	µ d-1	TPC pg cell-1	POC pg cell-1	PONtpc pg cell-1	PONpoc pg cell-1	PIC pg cell-1	PIC/POC	POC/PON	TPCprod pg cell-1 day-1	POCprod pg cell-1 day-1
13536	0.86	62.76	32.23	4.18	3.57	30.89	0.98	8.88	54.1	27.8
13536	0.86	62.38	31.13	4.16	3.57				53.8	26.8
12650	0.90	66.05	40.29	4.16	4.34	27.01	0.70	9.20	59.3	36.2
12650	0.90	65.48	37.22	4.39	4.09				58.8	33.4
11141	0.83	71.94	33.72	4.88	3.90	34.53	0.93	8.90	59.8	28.0
11141	0.83	71.10	40.26	4.83	4.41				59.1	33.5
14709	0.81	81.24	50.79	5.09	4.47	34.25	0.74	11.11	65.5	41.0
14709	0.81	79.86	41.82	5.04	3.87				64.4	33.7
14118	0.87	90.69	57.89	5.39	4.76	34.56	0.62	12.03	79.1	50.5
14118	0.87	90.41	54.09	5.39	4.55				78.9	47.2
19687	0.94	51.37	31.61	3.28	3.02	19.36	0.61	10.60	48.1	29.6
19687	0.94	51.22	32.26	3.17	3.00				48.0	30.2
18091	1.10	74.23	54.59	4.65	4.53	22.47	0.43	12.22	81.5	59.9
18091	1.10	74.30	49.00	4.62	3.95				81.5	53.8
17198	1.26	77.77	39.49	4.89	3.59	27.18	0.55	11.99	97.8	49.7
17198	1.26	75.39	59.32	4.76	4.65				94.8	74.6
17146	0.90	74.92	48.15	4.69	4.03	33.19	0.81	10.07	67.5	43.4
17146	0.90	73.71	34.11	4.67	4.13				66.4	30.7
18397	0.90	68.74	40.56	4.23	3.32	26.99	0.64	11.80	61.9	36.5
18397	0.90	69.36	43.56	4.27	3.81				62.5	39.2

PONtpcprod pg cell-1 day-1	PONpocprod pg cell-1 day-1	PICprod pg cell-1 day-1	d13C-DIC t0	d13C-DIC tfin	d13C-CO2 (0/00)	ep_CO2
3.6	3.1	26.6	-7.25	-6.70	-16.7	9.3
3.6	3.1				-16.7	9.8
3.7	3.9	24.3	-7.25	-6.70	-16.7	8.5
3.9	3.7				-16.7	8.9
4.1	3.2	28.7	-7.18	-6.93	-17.0	9.7
4.0	3.7				-17.0	8.9
4.1	3.6	27.6	-7.18	-6.75	-16.8	6.7
4.1	3.1				-16.8	5.2
4.7	4.1	30.2	-7.22	-6.68	-16.7	6.3
4.7	4.0				-16.7	6.5
3.1	2.8	18.1	-7.22	-6.70	-16.7	6.6
3.0	2.8				-16.7	7.0
5.1	5.0	24.7	-7.15	-6.90	-16.9	5.7
5.1	4.3				-16.9	5.8
6.1	4.5	34.2	-7.15	-6.89	-16.9	6.8
6.0	5.9				-16.9	5.3
4.2	3.6	29.9	-7.10	-6.92	-17.0	5.8
4.2	3.7				-17.0	12.9
3.8	3.0	24.3	-7.10	-6.90	-16.9	6.4
3.9	3.4				-16.9	6.4

Treatment	Treatment	AVG HCO3- (µmol Kg-1]	AVG CO32- (µmol Kg-1]	AVG pCO2 (µatm]	AVG CO2 (µmol kg-1]	AVG pH (NBS)	AVG Omega	TPC raw µg	POC raw µg	13C-TPC	13C-POC	PONtpc raw µg
200A	**200**	1016.15	77.30	261.95	9.10	8.11	1.89	361.3	165.7	-18.5	-26.5	23.4
	200	1016.15	77.30	261.95	9.10	8.11	1.89	362.2	252.8	-18.3	-21.8	23.3
200B	**200**	1066.40	53.55	420.15	14.60	7.92	1.31	437.0	301.9	-18.4	-21.7	29.1
	200	1066.40	53.55	420.15	14.60	7.92	1.31	436.8	317.1	-18.7	-21.7	29.6
280A	**280**	1429.45	114.90	335.80	11.70	8.14	2.81	285.0	323*	-18.2	-22.4	18.6
	280	1429.45	114.90	335.80	11.70	8.14	2.81	300.6	165.2	-18.0	-22.9	19.5
280B	**280**	1442.80	107.10	364.10	12.65	8.10	2.61	289,3*	229.7	-18.0	-22.1	18,3*
	280	1442.80	107.10	364.10	12.65	8.10	2.61	363.6	244.1	-18.1	-21.7	22.7
380A	**380**	1934.65	141.05	497.25	17.30	8.10	3.44	370.6	234.2	-17.4	-23.3	22.5
	380	1934.65	141.05	497.25	17.30	8.10	3.44	372.3		-17.4		23.4
380B	**380**	1942.80	131.45	539.65	18.75	8.06	3.21	347.4	219.7	-17.2	-24.2	22.0
	380	1942.80	131.45	539.65	18.75	8.06	3.21	364.3	221.6	-17.3	-24.2	22.8
950A	**950**	4906.75	353.55	1286.30	44.70	8.09	8.63	267.7	155.7	-19.5	-26.8	24.4
	950	4906.75	353.55	1286.30	44.70	8.09	8.63	265.3	165.2	-19.9	-23.7	24.7
950B	**950**	4886.55	375.60	1189.50	41.30	8.12	9.16	263.3	156.5	-20.0	-27.5	24.0
	950	4886.55	375.60	1189.50	41.30	8.12	9.16	260.2	153.4	-19.7	-27.8	24.7
1400A	**1400**	7167.55	515.05	1868.10	64.90	8.09	12.56	310.9	193.6	-20.9	-27.8	31.1
	1400	7167.55	515.05	1868.10	64.90	8.09	12.56	308.2	188.4	-20.9	-28.3	30.3
1400B	**1400**	7168.25	526.75	1827.55	63.45	8.10	12.84	298.5	207.1	-21.0	-27.9	29.0
	1400	7168.25	526.75	1827.55	63.45	8.10	12.84	306.2	196.0	-21.3	-28.0	29.7

Red=10 or more % difference between duplicates
Blue=remarks in labbook
Red*=excluded

Coccolithus braarudii TPC, POC, POC, stable carbon isotopes, PON
Growth rates (coulter counter (CC) and manual microscopy counts)
%collapsed spheres and %malformation

PONpoc raw µg	Blank TPC µg	Blank POC µg	Blank PON µg	TPC µg	POC µg	PONtpc µg	PONpoc µg	TPC pg ml-1	POC pg ml-1	PONtpc pg ml-1	PONpoc pg ml-1
23.7	4.2		0.8	358.3	163.8	23.0	23.4	1023642.9	468071.4	65785.7	66714.3
23.4	3.1		0.6	359.2	250.9	22.9	23.1	1026214.3	716928.6	65500.0	65857.1
28.8	2.4		0.1	434.0	300.0	28.7	28.5	1239928.6	857214.3	82071.4	81285.7
29.0	2.4		0.0	433.8	315.2	29.2	28.7	1239357.1	900642.9	83500.0	81857.1
26.1		2.0	0.4	282.0		18.2	25.8	805642.9		52071.4	73571.4
19.0		1.2	0.3	297.6	163.3	19.1	18.7	850214.3	466642.9	54642.9	53285.7
21.3		1.0	0.4		227.8		21.0		650928.6		59857.1
21.7		3.3	0.3	360.6	242.2	22.3	21.4	1030214.3	692071.4	63785.7	61000.0
24.9				367.6	232.3	22.1	24.6	1050214.3	663700.0	63214.3	70142.9
	3.0		0.4	369.3		23.0		1055071.4		65785.7	
26.8		1.9	0.4	344.4	217.8	21.6	26.4	983928.6	622300.0	61785.7	75514.3
34.1				361.3	219.7	22.4	33.7	1032214.3	627757.1	64071.4	96285.7
22.5				264.7	153.8	24.0	22.2	756214.3	439500.0	68642.9	63285.7
17.9				262.3	163.3	24.3	17.6	749357.1	466642.9	69500.0	50142.9
23.2				260.3	154.6	23.6	22.9	743642.9	441785.7	67500.0	65285.7
23.9				257.2	151.5	24.3	23.6	734785.7	432928.6	69500.0	67285.7
29.7				307.9	191.7	30.7	29.4	879642.9	547785.7	87785.7	83857.1
29.2				305.2	186.5	29.9	28.9	871928.6	532928.6	85500.0	82428.6
30.4				295.5	205.2	28.6	30.1	844214.3	586357.1	81785.7	85857.1
29.2				303.2	194.1	29.3	28.9	866214.3	554642.9	83785.7	82428.6

Cells ml-1 (as counted by CC)	µ d-1 (CC)	Cells ml-1 (LM counts)	µ d-1 (LM counts)	TPC pg cell-1	POC pg cell-1	PONtpc pg cell-1	PONpoc pg cell-1	PIC pg cell-1	PIC/POC	POC/PON	POC/PONtpc	TPCprod pg cell-1 day-1
1803	0.62	2355	0.67	434.67	198.76	27.93	28.33	183.62	0.73	8.94	9.03	292.4
1803	0.62	2355	0.67	435.76	304.43	27.81	27.96					293.1
2106	0.57	3170	0.67	391.14	270.41	25.89	25.64	113.79	0.41	10.77	10.62	263.5
2106	0.57	3170	0.67	390.96	284.11	26.34	25.82					263.3
1257	0.61	1540	0.64	523.14		33.81	47.77	234.60	0.77	7.36	8.75	336.5
1257	0.61	1540	0.64	552.09	303.01	35.48	34.60					355.1
1545	0.60	2253	0.64		288.92		26.57	159.22	0.53	11.11	10.53	
1545	0.60	2253	0.64	457.26	307.18	28.31	27.08					294.2
2103	0.64	2566	0.67	409.28	258.65	24.64	27.34	151.58	0.59	9.46	10.29	274.5
2103	0.64	2566	0.67	411.17		25.64						275.8
1893	0.62	2120	0.66	464.12	293.54	29.14	35.62	180.68	0.61	7.28	9.93	306.7
1893	0.62	2120	0.66	486.89	296.11	30.22	45.42					321.8
1511	0.49	877	0.47	862.27	501.14	78.27	72.16	341.75	0.66	7.99	6.56	409.2
1511	0.49	877	0.47	854.46	532.09	79.25	57.18					405.5
1597	0.49	948	0.41	784.43	466.02	71.20	68.87	318.41	0.69	6.60	6.38	320.4
1597	0.49	948	0.41	775.09	456.68	73.31	70.98					316.6
2059	0.51											
2059	0.51											
1657	0.57	667	0.27	1265.69	879.10	122.62	128.72	426.86	0.50	6.78	6.89	347.5
1657	0.57	667	0.27	1298.67	831.55	125.62	123.58					356.5

POCprod pg cell-1 day-1	PONtpcprod pg cell-1 day-1	PONpocprod pg cell-1 day-1	PICprod pg cell-1 day-1	d13C-DIC t0 (‰)	d13C-DIC tfin (‰)	d13C-CO2 (‰)	ep_CO2	%collapsed sphers	N_intact spheres	N_collapsed spheres	%blocky morphologies (malformation)
133.7	18.8	19.1	123.5	-7.25	-6.49	-18.4	7.0	14.1	269	44	10.2
204.8	18.7	18.8				-18.4	2.7				
182.1	17.4	17.3	76.6	-7.25	-6.55	-18.4	2.5	24.5	234	76	8.8
191.4	17.7	17.4				-18.4	2.5				
	21.7	30.7	150.9	-7.18	-6.89	-18.8		18.0	250	55	12.4
194.9	22.8	22.3				-18.8	3.6				
185.9		17.1	102.4	-7.18	-6.81	-18.7	2.8	19.0	247	58	15.3
197.6	18.2	17.4				-18.7	2.4				
173.5	16.5	18.3	101.7	-7.22	-			21.6	240	66	17.4
	17.2										
194.0	19.3	23.5	119.4	-7.22	-6.70	-18.6	4.6	16.8	272	55	16.0
195.7	20.0	30.0				-18.6	4.6				
237.8	37.1	34.2	162.2	-7.15	-6.95	-18.8	6.9	79.5	63	245	76.1
252.5	37.6	27.1				-18.8	4.2				
190.3	29.1	28.1	130.1	-7.15	-6.97	-18.8	7.5	82.9	55	267	74.4
186.5	29.9	29.0				-18.8	7.8				
				-7.10	-6.95	-18.8	7.5	98.1	6	308	90.9
						-18.8	8.0				
241.4	33.7	35.3	117.2	-7.10	-7.53	-19.4	7.0	95.1	16	312	88.5
228.3	34.5	33.9				-19.4	7.2				