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Supplement of

Estimates of micro-, nano-, and picoplankton contributions to particle export in the northeast Pacific

B. L. Mackinson et al.

Correspondence to: B. L. Mackinson (bmackinson@my.uri.edu)

Table S1: POC, Chl *a*, and indicator pigment concentrations from small volume samples from the photic zone. Whole Chl *a* and >5µm Chl *a* are determined by fluorescence while Chl *a* and indicator pigment concentrations are measured with HPLC.

Depth (m)	POC (µmol L ⁻¹)	Whole Chl <i>a</i> (ng L ⁻¹)	>5µm Chl <i>a</i> (ng L ⁻¹)	Chl <i>a</i> (ng L ⁻¹)	FUCO (ng L ⁻¹)	PER (ng L ⁻¹)	HEX (ng L ⁻¹)	BUT (ng L ⁻¹)	Allo (ng L ⁻¹)	Chl <i>b</i> (ng L ⁻¹)	ZEA (ng L ⁻¹)
Aug. 2010 P4											
5	-	1962.06	572.94	-	-	-	-	-	-	-	-
10	-	1594.51	470.25	-	-	-	-	-	-	-	-
20	-	1940.44	875.63	-	-	-	-	-	-	-	-
21	-	1691.80	916.17	-	-	-	-	-	-	-	-
30	-	68.64	92.43	-	-	-	-	-	-	-	-
50	-	38.92	21.62	-	-	-	-	-	-	-	-
75	-	32.97	25.40	-	-	-	-	-	-	-	-
Aug. 2010 P12											
5	-	400.65	85.81	-	-	-	-	-	-	-	-
10	-	307.42	95.27	358.00	39.00	7.00	60.00	23.00	4.00	40.00	48.00
20	-	452.68	160.80	541.00	73.00	7.00	84.00	26.00	4.00	74.00	76.00
27	-	513.49	290.19	-	-	-	-	-	-	-	-
30	-	486.46	232.42	558.00	87.00	9.00	215.00	23.00	5.00	102.00	15.00
50	-	142.56	37.16	-	-	-	-	-	-	-	-
75	-	59.46	17.50	61.00	8.00	1.00	29.00	7.00	1.00	13.00	1.00
Aug. 2010 P16											
5	-	172.63	85.81	-	-	-	-	-	-	-	-
10	-	192.56	84.12	179.00	15.00	9.00	54.00	15.00	1.00	27.00	1.00
20	-	212.15	88.85	-	-	-	-	-	-	-	-
30	-	283.09	116.21	270.00	26.00	7.00	124.00	17.00	1.00	54.00	2.00
40	-	436.13	93.91	-	-	-	-	-	-	-	-
50	-	187.15	55.40	-	-	-	-	-	-	-	-
50	-	142.56	60.13	-	-	-	-	-	-	-	-
50	-	164.86	57.77	-	-	-	-	-	-	-	-
75	-	170.60	29.42	160.00	13.00	1.00	64.00	14.00	1.00	25.00	4.00
Aug. 2010 P20											
5	-	271.61	50.00	-	-	-	-	-	-	-	-
10	-	193.23	61.48	213.00	21.00	5.00	82.00	18.00	1.00	25.00	1.00
20	-	279.71	72.97	-	-	-	-	-	-	-	-
30	-	493.22	158.10	386.00	79.00	10.00	118.00	26.00	1.00	48.00	2.00
36	-	439.17	167.56	-	-	-	-	-	-	-	-
36	-	466.19	135.13	-	-	-	-	-	-	-	-
50	-	362.82	164.86	-	-	-	-	-	-	-	-
75	-	172.96	34.05	194.00	16.00	1.00	73.00	19.00	1.00	36.00	5.00
Aug. 2010 P26											
5	-	226.00	104.39	-	-	-	-	-	-	-	-
10	-	230.06	111.48	-	-	-	-	-	-	-	-
20	-	237.49	115.53	-	-	-	-	-	-	-	-
30	-	306.06	363.83	-	-	-	-	-	-	-	-
35	-	334.44	156.07	-	-	-	-	-	-	-	-
50	-	302.01	91.89	-	-	-	-	-	-	-	-
75	-	118.57	36.48	-	-	-	-	-	-	-	-
Feb. 2011 P12											
1	-	271.88	60.42	550.00	50.00	6.00	102.00	45.00	14.00	131.00	17.00
35	-	324.74	45.31	-	-	-	-	-	-	-	-
43	-	286.98	41.54	431.00	42.00	6.00	82.00	35.00	13.00	102.00	13.00

48	-	313.41	41.54	-	-	-	-	-	-	-	-	-
55	-	313.41	56.64	445.00	44.00	6.00	84.00	36.00	13.00	103.00	14.00	-
60	-	302.09	41.54	-	-	-	-	-	-	-	-	-
65	-	290.76	52.87	408.00	36.00	5.00	70.00	29.00	10.00	99.00	12.00	-
Feb. 2011 P16												
1	-			236.00	19.00	2.00	84.00	25.00	2.00	62.00	24.00	-
7	-	168.66	22.66	-	-	-	-	-	-	-	-	-
13	-	171.18	25.17	231.00	18.00	2.00	80.00	24.00	2.00	62.00	25.00	-
20	-	171.18	25.17	-	-	-	-	-	-	-	-	-
40	-			234.00	18.00	3.00	84.00	25.00	2.00	63.00	24.00	-
95	-	25.17	5.03	26.00	3.00	1.00	8.00	3.00	1.00	10.00	1.00	-
Feb. 2011 P20												
1	-	156.08	15.10	828.00	79.00	14.00	265.00	104.00	19.00	160.00	76.00	-
6	-	156.08	12.59	-	-	-	-	-	-	-	-	-
11	-	143.49	15.10	774.00	69.00	11.00	231.00	89.00	16.00	150.00	66.00	-
19	-	168.66	15.10	-	-	-	-	-	-	-	-	-
38	-	191.32	20.14	804.00	77.00	12.00	269.00	103.00	19.00	159.00	70.00	-
50	-	173.70	17.62	-	-	-	-	-	-	-	-	-
77	-	138.46	12.59	516.00	51.00	1.00	184.00	58.00	5.00	134.00	31.00	-
June 2011 P4												
1	-	254.89	17.37	340.00	33.00	6.00	78.00	18.00	21.00	33.00	58.00	-
4	-	237.14	25.68	-	-	-	-	-	-	-	-	-
9	-	243.93	17.37	233.00	22.00	4.00	53.00	13.00	13.00	24.00	44.00	-
17	-	181.25	12.08	-	-	-	-	-	-	-	-	-
25	-	394.22	28.70	496.00	39.00	1.00	169.00	37.00	10.00	110.00	98.00	-
38	-	335.32	13.59	-	-	-	-	-	-	-	-	-
72	-	341.73	19.22	426.00	43.00	1.00	185.00	54.00	7.00	83.00	59.00	-
June 2011 P12												
1	-	262.44	21.90	-	-	-	-	-	-	-	-	-
5	-	255.26	21.15	391.00	51.00	1.00	134.00	27.00	13.00	44.00	108.00	-
15	-	287.93	18.13	387.00	51.00	1.00	136.00	28.00	14.00	39.00	97.00	-
20	-	250.73	21.15	-	-	-	-	-	-	-	-	-
40	-	257.61	20.77	339.00	75.00	1.00	203.00	45.00	3.00	25.00	20.00	-
65	-	228.07	24.17	-	-	-	-	-	-	-	-	-
90	-	141.98	14.10	187.00	44.00	1.00	53.00	38.00	3.00	33.00	3.00	-
June 2011 P16												
1	-	199.50	52.87	220.00	46.00	1.00	106.00	15.00	3.00	9.00	13.00	-
12	-	155.57	43.80	-	-	-	-	-	-	-	-	-
26	-	149.36	49.84	214.00	48.00	1.00	106.00	15.00	2.00	9.00	14.00	-
40	-	232.61	70.99	-	-	-	-	-	-	-	-	-
56	-	173.91	28.70	237.00	42.00	1.00	150.00	23.00	1.00	26.00	24.00	-
80	-	193.34	49.84	-	-	-	-	-	-	-	-	-
105	-	140.76	5.29	167.00	20.00	1.00	50.00	28.00	2.00	50.00	3.00	-
June 2011 P20												
1	-	149.36	27.19	199.50	35.50	3.50	86.50	15.50	2.00	10.00	16.00	-
8	-	145.00	28.70	-	-	-	-	-	-	-	-	-
15	-	149.99	29.45	199.00	47.00	1.00	75.00	16.00	2.00	11.00	14.00	-
22	-	234.12	40.78	-	-	-	-	-	-	-	-	-
34	-	312.78	59.66	394.00	102.00	5.00	194.00	39.00	3.00	23.00	24.00	-
50	-	330.98	77.45	-	-	-	-	-	-	-	-	-
70	-	155.57	18.13	217.00	33.00	1.00	53.00	26.00	2.00	67.00	7.00	-

June 2011 P26											
1	-	178.21	30.21	239.00	47.00	3.00	59.00	30.00	2.00	24.00	45.00
5	-	179.74	30.21	224.78	45.79	-	66.68	28.57	4.02	23.74	41.67
9	-	173.49	30.96	230.30	45.62	0.50	62.22	27.86	1.00	22.04	43.75
16	-	178.23	34.74	235.21	48.66	-	69.45	31.57	3.26	23.74	45.11
24	-	259.92	40.78	339.97	77.28	0.50	104.28	48.46	4.47	37.79	51.70
52	-	394.29	86.09	489.71	114.16	-	212.17	82.63	2.15	60.83	40.41
83	-	152.55	36.25	225.00	45.00	7.00	54.00	29.00	2.00	51.00	9.00

June 2011 P26											
1	-	221.53	33.98	282.39	62.03	-	90.93	26.45	3.24	21.36	28.07
5	-	225.05	42.29	278.37	74.44	-	99.85	33.01	5.07	23.24	35.35
10	-	220.59	39.27	272.35	71.66	-	96.23	32.87	-	20.89	33.42
15	-	232.61	78.54	286.71	76.50	-	103.13	33.34	4.48	24.43	35.11
24	-	233.07	56.64	295.00	81.50	-	105.00	35.00	5.00	27.00	36.00
48	-	444.32	92.89	522.81	152.93	4.86	198.44	87.58	2.08	63.10	25.72
85	-	86.09	77.03	115.79	26.95	-	37.44	27.51	-	15.46	4.68

Feb. 2012 P4											
1	-	-	-	580.80	104.92	-	125.80	40.07	23.71	93.35	5.67
5	6.67	417.84	97.42	-	-	-	-	-	-	-	-
8	-	427.45	90.63	546.93	101.62	-	113.34	40.77	27.97	92.91	-
14	5.06	490.60	89.87	628.22	109.05	-	115.50	38.07	26.12	94.47	7.45
22	4.13	429.09	94.40	608.17	99.56	-	119.31	40.15	22.16	105.10	11.33
35	-	438.02	54.38	664.89	96.79	-	144.08	36.00	24.62	115.39	10.36
50	4.78	438.97	86.85	657.72	98.16	-	122.81	33.76	25.27	107.84	8.48

Feb. 2012 P12											
1	2.76	12.08	36.75	276.66	38.51	6.82	147.38	50.76	-	46.91	11.99
8	-	212.97	31.72	299.87	38.72	10.12	155.20	51.76	3.41	52.30	12.01
12	2.58	208.44	30.96	282.59	37.14	4.09	147.06	48.29	-	53.60	12.73
26	-	244.69	36.25	314.93	40.21	-	156.79	53.89	-	52.44	14.96
41	2.80	222.03	33.98	283.90	35.96	-	143.26	47.78	-	49.67	13.05
55	-	237.14	37.76	241.39	32.62	-	118.89	39.82	-	33.14	8.04
95	1.66	57.40	14.35	74.36	15.80	-	29.70	11.24	-	18.05	4.96

Feb. 2012 P16											
2	2.46	238.65	61.12	-	-	-	-	-	-	-	-
10	-	279.43	64.95	-	-	-	-	-	-	-	-
20	3.38	253.00	49.09	-	-	-	-	-	-	-	-
50	-	252.24	57.40	-	-	-	-	-	-	-	-
58	2.41	268.86	61.93	-	-	-	-	-	-	-	-
70	-	255.26	66.46	-	-	-	-	-	-	-	-
95	1.25	43.05	30.96	-	-	-	-	-	-	-	-

Feb. 2012 P20											
1	-	297.55	90.25	-	-	-	-	-	-	-	-
10	-	234.12	83.07	-	-	-	-	-	-	-	-
30	-	304.35	80.05	-	-	-	-	-	-	-	-
50	-	454.64	71.75	-	-	-	-	-	-	-	-
75	-	267.35	72.50	-	-	-	-	-	-	-	-
100	-	164.64	55.13	-	-	-	-	-	-	-	-

Feb. 2012 P26											
1	3.11	222.79	77.79	336.21	58.81	10.91	79.84	43.35	3.96	31.90	6.82
10	-	253.75	87.60	315.33	53.39	9.49	77.25	42.68	0.00	24.69	5.14
15	3.54	226.56	77.79	314.67	52.78	8.88	75.99	43.68	3.93	26.07	4.25
25	-	228.07	107.24	329.06	60.31	90.71	79.81	40.95	4.88	20.72	8.60

36	4.29	237.14	81.56	350.69	57.24	10.61	82.36	47.77	4.59	22.14	5.37
47	-	225.05	101.20	319.36	58.35	8.68	75.02	47.01	-	35.66	3.97
75	4.02	253.00	72.50	348.51	56.69	9.24	84.26	46.10	-	34.60	3.63
June 2012 P4											
2	4.33	312.66	57.40	260.07	74.44	-	25.17	-	-	-	-
13	-	306.62	120.83	-	-	-	-	-	-	-	-
18	7.07	220.52	194.85	348.55	125.29	-	33.15	-	-	-	-
25	-	196.36	120.83	-	-	-	-	-	-	-	-
31	5.11	107.24	48.33	277.78	205.43	-	32.82	-	-	-	-
71	-	128.55	78.54	-	-	-	-	-	-	-	-
103	2.76	72.50	49.84	65.91	39.58	-	-	-	-	-	-
June 2012 P12											
6	4.06	220.00	50.00	94.11	17.42	-	55.18	13.54	-	-	-
75	-	230.00	20.00	-	-	-	-	-	-	-	-
111	2.50	260.00	30.00	110.91	16.77	-	76.97	24.17	-	-	-
138	-	280.00	60.00	-	-	-	-	-	-	-	-
151	1.97	330.00	30.00	-	-	-	-	-	-	-	-
158	-	170.00	50.00	-	-	-	-	-	-	-	-
164	1.10	130.00	20.00	527.34	5.56	-	-	-	-	-	-
June 2012 P16											
5	5.15	220.00	50.00	142.92	26.97	-	92.53	18.59	-	-	15.40
9	-	130.00	20.00	-	-	-	-	-	-	-	-
16	5.67	260.00	130.00	188.11	37.67	-	96.80	20.46	-	25.13	15.59
25	-	280.00	160.00	-	-	-	-	-	-	-	-
35	5.15	330.00	30.00	317.23	87.74	-	171.55	41.02	-	-	-
43	-	130.00	50.00	-	-	-	-	-	-	-	-
66	2.78	170.00	20.00	77.70	35.58	-	41.25	16.11	-	-	-
June 2012 P20											
5	4.36	110.00	10.00	451.86	5.56	-	82.99	-	-	46.78	34.35
15	-	182.76	6.04	-	-	-	-	-	-	-	-
28	4.07	190.00	10.00	136.70	74.47	-	39.24	-	-	59.33	21.58
44	-	110.00	60.00	-	-	-	-	-	-	-	-
60	2.44	130.00	10.00	198.88	125.34	-	72.42	-	-	30.20	9.81
75	-	130.00	10.00	-	-	-	-	-	-	-	-
115	1.91	110.00	10.00	26.81	205.51	-	13.56	-	-	63.73	-
June 2012 P26											
5	5.21	280.00	50.00	254.86	35.60	-	68.20	16.11	-	178.39	18.67
8	-	230.00	30.00	-	-	-	-	-	-	-	-
15	5.22	230.00	40.00	253.79	17.43	-	97.35	13.54	-	-	18.37
23	-	240.00	40.00	-	-	-	-	-	-	-	-
32	-	220.00	40.00	290.59	16.78	-	109.79	24.17	-	27.18	23.23
39	-	200.00	20.00	-	-	-	-	-	-	-	-
60	3.18	140.00	20.00	198.98	-	-	232.74	-	-	86.43	43.46

Table S2: Size-fractionated particulate ^{234}Th and POC concentrations.

Depth (m)	$>53 \mu\text{m } ^{234}\text{Th}$ (dpm L^{-1})	$10 - 53 \mu\text{m } ^{234}\text{Th}$ (dpm L^{-1})	$1 - 10 \mu\text{m } ^{234}\text{Th}$ (dpm L^{-1})	$>53 \mu\text{m POC}$ ($\mu\text{mol L}^{-1}$)	$10 - 53 \mu\text{m POC}$ ($\mu\text{mol L}^{-1}$)	$1 - 10 \mu\text{m POC}$ ($\mu\text{mol L}^{-1}$)	$>53 \mu\text{m POC}/^{234}\text{Th}$	$10 - 53 \mu\text{m POC}/^{234}\text{Th}$	$1 - 10 \mu\text{m POC}/^{234}\text{Th}$
June 2011 P26									
30	0.106 ± 0.005	0.046 ± 0.003	0.047 ± 0.003	0.535 ± 0.027	0.191 ± 0.010	0.159 ± 0.008	5.0 ± 0.4	4.1 ± 0.4	3.4 ± 0.3
50	0.046 ± 0.002	0.050 ± 0.003	0.032 ± 0.002	0.139 ± 0.007	0.118 ± 0.006	0.061 ± 0.003	3.0 ± 0.2	2.4 ± 0.2	1.9 ± 0.2
100	0.087 ± 0.005	0.066 ± 0.004	-	0.129 ± 0.007	0.066 ± 0.005	-	1.5 ± 0.1	1.0 ± 0.1	-
150	0.049 ± 0.004	0.025 ± 0.002	0.051 ± 0.004	0.116 ± 0.006	0.023 ± 0.001	0.065 ± 0.004	2.4 ± 0.2	0.9 ± 0.1	1.3 ± 0.1
200	0.020 ± 0.001	0.050 ± 0.003	0.029 ± 0.002	0.026 ± 0.001	0.056 ± 0.003	0.017 ± 0.001	1.3 ± 0.1	1.1 ± 0.1	0.6 ± 0.0
Feb. 2012 P4									
30	0.007 ± 0.001	0.047 ± 0.004	0.045 ± 0.003	0.028 ± 0.002	0.183 ± 0.009	0.135 ± 0.007	3.9 ± 0.5	3.9 ± 0.4	3.0 ± 0.3
50	0.003 ± 0.000	0.019 ± 0.002	0.016 ± 0.001	0.039 ± 0.002	0.103 ± 0.005	0.077 ± 0.004	12.5 ± 1.7	5.5 ± 0.5	4.8 ± 0.5
100	0.016 ± 0.001	0.079 ± 0.005	0.048 ± 0.004	0.037 ± 0.002	0.135 ± 0.007	0.060 ± 0.003	2.3 ± 0.3	1.7 ± 0.1	1.2 ± 0.1
150	0.024 ± 0.002	0.080 ± 0.006	0.022 ± 0.002	0.042 ± 0.002	0.103 ± 0.005	0.036 ± 0.002	1.8 ± 0.2	1.3 ± 0.1	1.7 ± 0.2
Feb. 2012 P12									
30	0.009 ± 0.001	0.046 ± 0.004	0.023 ± 0.002	0.036 ± 0.002	0.184 ± 0.009	0.081 ± 0.004	4.1 ± 0.5	4.0 ± 0.4	3.5 ± 0.4
50	0.038 ± 0.003	0.040 ± 0.004	0.028 ± 0.003	0.101 ± 0.005	0.155 ± 0.008	0.086 ± 0.004	2.6 ± 0.3	3.9 ± 0.4	3.0 ± 0.3
100	0.036 ± 0.005	0.033 ± 0.004	0.022 ± 0.003	0.228 ± 0.013	0.265 ± 0.014	0.261 ± 0.014	6.3 ± 0.9	7.9 ± 1.1	11.6 ± 1.5
200	0.013 ± 0.001	0.066 ± 0.005	0.026 ± 0.003	0.037 ± 0.002	0.098 ± 0.005	0.042 ± 0.002	2.8 ± 0.3	1.5 ± 0.1	1.6 ± 0.2
Feb. 2012 P26									
30	0.118 ± 0.014	0.221 ± 0.028	0.120 ± 0.015	1.836 ± 0.106	2.858 ± 0.156	2.015 ± 0.114	-	-	-
50	0.037 ± 0.003	0.095 ± 0.006	0.077 ± 0.005	0.054 ± 0.003	0.244 ± 0.012	0.139 ± 0.007	1.5 ± 0.1	2.6 ± 0.2	1.8 ± 0.1
100	0.112 ± 0.013	0.153 ± 0.017	0.388 ± 0.047	0.194 ± 0.011	0.359 ± 0.019	1.113 ± 0.057	1.7 ± 0.2	2.3 ± 0.3	2.9 ± 0.4
200	0.015 ± 0.002	0.108 ± 0.008	0.022 ± 0.002	0.025 ± 0.001	0.128 ± 0.007	0.034 ± 0.002	1.7 ± 0.2	1.2 ± 0.1	1.5 ± 0.2
June 2012 P4									
30	0.063 ± 0.003	0.044 ± 0.005	0.005 ± 0.001	1.111 ± 0.029	0.285 ± 0.015	0.085 ± 0.005	17.6 ± 1.1	6.4 ± 0.8	15.6 ± 2.0
50	0.071 ± 0.006	0.032 ± 0.003	0.008 ± 0.001	0.702 ± 0.036	0.208 ± 0.011	0.052 ± 0.003	10.0 ± 1.0	6.5 ± 0.7	6.7 ± 0.9
200	0.014 ± 0.002	0.026 ± 0.002	0.010 ± 0.001	0.019 ± 0.001	0.058 ± 0.003	0.025 ± 0.002	1.3 ± 0.2	2.2 ± 0.2	2.4 ± 0.3

June 2012 P12

30	0.042 ± 0.004	0.014 ± 0.002	0.009 ± 0.001	0.113 ± 0.006	0.073 ± 0.004	0.048 ± 0.002	2.7 ± 0.3	5.1 ± 0.6	5.5 ± 0.7
50	0.062 ± 0.005	0.014 ± 0.002	0.009 ± 0.001	0.172 ± 0.009	0.070 ± 0.004	0.038 ± 0.002	2.8 ± 0.3	4.9 ± 0.6	4.4 ± 0.6
100	0.034 ± 0.004	0.068 ± 0.006	0.025 ± 0.003	0.053 ± 0.003	0.122 ± 0.006	0.041 ± 0.002	1.6 ± 0.2	1.8 ± 0.2	1.6 ± 0.2
200	0.032 ± 0.003	0.070 ± 0.006	0.018 ± 0.002	0.056 ± 0.003	0.102 ± 0.005	0.032 ± 0.002	1.8 ± 0.2	1.5 ± 0.1	1.8 ± 0.2

June 2012 P16

30	0.131 ± 0.009	0.014 ± 0.002	0.014 ± 0.002	0.398 ± 0.020	0.084 ± 0.004	0.054 ± 0.003	3.0 ± 0.3	6.1 ± 0.8	3.9 ± 0.5
50	0.127 ± 0.010	0.031 ± 0.003	0.022 ± 0.002	0.230 ± 0.012	0.091 ± 0.005	0.050 ± 0.003	1.8 ± 0.2	2.9 ± 0.3	2.3 ± 0.3
100	0.035 ± 0.003	0.036 ± 0.003	0.019 ± 0.002	0.076 ± 0.004	0.081 ± 0.004	0.026 ± 0.002	2.2 ± 0.2	2.2 ± 0.2	1.4 ± 0.2
200	0.035 ± 0.004	0.055 ± 0.006	0.022 ± 0.003	0.050 ± 0.003	0.075 ± 0.004	0.034 ± 0.002	1.4 ± 0.2	1.4 ± 0.2	1.5 ± 0.2

June 2012 P20

30	0.032 ± 0.004	0.018 ± 0.002	0.011 ± 0.001	0.060 ± 0.003	0.079 ± 0.004	0.044 ± 0.002	1.9 ± 0.2	4.3 ± 0.5	3.9 ± 0.5
50	0.040 ± 0.004	0.024 ± 0.003	0.017 ± 0.002	0.071 ± 0.003	0.081 ± 0.004	0.040 ± 0.002	1.8 ± 0.2	3.4 ± 0.4	2.4 ± 0.3
100	0.032 ± 0.003	0.102 ± 0.009	0.044 ± 0.004	0.025 ± 0.001	0.113 ± 0.006	0.024 ± 0.001	0.8 ± 0.1	1.1 ± 0.1	0.6 ± 0.1
200	0.021 ± 0.003	0.098 ± 0.009	0.023 ± 0.003	0.011 ± 0.000	0.065 ± 0.003	0.002 ± 0.000	0.5 ± 0.1	0.7 ± 0.1	0.1 ± 0.0

June 2012 P26

30	0.098 ± 0.007	0.046 ± 0.004	0.096 ± 0.007	0.332 ± 0.017	0.178 ± 0.009	0.191 ± 0.009	3.4 ± 0.3	3.9 ± 0.4	2.0 ± 0.2
50	0.041 ± 0.004	0.043 ± 0.004	0.040 ± 0.004	0.097 ± 0.005	0.082 ± 0.004	0.054 ± 0.003	2.4 ± 0.3	1.9 ± 0.2	1.3 ± 0.1
100	0.025 ± 0.003	0.029 ± 0.003	0.018 ± 0.002	0.040 ± 0.002	0.072 ± 0.004	0.015 ± 0.001	1.6 ± 0.2	2.5 ± 0.3	0.9 ± 0.1
200	0.012 ± 0.002	0.028 ± 0.003	0.010 ± 0.001	0.013 ± 0.001	0.059 ± 0.003	0.014 ± 0.001	1.1 ± 0.1	2.1 ± 0.3	1.3 ± 0.2

Table S3: Size-fractionated pigment proportion factors (PF) from particles collected by in situ pump and water column PFs from Niskin bottle samples.

Depth (m)	Pump									Bottle		
	>53 μm			10 - 53 μm			1 - 10 μm			mPF	nPF	pPF
	mPF	nPF	pPF	mPF	nPF	pPF	mPF	nPF	pPF	mPF	nPF	pPF
Aug. 2010 P12												
10	-	-	-	-	-	-	-	-	-	0.208	0.394	0.398
20	-	-	-	-	-	-	-	-	-	0.233	0.331	0.436
30	-	-	-	-	-	-	-	-	-	0.211	0.533	0.257
75	-	-	-	-	-	-	-	-	-	0.150	0.617	0.233
Aug. 2010 P16												
10	-	-	-	-	-	-	-	-	-	0.197	0.574	0.230
30	-	-	-	-	-	-	-	-	-	0.143	0.615	0.242
75	-	-	-	-	-	-	-	-	-	0.115	0.648	0.238
Aug. 2010 P20												
10	-	-	-	-	-	-	-	-	-	0.170	0.660	0.170
30	-	-	-	-	-	-	-	-	-	0.313	0.511	0.176
75	-	-	-	-	-	-	-	-	-	0.113	0.616	0.272
Feb. 2011 P12												
1	-	-	-	-	-	-	-	-	-	0.153	0.441	0.405
43	-	-	-	-	-	-	-	-	-	0.164	0.444	0.392
55	-	-	-	-	-	-	-	-	-	0.167	0.443	0.390
65	-	-	-	-	-	-	-	-	-	0.157	0.418	0.425
Feb. 2011 P16												
1	-	-	-	-	-	-	-	-	-	0.096	0.509	0.394
13	-	-	-	-	-	-	-	-	-	0.094	0.498	0.408
40	-	-	-	-	-	-	-	-	-	0.096	0.507	0.397
95	-	-	-	-	-	-	-	-	-	0.148	0.444	0.407
Feb. 2011 P20												
1	-	-	-	-	-	-	-	-	-	0.130	0.541	0.329
11	-	-	-	-	-	-	-	-	-	0.127	0.532	0.342
38	-	-	-	-	-	-	-	-	-	0.126	0.551	0.323
77	-	-	-	-	-	-	-	-	-	0.112	0.532	0.356
June 2011 P4												
1	-	-	-	-	-	-	-	-	-	0.158	0.474	0.368
9	-	-	-	-	-	-	-	-	-	0.150	0.457	0.393
25	-	-	-	-	-	-	-	-	-	0.086	0.466	0.448
72	-	-	-	-	-	-	-	-	-	0.102	0.569	0.329

June 2011 P12

5	-	-	-	-	-	-	-	-	-	0.138	0.460	0.402
15	-	-	-	-	-	-	-	-	-	0.142	0.486	0.372
40	-	-	-	-	-	-	-	-	-	0.204	0.675	0.121
90	-	-	-	-	-	-	-	-	-	0.257	0.537	0.206

June 2011 P16

1	-	-	-	-	-	-	-	-	-	0.244	0.642	0.114
26	-	-	-	-	-	-	-	-	-	0.251	0.631	0.118
56	-	-	-	-	-	-	-	-	-	0.161	0.652	0.187
105	-	-	-	-	-	-	-	-	-	0.136	0.519	0.344

June 2011 P20

1	-	-	-	-	-	-	-	-	-	0.231	0.615	0.154
15	-	-	-	-	-	-	-	-	-	0.289	0.560	0.151
34	-	-	-	-	-	-	-	-	-	0.274	0.605	0.121
70	-	-	-	-	-	-	-	-	-	0.180	0.429	0.392

June 2011 P26

1	-	-	-	-	-	-	-	-	-	0.257	0.493	0.250
5	-	-	-	-	-	-	-	-	-	0.246	0.490	0.264
9	-	-	-	-	-	-	-	-	-	0.227	0.449	0.324
10	-	-	-	-	-	-	-	-	-	0.281	0.506	0.213
14	-	-	-	-	-	-	-	-	-	0.276	0.509	0.215
16	-	-	-	-	-	-	-	-	-	0.219	0.470	0.310
24	-	-	-	-	-	-	-	-	-	0.261	0.492	0.247
30	0.545	0.351	0.104	0.487	0.442	0.071	0.421	0.498	0.081	-	-	-
49	-	-	-	-	-	-	-	-	-	0.295	0.539	0.166
50	0.630	0.288	0.083	0.606	0.326	0.067	0.496	0.431	0.073	-	-	-
52	-	-	-	-	-	-	-	-	-	0.223	0.580	0.198
83	-	-	-	-	-	-	-	-	-	0.264	0.431	0.305
85	-	-	-	-	-	-	-	-	-	0.241	0.580	0.180
100	0.809	0.119	0.072	0.729	0.198	0.073	0.712	0.225	0.063	-	-	-
150	0.505	0.495	0.000	0.532	0.327	0.142	0.526	0.474	0.000	-	-	-
200	0.585	0.226	0.189	0.590	0.161	0.249	0.451	0.332	0.217	-	-	-

Feb. 2012 P4

1	-	-	-	-	-	-	-	-	-	0.267	0.482	0.252
8	-	-	-	-	-	-	-	-	-	0.270	0.483	0.247
14	-	-	-	-	-	-	-	-	-	0.280	0.458	0.263
22	-	-	-	-	-	-	-	-	-	0.252	0.458	0.290
30	0.667	0.317	0.016	0.660	0.278	0.062	0.543	0.376	0.080	-	-	-
35	-	-	-	-	-	-	-	-	-	0.227	0.479	0.294
50	0.666	0.334	0.000	0.638	0.269	0.094	0.527	0.397	0.076	0.248	0.461	0.291
100	0.615	0.385	0.000	0.529	0.354	0.117	0.584	0.332	0.085	-	-	-

150	0.444	0.298	0.258	0.480	0.438	0.083	0.590	0.410	0.000	-	-	-
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Feb. 2012 P12

1	-	-	-	-	-	-	-	-	-	0.149	0.656	0.195
8	-	-	-	-	-	-	-	-	-	0.151	0.650	0.199
12	-	-	-	-	-	-	-	-	-	0.136	0.645	0.219
26	-	-	-	-	-	-	-	-	-	0.126	0.662	0.212
30	0.633	0.291	0.076	0.431	0.481	0.088	0.279	0.568	0.153	-	-	-
41	-	-	-	-	-	-	-	-	-	0.124	0.659	0.216
50	0.514	0.396	0.089	0.380	0.492	0.128	0.234	0.517	0.249	-	-	-
55	-	-	-	-	-	-	-	-	-	0.140	0.683	0.177
95	-	-	-	-	-	-	-	-	-	0.192	0.515	0.293
100	0.509	0.491	0.000	0.330	0.501	0.169	0.435	0.565	0.000	-	-	-
200	0.283	0.717	0.000	0.480	0.393	0.127	0.251	0.749	0.000	-	-	-

Feb. 2012 P26

1	-	-	-	-	-	-	-	-	-	0.296	0.540	0.164
10	-	-	-	-	-	-	-	-	-	0.296	0.564	0.140
15	-	-	-	-	-	-	-	-	-	0.286	0.574	0.140
25	-	-	-	-	-	-	-	-	-	0.494	0.411	0.096
30	0.680	0.265	0.055	0.799	0.201	0.000	0.699	0.301	0.000	-	-	-
36	-	-	-	-	-	-	-	-	-	0.295	0.586	0.119
47	-	-	-	-	-	-	-	-	-	0.293	0.534	0.173
50	0.778	0.172	0.050	0.672	0.229	0.099	0.654	0.258	0.088	-	-	-
75	-	-	-	-	-	-	-	-	-	0.281	0.556	0.163
100	0.666	0.197	0.138	0.596	0.253	0.151	0.590	0.268	0.142	-	-	-
200	0.734	0.266	0.000	0.502	0.237	0.261	0.668	0.332	0.000	-	-	-

June 2012 P4

2	-	-	-	-	-	-	-	-	-	0.747	0.253	0.000
18	-	-	-	-	-	-	-	-	-	0.791	0.209	0.000
30	0.720	0.158	0.122	0.902	0.072	0.026	0.883	0.100	0.017	-	-	-
31	-	-	-	-	-	-	-	-	-	0.862	0.138	0.000
50	-	-	-	-	-	-	0.884	0.069	0.048	-	-	-
103	-	-	-	-	-	-	-	-	-	1.000	0.000	0.000
200	0.856	0.112	0.032	-	-	-	0.851	0.149	0.000	-	-	-

June 2012 P12

6	-	-	-	-	-	-	-	-	-	0.202	0.798	0.000
30	0.555	0.412	0.033	0.576	0.386	0.038	-	-	-	-	-	-
50	0.552	0.388	0.060	0.595	0.359	0.046	0.381	0.490	0.129	-	-	-
100	0.738	0.213	0.049	0.541	0.369	0.090	0.416	0.517	0.067	-	-	-
111	-	-	-	-	-	-	-	-	-	0.142	0.858	0.000
164	-	-	-	-	-	-	-	-	-	1.000	0.000	0.000
200	0.298	0.542	0.161	0.309	0.589	0.103	0.247	0.753	0.000	-	-	-

Table S4: Chl *a* and indicator pigment concentrations determined by HPLC from in situ pump samples.

Depth (m)	Size-fraction	Chl <i>a</i> (ng L ⁻¹)	FUCO (ng L ⁻¹)	PER (ng L ⁻¹)	HEX (ng L ⁻¹)	BUT (ng L ⁻¹)	ALLO (ng L ⁻¹)	Chl <i>b</i> (ng L ⁻¹)	ZEA (ng L ⁻¹)
June 2011 P26									
30	>53 μm	511.12	229.16	7.54	119.35	27.87	4.93	33.69	11.48
30	10 - 53 μm	673.72	264.61	9.77	188.55	56.52	3.78	25.35	14.55
30	1 - 10 μm	625.27	227.05	7.24	212.78	60.45	3.92	26.18	19.07
50	>53 μm	82.39	55.73	12.81	24.99	6.35	-	5.95	3.03
50	10 - 53 μm	121.63	72.34	21.95	40.85	9.91	-	6.08	4.41
50	1 - 10 μm	47.43	24.51	9.17	24.14	5.13	-	3.17	1.75
100	>53 μm	33.61	20.82	1.60	2.61	0.01	0.68	1.23	0.77
100	10 - 53 μm	139.07	73.64	7.63	7.69	12.98	1.36	6.95	1.20
100	1 - 10 μm	11.67	6.35	1.10	1.15	1.21	0.003	0.52	0.14
150	>53 μm	5.61	1.94	1.91	3.36	0.41	-	-	-
150	10 - 53 μm	18.50	7.01	4.24	5.79	1.12	-	2.60	0.40
150	1 - 10 μm	3.32	1.11	0.96	1.56	0.31	-	-	-
200	>53 μm	6.21	3.00	1.31	1.17	0.003	0.50	0.77	0.63
200	10 - 53 μm	15.53	5.93	2.52	1.46	0.01	0.84	2.86	0.70
200	1 - 10 μm	3.50	1.31	0.52	0.54	0.65	0.16	0.67	0.21
Feb. 2012 P4									
30	>53 μm	40.59	20.44	-	7.63	1.19	0.89	-	0.49
30	10 - 53 μm	545.35	268.88	76.29	112.12	21.34	11.74	32.34	-
30	1 - 10 μm	432.97	204.00	-	111.84	17.21	12.35	24.57	5.60
50	>53 μm	17.62	10.00	-	4.35	0.66	-	-	-
50	10 - 53 μm	203.71	102.04	29.95	43.46	7.72	4.39	9.15	10.24
50	1 - 10 μm	220.87	100.64	-	60.78	7.97	7.06	11.86	2.75
100	>53 μm	5.28	2.85	-	1.51	0.27	-	-	-
100	10 - 53 μm	50.51	26.90	6.81	18.45	3.15	0.99	6.68	0.78
100	1 - 10 μm	39.13	20.82	2.66	10.92	1.76	0.67	2.65	0.76
150	>53 μm	3.26	1.86	0.67	1.23	0.47	-	-	1.48
150	10 - 53 μm	19.19	7.44	2.90	7.78	0.97	0.67	1.78	-
150	1 - 10 μm	4.77	2.41	0.00	1.68	-	-	-	-
Feb. 2012 P12									
30	>53 μm	20.81	12.90	1.96	4.66	2.18	-	1.78	-
30	10 - 53 μm	297.72	105.62	40.44	126.95	32.07	4.14	26.73	3.25
30	1 - 10 μm	86.74	18.82	10.23	44.53	12.84	1.74	14.36	1.55
50	>53 μm	103.21	62.46	16.84	41.04	9.41	10.66	11.97	1.78
50	10 - 53 μm	253.18	71.78	27.49	95.03	28.12	5.27	30.50	3.06
50	1 - 10 μm	159.39	26.82	13.44	63.47	23.15	2.49	40.10	2.78
100	>53 μm	2.24	0.97	-	0.70	0.23	-	-	-
100	10 - 53 μm	3.24	0.72	0.53	1.56	0.33	-	0.64	-
100	1 - 10 μm	2.67	1.09	-	1.04	0.36	-	-	-
200	>53 μm	1.72	0.39	-	0.69	0.28	-	-	-
200	10 - 53 μm	22.18	6.25	3.58	4.64	1.77	1.65	2.60	-
200	1 - 10 μm	4.75	0.93	-	2.08	0.68	-	-	-
Feb. 2012 P26									
30	>53 μm	1355.87	597.74	332.35	271.35	91.56	-	74.59	-
30	10 - 53 μm	437.92	231.80	86.08	50.77	29.04	-	-	-
30	1 - 10 μm	188.72	73.00	63.13	34.57	24.05	-	-	-
50	>53 μm	76.53	64.69	10.68	9.77	6.31	0.59	3.56	1.23
50	10 - 53 μm	452.25	227.96	92.37	75.94	26.42	7.00	40.92	6.31
50	1 - 10 μm	434.35	178.31	131.28	85.77	28.27	8.09	34.14	7.47
100	>53 μm	110.25	72.78	10.23	13.40	11.11	-	13.19	3.99

100	10 - 53 µm	115.33	57.53	12.36	20.41	9.22	-	17.65	-
100	1 - 10 µm	125.06	53.84	36.95	27.93	9.40	3.95	19.38	2.45
200	>53 µm	1.49	0.56	0.92	0.35	0.19	-	-	-
200	10 - 53 µm	11.51	3.31	4.43	2.23	0.97	0.45	4.02	-
200	1 - 10 µm	1.95	0.51	0.76	0.41	0.22	-	-	-

June 2012 P4

30	>53 µm	230.87	223.78	19.14	42.55	-	10.71	13.92	27.17
30	10 - 53 µm	352.30	236.17	-	18.89	-	-	-	6.85
30	1 - 10 µm	117.89	73.57	4.75	7.08	-	1.74	-	1.53
50	>53 µm	557.66	423.75	29.72	22.22	-	-	-	14.00
50	10 - 53 µm	479.75	329.71	19.32	13.46	-	-	-	-
50	1 - 10 µm	61.77	48.71	5.09	4.19	-	-	1.49	1.41
200	>53 µm	10.41	8.90	0.46	1.22	-	-	-	0.35
200	10 - 53 µm	20.83	18.84	-	3.20	-	-	-	0.94
200	1 - 10 µm	1.96	2.69	-	0.47	-	-	-	-

June 2012 P12

30	>53 µm	42.53	23.34	-	13.35	3.96	-	1.37	-
30	10 - 53 µm	33.69	16.84	-	10.02	1.26	-	1.11	-
30	1 - 10 µm	10.89	3.79	-	4.98	0.55	-	0.98	-
50	>53 µm	60.19	31.10	-	15.81	6.03	-	2.58	0.80
50	10 - 53 µm	34.02	23.14	-	11.89	2.07	-	1.80	-
50	1 - 10 µm	4.65	2.39	-	2.74	0.33	-	0.81	-
100	>53 µm	15.59	11.04	4.48	3.66	0.82	-	1.04	-
100	10 - 53 µm	38.28	20.46	6.75	14.10	4.45	-	4.53	-
100	1 - 10 µm	2.28	7.55	1.23	9.12	1.77	-	1.42	-
200	>53 µm	1.25	1.14	-	1.83	0.25	-	0.62	-
200	10 - 53 µm	1.61	1.43	-	2.72	-	-	0.47	-
200	1 - 10 µm	0.37	0.20	-	0.61	-	-	-	-

June 2012 P16

30	>53 µm	26.25	13.87	-	3.85	0.54	-	2.87	-
30	10 - 53 µm	9.10	5.90	-	1.83	0.31	-	-	-
30	1 - 10 µm	6.95	4.00	0.57	2.25	0.34	-	0.25	0.23
50	>53 µm	18.31	10.14	1.45	7.60	0.58	0.52	2.31	0.78
50	10 - 53 µm	12.96	7.26	1.31	5.84	0.83	-	0.65	-
50	1 - 10 µm	7.04	3.79	0.62	5.25	0.30	-	0.40	-
100	>53 µm	8.68	8.89	1.25	1.22	0.20	-	-	-
100	10 - 53 µm	21.76	16.93	2.10	2.17	1.84	-	0.92	-
100	1 - 10 µm	3.21	3.73	0.71	1.62	0.33	-	0.48	-
200	>53 µm	0.33	0.29	-	0.32	-	-	-	-
200	10 - 53 µm	1.31	1.24	-	0.42	-	-	-	-
200	1 - 10 µm	-	0.05	-	0.10	-	-	-	-

June 2012 P20

30	>53 µm	2.00	1.48	-	1.03	0.18	-	0.25	0.47
30	10 - 53 µm	5.04	3.14	0.36	1.05	0.38	-	0.34	0.26
30	1 - 10 µm	2.03	0.90	0.20	0.92	0.30	-	0.27	0.25
50	>53 µm	2.41	1.89	0.35	-	0.31	-	0.78	0.31
50	10 - 53 µm	9.69	7.37	1.60	-	0.46	-	1.32	-
50	1 - 10 µm	3.22	2.24	1.34	-	0.23	-	0.41	-
100	>53 µm	0.61	0.61	0.15	-	0.08	-	0.18	0.04
100	10 - 53 µm	5.46	3.81	0.71	0.85	0.61	-	0.60	-
100	1 - 10 µm	0.65	0.58	0.08	0.65	0.17	-	0.14	-
200	>53 µm	0.16	0.14	-	0.18	-	-	0.00	-

200	10 - 53 μm	0.49	0.38	-	0.58	-	-	0.18	-
200	1 - 10 μm	-	0.06	-	0.12	-	-	-	-

June 2012 P26

30	>53 μm	72.84	41.00	-	16.83	2.54	-	2.72	-
30	10 - 53 μm	62.61	39.83	1.45	8.21	2.71	-	-	-
30	1 - 10 μm	63.80	32.56	1.17	21.47	8.08	-	2.08	-
50	>53 μm	10.90	7.21	0.76	3.89	0.98	-	0.76	-
50	10 - 53 μm	26.13	15.79	1.84	6.98	1.62	-	1.86	-
50	1 - 10 μm	16.68	6.53	4.24	8.60	1.70	-	0.94	-
100	>53 μm	3.93	4.67	-	-	0.45	-	0.39	-
100	10 - 53 μm	7.03	5.06	0.69	1.24	0.56	-	0.61	0.13
100	1 - 10 μm	2.56	2.49	0.29	1.98	0.48	-	0.54	-
200	>53 μm	0.20	0.22	-	0.14	0.05	-	-	-
200	10 - 53 μm	0.45	0.48	-	-	-	-	-	-
200	1 - 10 μm	0.07	0.11	-	-	0.05	-	-	-

Table S5: Total ^{234}Th and ^{238}U activities, $^{234}\text{Th}/^{238}\text{U}$ activity ratios, and ^{234}Th fluxes.

Depth (m)	Total ^{234}Th (dpm L ⁻¹)	^{238}U (dpm L ⁻¹)	$^{234}\text{Th}/^{238}\text{U}$ AR	P_{Th} (dpm m ⁻² d ⁻¹)	Trap_{Th} (dpm m ⁻² d ⁻¹)
Aug. 2010 P4					
5	0.73 ± 0.06	2.27	0.32	-	-
10	1.08 ± 0.09	2.27	0.47	-	-
20	-	2.28	-	-	-
21	1.33 ± 0.10	2.28	0.58	-	-
30	1.81 ± 0.12	2.29	0.79	794 ± 97	-
50	2.26 ± 0.15	2.30	0.98	944 ± 163	-
75	2.25 ± 0.17	2.32	0.97	-	-
100	2.69 ± 0.17	2.36	1.14	894 ± 393	-
150	2.06 ± 0.13	2.39	0.86	901 ± 611	-
200	-	2.40	-	1466 ± 830	-
300	2.43 ± 0.16	2.41	1.01	-	-
500	2.36 ± 0.16	2.42	0.98	-	-
Aug. 2010 P12					
5	1.10 ± 0.08	2.24	0.49	-	-
10	1.12 ± 0.08	2.24	0.50	-	-
20	0.78 ± 0.06	2.24	0.35	-	-
27	1.48 ± 0.11	2.28	0.65	-	-
30	1.49 ± 0.11	2.30	0.65	786 ± 71	-
50	1.80 ± 0.12	2.30	0.78	1163 ± 132	-
75	1.84 ± 0.13	2.30	0.80	-	-
100	2.06 ± 0.13	2.32	0.89	1774 ± 310	-
150	2.35 ± 0.15	2.36	0.99	1972 ± 513	-
200	2.52 ± 0.17	2.39	1.05	1891 ± 744	-
300	2.19 ± 0.15	2.40	0.91	-	-
500	2.14 ± 0.14	2.41	0.89	-	-
Aug. 2010 P16					
5	1.49 ± 0.10	2.30	0.65	-	-
10	1.84 ± 0.14	2.30	0.80	-	-
20	1.54 ± 0.11	2.30	0.67	-	-
30	0.96 ± 0.07	2.30	0.42	472 ± 104	-
40	1.66 ± 0.11	2.31	0.72	-	-
50	1.87 ± 0.12	2.31	0.81	918 ± 155	-
75	2.21 ± 0.15	2.32	0.95	-	-
100	2.23 ± 0.15	2.33	0.96	1194 ± 355	-
150	2.33 ± 0.16	2.39	0.97	1316 ± 573	-
200	2.06 ± 0.13	2.39	0.86	1603 ± 780	-
300	2.38 ± 0.16	2.40	0.99	-	-
500	2.50 ± 0.16	2.41	1.03	-	-

Aug. 2010 P20

5	1.30 ± 0.11	2.30	0.56	-	-
10	1.33 ± 0.09	2.30	0.58	-	-
20	1.72 ± 0.12	2.30	0.75	-	-
30	1.80 ± 0.13	2.30	0.78	560 ± 87	-
36	1.51 ± 0.11	2.31	0.65	-	-
50	1.68 ± 0.12	2.31	0.73	960 ± 151	-
75	2.03 ± 0.14	2.32	0.88	-	-
100	1.99 ± 0.13	2.35	0.85	1521 ± 338	-
150	2.20 ± 0.14	2.39	0.92	1913 ± 536	-
200	2.48 ± 0.16	2.39	1.04	1982 ± 758	-
300	2.33 ± 0.16	2.40	0.97	-	-
500	-	2.41	-	-	-

Aug. 2010 P26

5	1.02 ± 0.07	2.31	0.44	-	-
10	1.32 ± 0.10	2.31	0.57	-	-
20	1.07 ± 0.08	2.31	0.46	-	-
30	1.67 ± 0.12	2.32	0.72	846 ± 93	-
35	1.33 ± 0.09	2.32	0.57	-	-
50	1.35 ± 0.10	2.32	0.58	1386 ± 139	-
75	1.83 ± 0.12	2.32	0.79	-	-
100	2.08 ± 0.14	2.33	0.89	2184 ± 300	-
150	2.30 ± 0.16	2.39	0.96	2429 ± 518	-
200	2.27 ± 0.15	2.39	0.95	2576 ± 742	-
300	2.03 ± 0.13	2.40	0.84	-	-
500	2.28 ± 0.14	2.42	0.94	-	-

Feb. 2011 P12

1	1.96 ± 0.13	2.29	0.86	-	-
5	2.13 ± 0.14	2.29	0.93	-	-
10	2.18 ± 0.15	2.29	0.95	-	-
20	2.12 ± 0.14	2.29	0.93	-	-
30	2.22 ± 0.15	2.29	0.97	234 ± 171	-
50	2.01 ± 0.13	2.29	0.88	337 ± 234	-
75	2.25 ± 0.15	2.29	0.98	-	-
100	2.35 ± 0.15	2.35	1.00	468 ± 426	-
150	2.51 ± 0.16	2.39	1.05	381 ± 648	-
200	2.44 ± 0.16	2.40	1.02	265 ± 878	-
300	2.35 ± 0.15	2.40	0.98	-	-
500	2.37 ± 0.15	2.41	0.98	-	-

Feb. 2011 P16

1	1.87 ± 0.13	2.31	0.81	-	-
10	2.05 ± 0.13	2.31	0.89	-	-

20	2.09 ± 0.14	2.31	0.91	-	-
30	1.48 ± 0.10	2.31	0.64	335 ± 120	-
40	2.04 ± 0.13	2.31	0.89	-	-
50	1.97 ± 0.13	2.31	0.85	579 ± 188	-
75	2.02 ± 0.14	2.31	0.88	-	-
100	2.42 ± 0.16	2.34	1.03	879 ± 387	-
150	2.37 ± 0.15	2.39	0.99	834 ± 610	-
200	2.40 ± 0.15	2.39	1.00	838 ± 830	-
300	2.43 ± 0.16	2.40	1.01	-	-
500	2.30 ± 0.15	2.41	0.95	-	-

Feb. 2011 P20

1	2.12 ± 0.14	2.30	0.92	-	-
10	2.06 ± 0.14	2.30	0.90	-	-
20	1.99 ± 0.13	2.30	0.87	-	-
30	2.07 ± 0.14	2.30	0.90	215 ± 120	-
35	2.05 ± 0.14	2.30	0.89	-	-
50	2.03 ± 0.14	2.30	0.88	360 ± 196	-
75	1.95 ± 0.13	2.30	0.85	-	-
100	2.47 ± 0.16	2.35	1.05	661 ± 394	-
150	2.46 ± 0.16	2.39	1.03	526 ± 624	-
200	2.55 ± 0.17	2.39	1.07	366 ± 860	-
300	2.27 ± 0.15	2.40	0.95	-	-
500	2.35 ± 0.16	2.41	0.97	-	-

Feb. 2011 P26

5	2.21 ± 0.14	2.31	0.95	-	-
10	2.31 ± 0.16	2.31	1.00	-	-
25	2.14 ± 0.15	2.31	0.93	-	-
30	-	-	-	114 ± 132	-
50	2.30 ± 0.15	2.31	0.99	160 ± 211	-
75	2.31 ± 0.15	2.31	1.00	-	-
100	2.19 ± 0.15	2.36	0.93	224 ± 418	-
125	2.44 ± 0.15	2.38	1.03	-	-
150	2.27 ± 0.15	2.39	0.95	280 ± 636	-
175	2.07 ± 0.13	2.39	0.87	-	-
200	2.10 ± 0.14	2.39	0.88	659 ± 836	-
250	2.06 ± 0.13	2.40	0.86	-	-
300	2.15 ± 0.16	2.40	0.90	-	-

June 2011 P4

1	1.21 ± 0.09	2.25	0.54	-	-
10	1.15 ± 0.08	2.25	0.51	-	-
20	1.37 ± 0.10	2.28	0.60	-	-
30	1.61 ± 0.11	2.29	0.70	849 ± 91	-

39	1.61 ± 0.11	2.30	0.70	-	-
50	1.70 ± 0.12	2.30	0.74	1232 ± 149	-
75	2.27 ± 0.15	2.32	0.98	-	-
100	2.11 ± 0.14	2.36	0.89	1571 ± 341	-
150	2.16 ± 0.14	2.39	0.90	1921 ± 538	-
200	2.21 ± 0.14	2.40	0.92	2227 ± 741	-
300	2.32 ± 0.15	2.41	0.96	-	-
500	2.33 ± 0.16	2.42	0.96	-	-

June 2011 P12

1	1.22 ± 0.09	2.28	0.53	-	-
10	0.98 ± 0.07	2.29	0.43	-	-
20	1.30 ± 0.09	2.29	0.57	-	-
30	1.15 ± 0.08	2.30	0.50	899 ± 75	-
45	1.38 ± 0.09	2.30	0.60	-	-
50	1.82 ± 0.12	2.30	0.79	1450 ± 126	-
75	2.51 ± 0.16	2.32	1.08	-	-
100	2.46 ± 0.15	2.37	1.04	1456 ± 336	-
150	2.34 ± 0.15	2.39	0.98	1425 ± 550	-
200	2.16 ± 0.14	2.40	0.90	1631 ± 757	-
300	2.37 ± 0.15	2.40	0.99	-	-
500	2.24 ± 0.15	2.42	0.93	-	-

June 2011 P16

1	1.69 ± 0.11	2.31	0.73	-	-
10	1.56 ± 0.11	2.31	0.67	-	-
20	1.86 ± 0.12	2.31	0.80	-	-
30	1.04 ± 0.08	2.31	0.45	544 ± 95	-
50	1.40 ± 0.09	2.31	0.61	1172 ± 141	-
60	1.79 ± 0.12	2.31	0.77	-	-
75	1.82 ± 0.12	2.31	0.79	-	-
100	2.50 ± 0.16	2.33	1.07	1715 ± 321	-
150	2.56 ± 0.16	2.39	1.07	1474 ± 553	-
200	2.27 ± 0.14	2.39	0.95	1447 ± 774	-
300	2.20 ± 0.14	2.40	0.92	-	-
500	-	2.41	-	-	-

June 2011 P20

1	1.56 ± 0.11	2.30	0.68	-	-
10	1.55 ± 0.10	2.30	0.67	-	-
20	1.34 ± 0.09	2.30	0.58	-	-
30	1.50 ± 0.10	2.30	0.65	746 ± 86	-
50	1.48 ± 0.10	2.30	0.64	1217 ± 143	-
55	1.56 ± 0.11	2.30	0.68	-	-
75	2.24 ± 0.15	2.31	0.97	-	-

100	2.54 ± 0.16	2.34	1.09	1525 ± 340	-
150	2.47 ± 0.16	2.39	1.03	1335 ± 569	-
200	2.20 ± 0.14	2.39	0.92	1424 ± 785	-
300	2.32 ± 0.15	2.40	0.97	-	-
500	2.39 ± 0.16	2.42	0.99	-	-

June 2011 P26 D (Trap Depolyment)

1	1.17 ± 0.08	2.31	0.51	-	-
10	1.30 ± 0.08	2.31	0.56	-	-
20	1.20 ± 0.08	2.31	0.52	-	-
30	1.27 ± 0.09	2.31	0.55	949 ± 78	3192 ± 117
45	1.38 ± 0.09	2.31	0.60	-	-
50	1.35 ± 0.09	2.32	0.58	1514 ± 126	2909 ± 92
75	2.12 ± 0.13	2.32	0.91	-	-
83	-	-	-	1974 ± 235	-
100	2.24 ± 0.14	2.32	0.96	2033 ± 301	2256 ± 94
150	2.49 ± 0.16	2.39	1.04	2021 ± 514	1928 ± 79
200	2.51 ± 0.16	2.39	1.05	1867 ± 739	2281 ± 97
300	2.28 ± 0.14	2.40	0.95	-	-
500	2.30 ± 0.14	2.42	0.95	-	-

June 2011 P26 R (Trap Recovery)

1	1.22 ± 0.08	2.32	0.53	-	-
10	1.35 ± 0.09	2.32	0.58	-	-
20	1.20 ± 0.08	2.32	0.52	-	-
30	1.28 ± 0.08	2.32	0.55	923 ± 78	3192 ± 117
48	1.68 ± 0.11	2.32	0.73	-	-
50	1.59 ± 0.10	2.32	0.68	1395 ± 130	2909 ± 92
75	2.01 ± 0.12	2.32	0.87	-	-
85	-	-	-	1847 ± 246	-
100	2.25 ± 0.13	2.32	0.97	1910 ± 301	2256 v 94
150	2.47 ± 0.14	2.36	1.05	1881 ± 499	1928 ± 79
200	2.29 ± 0.14	2.39	0.96	1871 ± 705	2281 ± 97
300	2.31 ± 0.14	2.40	0.96	-	-
500	2.38 ± 0.14	2.42	0.98	-	-

Feb. 2012 P4

1	1.79 ± 0.12	2.30	0.78	-	-
10	1.74 ± 0.11	2.30	0.76	-	-
20	1.94 ± 0.13	2.30	0.85	-	-
30	1.91 ± 0.13	2.30	0.83	336 ± 135	-
40	1.74 ± 0.11	2.30	0.76	-	-
50	2.09 ± 0.13	2.30	0.91	581 ± 193	-
75	2.00 ± 0.13	2.31	0.87	-	-
100	1.99 ± 0.13	2.37	0.84	1015 ± 370	-

150	2.23 ± 0.14	2.39	0.93	1401 ± 562	-
200	2.22 ± 0.14	2.40	0.93	1646 ± 763	-
300	2.40 ± 0.15	2.40	1.00	-	-
500	2.28 ± 0.15	2.42	0.94	-	-

Feb. 2012 P12

1	1.94 ± 0.11	2.31	0.84	-	-
10	1.70 ± 0.10	2.31	0.73	-	-
20	2.07 ± 0.12	2.31	0.90	-	-
30	2.04 ± 0.12	2.31	0.88	350 ± 104	-
40	-	2.31	-	-	-
50	2.18 ± 0.14	2.31	0.94	356 ± 180	-
75	1.91 ± 0.12	2.31	0.83	-	-
100	2.17 ± 0.13	2.31	0.94	739 ± 357	-
150	2.79 ± 0.16	2.39	1.17	551 ± 571	-
200	2.66 ± 0.17	2.40	1.11	71 ± 807	-
300	2.41 ± 0.15	2.40	1.01	-	-
500	2.35 ± 0.15	2.42	0.97	-	-

Feb. 2012 P16

1	1.76 ± 0.11	2.31	0.76	-	-
10	1.64 ± 0.11	2.31	0.71	-	-
20	1.81 ± 0.11	2.31	0.78	-	-
30	1.81 ± 0.11	2.31	0.78	435 ± 105	-
40	1.83 ± 0.11	2.31	0.79	-	-
50	1.80 ± 0.11	2.31	0.78	719 ± 165	-
75	2.24 ± 0.14	2.31	0.97	-	-
100	2.40 ± 0.14	2.31	1.04	922 ± 352	-
150	2.71 ± 0.16	2.40	1.13	632 ± 567	-
200	2.83 ± 0.17	2.40	1.18	96 ± 799	-
300	2.73 ± 0.16	2.40	1.14	-	-
500	2.75 ± 0.15	2.41	1.14	-	-

Feb. 2012 P20

1	2.16 ± 0.13	2.31	0.93	-	-
10	2.06 ± 0.12	2.31	0.89	-	-
20	2.04 ± 0.12	2.31	0.88	-	-
30	2.03 ± 0.12	2.31	0.88	121 ± 123	-
40	2.27 ± 0.14	2.31	0.98	-	-
50	1.98 ± 0.12	2.31	0.86	220 ± 188	-
75	2.13 ± 0.12	2.31	0.92	-	-
100	1.97 ± 0.12	2.31	0.85	593 ± 357	-
150	2.68 ± 0.16	2.40	1.12	636 ± 555	-
200	2.23 ± 0.14	2.40	0.93	545 ± 765	-
300	2.35 ± 0.14	2.40	0.98	-	-

500	2.45 ± 0.14	2.41	1.02	-	-
Feb. 2012 P26					
1	1.90 ± 0.12	2.31	0.82	-	-
10	2.33 ± 0.14	2.31	1.01	-	-
20	2.12 ± 0.12	2.31	0.92	-	-
30	2.23 ± 0.13	2.31	0.96	78 ± 125	-
50	2.31 ± 0.14	2.31	1.00	105 ± 194	-
75	2.07 ± 0.12	2.31	0.90	195 ± 283	-
100	2.03 ± 0.12	2.31	0.88	386 ± 369	-
125	1.65 ± 0.10	2.32	0.71	-	-
150	2.55 ± 0.14	2.37	1.08	898 ± 534	-
200	2.49 ± 0.15	2.39	1.04	694 ± 741	-
300	2.56 ± 0.15	2.40	1.07	-	-
500	2.58 ± 0.15	2.41	1.07	-	-

June 2012 P4					
1	0.84 ± 0.06	2.25	0.38	-	-
10	0.82 ± 0.06	2.25	0.36	-	-
20	0.91 ± 0.07	2.25	0.40	-	-
30	1.70 ± 0.12	2.28	0.75	907 ± 91	-
40	1.99 ± 0.14	2.30	0.86	-	-
50	1.88 ± 0.13	2.31	0.82	1143 ± 155	-
75	2.37 ± 0.16	2.31	1.03	-	-
100	1.91 ± 0.13	2.34	0.81	1408 ± 359	-
150	2.49 ± 0.16	2.39	1.04	1649 ± 565	-
200	2.54 ± 0.17	2.40	1.06	1474 ± 798	-
300	2.26 ± 0.15	2.41	0.94	-	-
500	2.49 ± 0.16	2.42	1.03	-	-

June 2012 P12					
1	1.26 ± 0.08	2.31	0.54	-	-
10	1.38 ± 0.09	2.31	0.60	-	-
20	1.31 ± 0.09	2.31	0.57	-	-
30	1.73 ± 0.12	2.31	0.75	678 ± 90	-
50	2.03 ± 0.14	2.31	0.88	928 ± 161	-
60	2.02 ± 0.13	2.31	0.87	-	-
75	2.33 ± 0.15	2.31	1.01	-	-
100	2.55 ± 0.17	2.32	1.10	982 ± 373	-
150	2.02 ± 0.14	2.39	0.85	1085 ± 591	-
164	-	-	-	1209 ± 647	-
200	2.46 ± 0.16	2.40	1.03	1305 ± 805	-
300	2.36 ± 0.16	2.40	0.98	-	-
500	2.36 ± 0.16	2.41	0.98	-	-

June 2012 P16

1	1.62 ± 0.12	2.32	0.70	-	-
10	1.55 ± 0.11	2.32	0.67	-	-
20	1.38 ± 0.10	2.32	0.60	-	-
30	1.55 ± 0.11	2.32	0.67	637 ± 95	-
40	1.67 ± 0.12	2.32	0.72	-	-
50	1.80 ± 0.13	2.32	0.77	1008 ± 160	-
75	2.21 ± 0.15	2.32	0.95	-	-
100	2.33 ± 0.16	2.32	1.00	1270 ± 368	-
150	2.58 ± 0.17	2.40	1.08	1128 ± 603	-
200	2.44 ± 0.16	2.40	1.02	960 ± 842	-
300	2.37 ± 0.16	2.40	0.99	-	-
500	2.49 ± 0.16	2.41	1.03	-	-

June 2012 P20

1	1.61 ± 0.11	2.31	0.70	-	-
10	1.57 ± 0.11	2.31	0.68	-	-
20	1.62 ± 0.11	2.31	0.70	-	-
30	1.83 ± 0.13	2.31	0.79	551 ± 95	-
44	1.62 ± 0.11	2.31	0.70	-	-
50	2.36 ± 0.16	2.32	1.02	843 ± 167	-
75	2.12 ± 0.14	2.32	0.92	-	-
100	2.68 ± 0.17	2.32	1.15	841 ± 385	-
115	-	-	-	699 ± 458	-
150	2.57 ± 0.17	2.39	1.08	454 ± 629	-
200	-	2.40	-	192 ± 873	-
300	-	2.40	-	-	-
500	-	2.41	-	-	-

June 2012 P26 D (Trap Deployment)

1	1.64 ± 0.11	2.32	0.71	-	-
10	1.95 ± 0.13	2.32	0.84	-	-
20	1.51 ± 0.11	2.32	0.65	-	-
30	1.59 ± 0.11	2.32	0.69	513 ± 104	3999 ± 206
40	1.43 ± 0.10	2.32	0.62	-	-
50	1.39 ± 0.10	2.32	0.60	1008 ± 161	5485 ± 290
60	-	-	-	1241 ± 190	-
75	1.98 ± 0.13	2.32	0.85	-	-
100	2.12 ± 0.15	2.32	0.92	1655 ± 342	3154 ± 192
150	2.21 ± 0.15	2.38	0.93	1918 ± 551	2151 ± 135
200	2.19 ± 0.14	2.39	0.91	2186 ± 760	3959 ± 129
300	2.39 ± 0.16	2.40	1.00	-	-
500	2.51 ± 0.17	2.42	1.04	-	-

June 2012 P26 R (Trap Recovery)

1	1.34 ± 0.10	2.32	0.58	-	-
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10	1.38 ± 0.10	2.32	0.60	-	-
20	1.60 ± 0.11	2.32	0.69	-	-
30	1.71 ± 0.11	2.32	0.74	706 ± 94	3999 ± 206
40	1.71 ± 0.12	2.32	0.74	-	-
50	1.62 ± 0.11	2.32	0.70	1068 ± 157	5485 ± 290
60	-	-	-	1249 ± 188	-
75	1.95 ± 0.13	2.32	0.84	-	-
100	2.27 ± 0.14	2.32	0.98	1599 ± 338	3154 ± 192
150	2.41 ± 0.16	2.38	1.01	1617 ± 553	2151 ± 135
200	2.40 ± 0.16	2.39	1.01	1589 ± 780	3959 ± 129
300	2.33 ± 0.15	2.40	0.97	-	-
500	2.38 ± 0.16	2.42	0.98	-	-

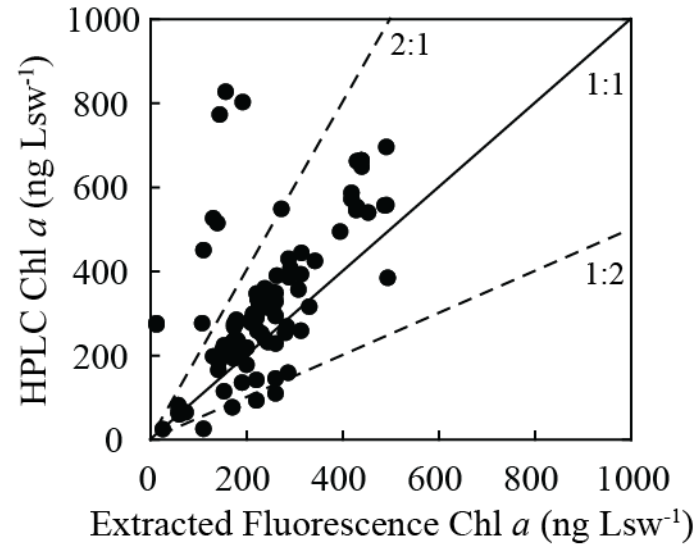


Figure S1. Comparison of fluorescence and high-performance liquid chromatography (HPLC) measurements of Chl *a* concentrations.

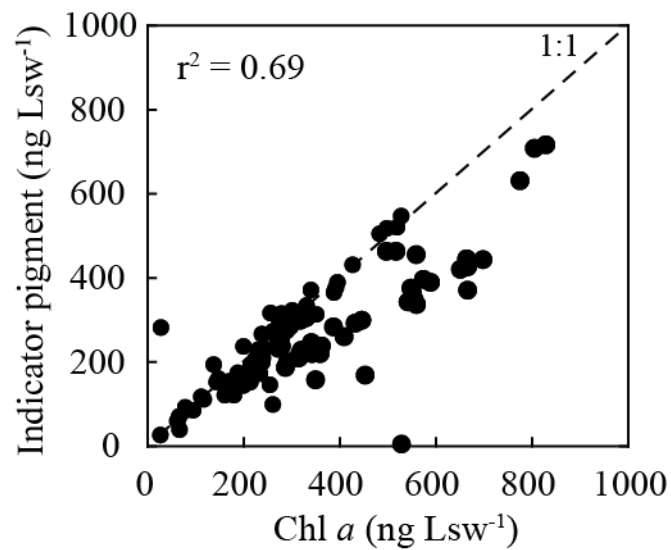
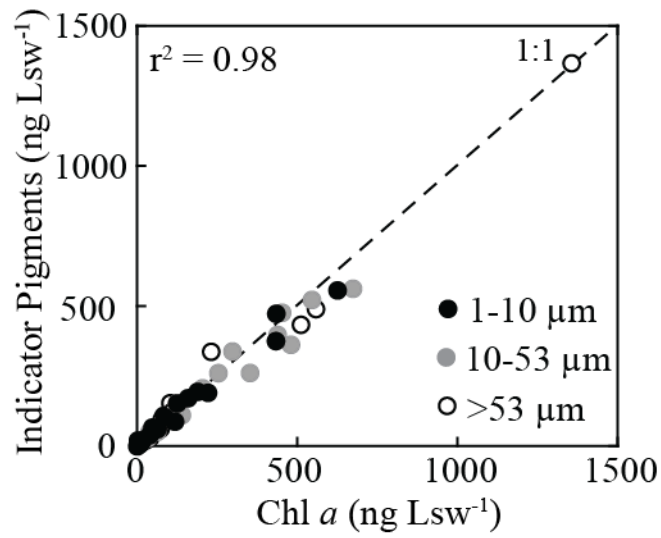


Figure S2. Chl *a* concentrations plotted against total indicator pigment concentrations for Niskin bottle samples. The correlation coefficient (r^2) is also shown.



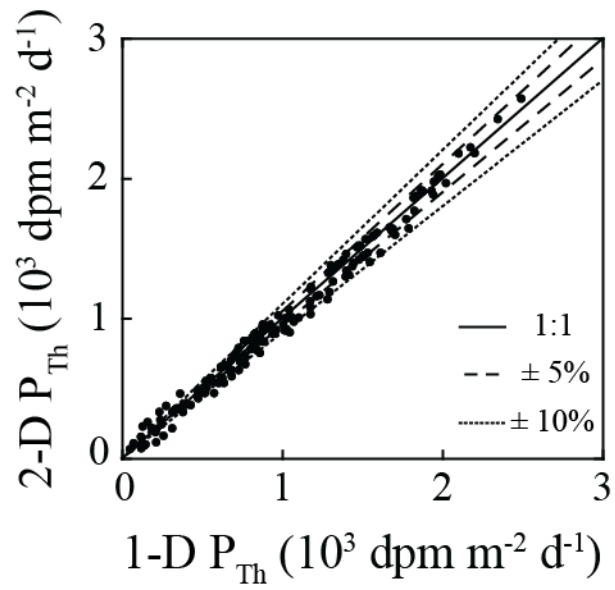


Figure S4. ^{234}Th fluxes determined by the 1-D steady-state model compared to those determined by the 2-D steady-state model. Dashed and dotted lines envelope 5% and 10% error ranges respectively.