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Carbon Flux Explorer optical assessment of C, N and P fluxes

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Table S1

cfe	dive	bottle	notes	PN mmol/filter raw	PN mmol/filter corrected	PN error	POC mmol/filter raw	POC mmol/filter corrected	POC error	PP mmols/filter raw	PP mmol/filter corrected	PP error	VA (mATN-cm^2) A*	VA (mATN-cm^2) B*
2	41	2		0.01551	0.0126052	0.0010	0.15696	0.125	0.019	1.46E-03	1.38E-03	4.90E-05	1358.97	1331.51
2	50	1		0.00705	0.0041452	0.0005	0.07696	0.045	0.010	1.36E-04	4.69E-05	2.96E-06	376.68	365.38
2	60	1								1.96E-04	1.46E-04	1.62E-05	420.00	411.85
4	60	1	C:N >20	0.00583	0.0020158	0.0005	0.12964	0.067	0.016	2.80E-04	1.59E-04	1.74E-05	211.90	194.07
2	61	2								1.70E-04	1.20E-04	1.59E-05	230.70	136.76
2	62	3								1.65E-04	1.15E-04	1.59E-05	276.91	255.22
4	62	3		0.00497	0.0014300	0.0005	0.04742	0.011	0.009	1.23E-04	5.00E-05	1.55E-05	281.93	297.94
2	70	1								8.55E-05	3.55E-05	1.54E-05	528.79	527.93
4	70	1		0.01095	0.0055484	0.0007	0.11799	0.059	0.015	6.67E-05	1.15E-05	1.53E-05	326.72	319.73
2	71	2		0.00580	0.0028952	0.0005	0.07318	0.041	0.010	1.55E-04	1.05E-04	1.58E-05	542.68	524.79
4	71	2								1.26E-04	5.23E-05	1.56E-05	290.95	254.46
2	72	3								8.20E-05	3.20E-05	1.54E-05	536.39	552.96
4	72	3	C:N >20	0.00507	0.0014915	0.0004	0.07934	0.033	0.011	1.39E-04	6.16E-05	1.56E-05	236.78	229.48
2	80	1		0.00318	0.0002752	0.0004	0.02668	-0.005	0.008	1.06E-04	8.66E-05	6.50E-06	199.13	155.71
2	81	2								6.35E-05	4.41E-05	5.93E-06	114.46	133.41
2	82	3	C:N >20	0.00532	0.0024127	0.0004	0.08365	0.052	0.011	3.85E-05	1.91E-05	5.76E-06	67.09	63.79
2	90	1								1.48E-04	1.28E-04	7.32E-06	151.91	151.96
4	90	1		0.00289	-0.0000102	0.0004	0.04166	0.007	0.008	4.91E-05	2.05E-05	5.82E-06	100.53	97.69
2	91	2		0.00309	0.0001852	0.0004	0.03408	0.002	0.008	6.77E-05	4.83E-05	5.97E-06	85.43	86.09
4	91	2								7.16E-05	3.60E-05	6.02E-06	55.79	58.42
2	92	3								5.29E-05	3.35E-05	5.85E-06	34.10	21.03
4	92	3		0.00295	0.0000312	0.0004	0.03585	0.003	0.008	3.97E-05	1.40E-05	5.77E-06	24.63	50.16
4	100	1								3.14E-04	2.64E-04	1.80E-05	1034.43	1043.35
2	101	2								4.35E-04	3.85E-04	2.05E-05	1001.29	982.04
4	101	2								1.49E-04	9.89E-05	1.57E-05	954.72	932.89
2	102	3		0.00759	0.0046902	0.0005	0.08476	0.053	0.011	2.34E-04	1.84E-04	1.67E-05	518.71	535.28
4	102	3								1.54E-04	1.04E-04	1.58E-05	498.74	568.82
2	110	1								3.26E-04	2.76E-04	1.82E-05	818.42	855.87
4	110	1		0.01051	0.0076052	0.0007	0.09483	0.063	0.012	2.66E-04	2.16E-04	1.71E-05	657.29	737.10
2	111	2	Jelly	0.00760	0.0046987	0.0005	0.06751	0.035	0.010	4.34E-04	3.84E-04	1.78E-05	744.60	673.86
4	111	2								3.04E-04	2.54E-04	2.05E-05	757.06	724.43
2	112	3								2.07E-04	1.57E-04	1.63E-05	1055.91	1033.01
4	112	3		0.00550	0.0025952	0.0004	0.06563	0.033	0.010	1.03E-04	5.34E-05	1.54E-05	288.21	278.28
2	113	4								8.18E-05	3.18E-05	1.54E-05	469.61	472.65
4	113	4								1.42E-04	9.21E-05	1.57E-05	95.46	89.13

Table S1 continued

cfe	dive		VA (mATN-cm^2) C*	VA (mATN-cm^2) D*	mATN stdev
	2	41	1431.33	1472.57	64.85
	2	50	437.69	465.15	47.97
	2	60	437.64	453.50	18.60
	4	60	228.52	223.86	15.37
	2	61	234.96	173.95	47.27
	2	62	292.57	306.25	21.91
	4	62	350.74	389.25	49.26
	2	70	557.52	576.73	23.72
	4	70	362.24	385.24	30.77
	2	71	543.49	552.86	11.73
	4	71	298.14	293.43	20.08
	2	72	561.02	613.06	33.09
	4	72	273.77	295.66	31.24
	2	80	219.30	229.94	32.80
	2	81	173.29	219.71	46.62
	2	82	70.08	79.96	6.97
	2	90	153.28	160.32	4.02
	4	90	101.69	106.96	3.88
	2	91	86.54	92.78	3.41
	4	91	65.72	71.55	7.15
	2	92	34.91	27.72	6.47
	4	92	50.16	83.71	24.23
	4	100	1143.17	1186.13	74.79
	2	101	1057.58	1043.60	35.38
	4	101	1072.53	1144.03	99.74
	2	102	600.90	638.44	56.07
	4	102	631.80	757.06	109.71
	2	110	1069.49	1150.72	161.77
	4	110	1034.83	1024.09	194.63
	2	111	1393.22	1351.67	384.37
	4	111	849.03	960.80	106.04
	2	112	1363.73	1331.35	175.73
	4	112	357.07	380.84	50.59
	2	113	494.64	548.60	36.56
	4	113	172.58	219.05	62.76

Table S1:

Data from this Table used to make figure 5

Table shows CFE number, dive number, bottle number and PN, POC and PP data. PN, POC and PP data is reported both as raw values and also as corrected values.

If a sample analysis was replicated, the average of the replications is reported.

Corrected values have been blank corrected, and CFE4 location 1,2 and 3 have been divided by 1.45 as discussed in section 3.2

The 1.45 correction affected 6 POC and PN samples : CFE4 dive 60, 62, 70, 72, 90 and 92.

*VA is the abbreviation for Volume Attenuance

Cumulative VA was blank corrected in 4 different ways.

(A) was calculated by subtracting the clean at the beginning of the cycle from the final particle laden image of an imaging cycle (Bishop et al. 2016).

(B) was calculated by subtracting the clean image of the next image cycle from the final particle image of the previous cycle. Used in our regression analysis

(C) The lowest value of attenuance of cleaning image of a dive was subtracted from the particle laden image at the end of an imaging sequence. Assumes all material above lowest blank transferred

(D) The attenuance of the final clean image for a dive was subtracted from the sum of the cumulative attenuance from each imaging sequence and the attenuance of the initial clean image.

Method B used in this paper yielded the highest r2 values and thus was determined to be the best measure of the amount of material entering the sample bottle.

The uncertainty of the attenunace measurement was the standard deviation of the methods A, B, C and D.

Sample Notes:

CFE 2 dive 111 were not included in any plots due to imagery contamination by a living 1 cm scale gelatinous organism

Samples CFE 2 dive 82, CFE 4 dive 72, and CFE 4 dive 60 were not used in POC VA analysis.

mATN-cm^2-cm^{-2}-day^{-1}	mATN-cm^2-cm^{-2} day^{-1} error	POC Flux corrected mmol/m^2/day	POC flux error/m^2/day	CFE	DIVE	DAYS
42.70	2.08	40.03	6.21	2	41	0.167
9.63	1.26	11.81	2.75	2	50	0.204
9.97	1.65	3.52	1.99	4	62	0.161
7.69	0.74	14.24	2.43	4	70	0.223
16.84	0.38	13.17	3.25	2	71	0.167
4.74	1.00	-1.66	2.55	2	80	0.176
2.50	0.10	1.68	1.50	4	90	0.209
2.76	0.11	0.62	2.68	2	91	0.167
6.32	3.05	3.22	7.27	4	92	0.043
17.92	1.88	17.61	3.73	2	102	0.160
13.19	3.48	11.22	2.17	4	110	0.300
5.36	0.98	6.46	1.85	4	112	0.279

Table S2:

Data from this table was used to make figure 6.

Data shows VAF (mATN-cm^2-cm^{-2}-day^{-1}) with associated error, POC flux (mmol C/m2/day) with associated error

The CFE number, dive number and day fraction of sampling period