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Supplement of

Spatial and temporal variability in the response of phytoplankton and prokaryotes to B-vitamin amendments in an upwelling system

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2 **Table S1:** concentration of hydroxocobalamin (OHB12) and cyanocobalamin (CNB12)

3 in seawater samples corresponding to the initial time of the experiments. Abbreviations:

4 Not detected (nd) and lower concentration of the quantification limit (<LOQ).

Sample ID	Station	Depth	Month	OHB12 pmol l ⁻¹	CNB12 pmol l ⁻¹
1602_st3_d1_p1	coast	surface	February	0.21	nd
1602_st3_d3_p1	coast	surface	February	0.20	nd
1602_st3_d5_p1	coast	surface	February	0.26	nd
1604_st3_d1_p1	coast	surface	April	0.47	nd
1604_st3_d3_p1	coast	surface	April	0.66	nd
1604_st3_d5_p1	coast	surface	April	0.23	nd
1608_st3_d1_p1	coast	surface	August	0.30	nd
1608_st3_d3_p1	coast	surface	August	0.38	nd
1608_st3_d5_p1	coast	surface	August	0.19	nd
1602_st3_d1_p2	coast	SCM	February	0.36	nd
1602_st3_d3_p2	coast	SCM	February	0.10	nd
1602_st3_d5_p2	coast	SCM	February	0.41	nd
1604_st3_d1_p2	coast	SCM	April	0.32	nd
1604_st3_d3_p2	coast	SCM	April	0.27	nd
1604_st3_d5_p3	coast	SCM	April	0.15	nd
1608_st3_d1_p2	coast	SCM	August	0.46	nd
1608_st3_d3_p2	coast	SCM	August	0.21	nd
1608_st3_d5_p2	coast	SCM	August	0.39	nd
1602_st6_d1_p1	ocean	surface	February	0.31	nd
1602_st6_d3_p1	ocean	surface	February	0.09	nd
1602_st6_d5_p1	ocean	surface	February	0.06	nd
1604_st6_d1_p1	ocean	surface	April	0.13	nd
1604_st6_d3_p1	ocean	surface	April	0.09	nd
1604_st6_d6_p1	ocean	surface	April	0.04	nd
1608_st6_d1_p1	ocean	surface	August	0.20	nd
1608_st6_d3_p1	ocean	surface	August	0.09	nd
1608_st6_d6_p1	ocean	surface	August	0.14	nd
1602_st6_d1_p3	ocean	SCM	February	0.21	0.55
1602_st6_d3_p2	ocean	SCM	February	0.08	nd
1604_st6_d1_p2	ocean	SCM	April	nd	nd
1604_st6_d3_p2	ocean	SCM	April	0.07	nd
1604_st6_d6_p2	ocean	SCM	April	0.05	nd
1608_st6_d1_p2	ocean	SCM	August	0.19	nd
1608_st6_d3_p2	ocean	SCM	August	0.09	nd
1608_st6_d6_p2	ocean	SCM	August	0.16	nd

5

6 **Table S2:** Summary of initial conditions for each experiment (expt) at both coastal and
7 oceanic stations (Stn). Sampling months were February (Feb), April (Apr) and August
8 (Aug). The variables measured at t0 were temperature (Temp), salinity (Sal), nitrate (NO_3^-
9), nitrite (NO_2^-), ammonium (NH_4^+), phosphate (HPO_4^{2-}), ratio inorganic nitrogen:phosphate
10 (DIN:P), silicate (SiO_4^{2-}), Chlorophyll-*a* (Chl-*a*) and prokaryote biomass (PB).

11

12 Table S2

Stn	Depth	Month	Expt	Day	Temp °C	Sal	----- $\mu\text{mol l}^{-1}$ -----				DIN:P	SiO_4^{2-} $\mu\text{mol l}^{-1}$	Chl- <i>a</i> $\mu\text{g l}^{-1}$	PB $\mu\text{g C l}^{-1}$
							NO_3^-	NO_2^-	NH_4^+	HPO_4^{2-}				
Coast	surface	Feb	3	0	13.8	35.0	2.86	0.19	0.35	0.17	19.7	3.6	1.39	1.84
			3	2	13.2	34.3	4.89	0.36	0.51	0.33	17.3	6.8	0.73	1.91
			3	5	13.4	34.2	4.63	0.19	0.09	0.18	27.7	8.6	4.86	3.45
		Apr	3	0	13.0	34.6	2.21	0.24	0.32	0.19	14.6	5.2	2.73	7.88
			3	2	13.3	34.3	12.46	0.36	0.54	0.41	32.7	12.6	1.40	9.17
			3	5	14.0	31.8	4.18	0.16	0.55	0.19	25.9	10.5	2.18	4.30
		Aug	3	0	14.1	35.6	0.50	0.10	0.84	0.12	11.8	1.1	5.73	14.64
			3	2	14.4	35.6	0.81	0.08	1.08	0.20	9.9	0.3	5.52	6.39
			3	5	13.7	35.2	3.93	0.17	0.12	0.33	12.8	3.9	5.64	10.61
SCM		Feb	3	0	13.7	35.7	3.58	0.14	0.04	0.31	12.1	5.2	0.21	1.30
			3	2	13.9	35.3	4.16	0.15	0.07	0.37	11.9	4.6	0.99	1.83
			3	5	13.4	34.7	2.94	0.09	0.10	0.17	18.4	6.1	4.98	2.36
		Apr	3	0	12.8	35.3	3.22	0.34	0.46	0.28	14.3	4.4	0.99	5.90
			3	2	13.2	35.3	0.24	0.07	0.12	0.04	10.2	2.8	2.15	9.47
			3	5	13.9	34.9	0.21	0.07	0.10	0.06	6.5	3.4	2.18	9.51
		Aug	3	0	13.6	35.6	0.91	0.13	0.23	0.15	8.3	1.7	20.75	12.71
			3	2	13.8	35.6	1.40	0.16	0.14	0.23	7.5	1.4	20.07	1.73
			3	5	13.4	35.6	5.29	0.13	0.14	0.41	13.5	3.9	4.63	9.21
Ocean	surface	Feb	6	1	14.0	30.2	1.32	0.18	0.11	0.16	10.1	3.2	0.82	2.38
			6	3	14.2	35.9	0.90	0.11	0.04	0.12	9.2	2.3	1.20	2.98
			6	6	14.1	35.4	1.03	0.15	0.13	0.16	8.4	3.0	2.08	2.92
		Apr	6	1	13.4	35.7	0.95	0.11	0.06	0.12	9.6	2.3	1.51	6.58
			6	3	13.6	35.7	0.47	0.11	0.06	0.08	8.3	2.7	1.29	7.37
			6	6	13.9	35.6	0.12	0.03	0.06	0.04	4.9	2.1	0.75	11.76
		Aug	6	1	16.0	35.6	0.05	0.01	0.06	0.02	4.9	1.5	0.65	39.38
			6	3	16.0	35.6	0.26	0.01	0.09	0.05	7.5	3.2	0.99	11.46
			6	6	15.3	35.5	0.45	0.04	0.05	0.07	7.4	1.4	1.30	5.63
SCM		Feb	6	1	14.1	35.8	1.73	0.20	0.04	0.18	11.2	3.5	0.88	2.28
			6	3	14.1	35.8	1.60	0.19	0.02	0.15	11.7	2.9	1.22	3.18
			6	6	14.1	35.8	1.13	0.18	0.12	0.16	9.2	2.9	2.39	3.49
		Apr	6	1	13.3	35.7	1.63	0.31	0.10	0.18	11.5	3.2	1.61	5.38
			6	3	13.3	35.7	1.45	0.33	0.12	0.16	11.9	2.4	1.50	6.96
			6	6	13.7	35.6	0.03	0.06	0.07	0.05	3.0	1.9	1.45	11.74
		Aug	6	1	14.9	35.6	0.00	0.04	0.10	0.03	4.2	1.4	0.84	26.55
			6	3	16.0	35.6	0.27	0.00	0.07	0.05	6.5	2.8	1.11	6.04
			6	6	15.4	35.6	0.35	0.06	0.06	0.07	6.5	1.7	1.41	5.45

13 **Figure S1:** A non-metric multi-dimensional scaling (MDS) showing the distance
14 according to similarity in the microbial plankton composition at the beginning of each
15 experiment (each symbol). Filled and open symbols represent samples from coastal
16 and oceanic station, respectively, numbers correspond to the sampling station, triangles
17 and circles represent samples from surface and SCM, respectively, and colours
18 correspond to the months: (green) February, (blue) April and (pink) August. SCM: sub-
19 surface chlorophyll maximum.

20

21 **Figure S2:** Response ratio (RR) to inorganic nutrient addition (averaged biomass at the
22 end of the experiments divided by the averaged value in the control) of total
23 phytoplankton community (smooth bars) and of prokaryote biomass (PB) (striped bars)
24 at (a) coastal and (b) oceanic station. Each bar corresponds to one of the 3 experiments
25 (a, b or c) performed in each depth and station during February, April and August.
26 Colours represent samples from (light grey) surface (surf) and (dark grey) SCM.
27 Horizontal line represents a response equal to 1, which implies no change relative to
28 control. Asterisks indicate phytoplankton significant response (t-test; * $p < 0.05$) and
29 circle indicate bacterial significant response (t-test; ⁰ $p < 0.05$). Note that different scales
30 were used. Note that y-axis in Fig. S2 b is broken. SCM: sub-surface chlorophyll
31 maximum.

32

33 **Figure S3:** Response ratio (RR) of total phytoplankton at surface and SCM in the coastal
34 station and at surface and SCM in the oceanic waters in (a-d) February, (e-h) April and
35 (i-l) August. Treatments represented are: B12/C; B1/C; B12+B1/C in pink tones and
36 I+B12/I; I+B1/I; I+B12+B1/I in green tones. Pink symbols represent primary
37 responses to B vitamins and green symbols represent secondary responses
38 to B vitamins. Horizontal dotted-line represents a response equal to 1, that means no

39 change relative to control in the primary responses, and no change relative to inorganic
40 treatment in the secondary responses. Asterisks indicate phytoplankton significant
41 response (t-test; * $p < 0.05$). Note that the y-axis is broken in *a* and *b*.

42

43 **Figure S4:** Response ratio (RR) of prokaryote biomass at surface and SCM in the coastal
44 station and at surface and SCM in the oceanic waters in (a-d) February, (e-h) April and
45 (i-l) August. Treatments represented are: B12/C; B1/C; B12+B1/C in pink tones and
46 I+B12/I; I+B1/I; I+B12+B1/I in green tones. Pink symbols represent primary
47 responses to B vitamins and green symbols represent secondary responses to B vitamins.
48 Horizontal dotted-line represents a response equal to 1, that means no change relative
49 to control in the primary responses, and no change relative to inorganic treatment in the
50 secondary responses. Asterisks indicate prokaryote significant response (t-test; * $p <$
51 0.05).

Figure S1

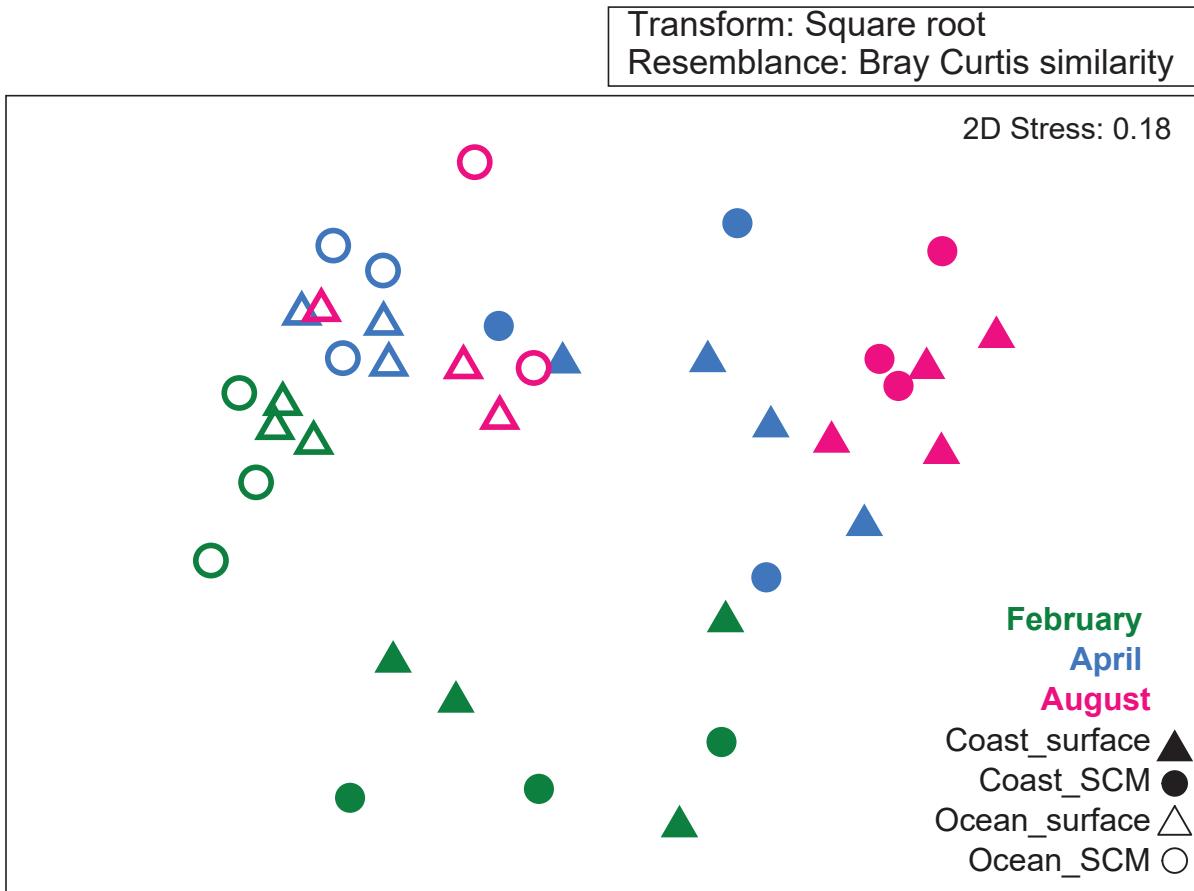
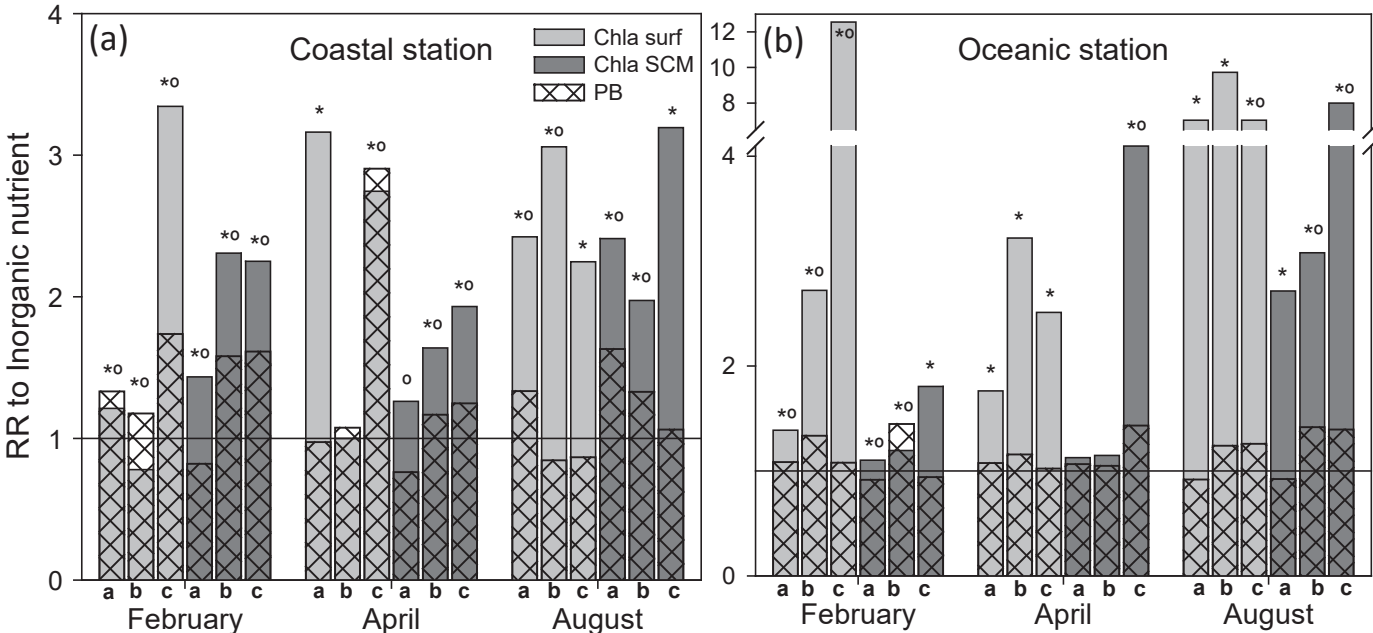
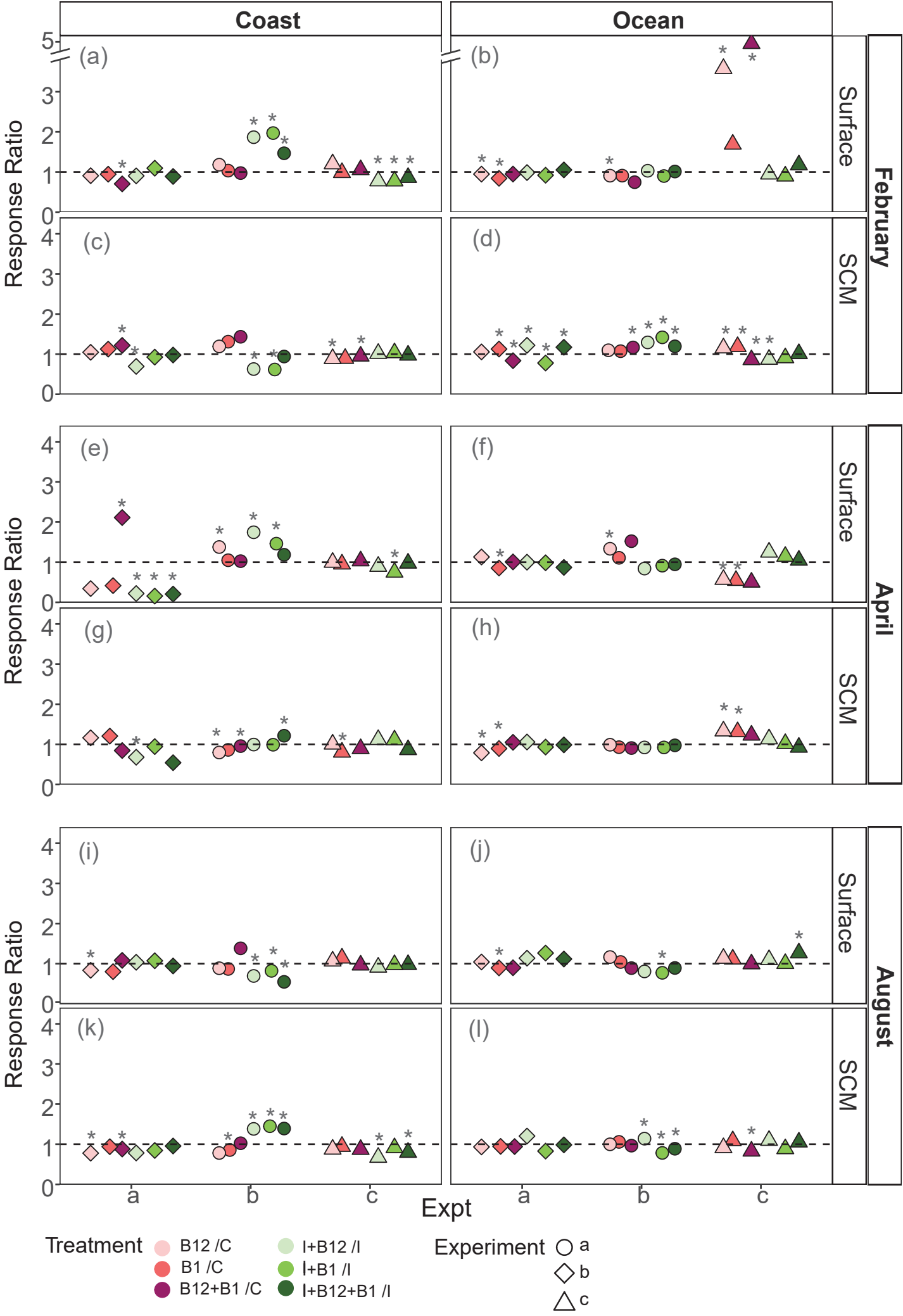


Figure S2



Chlorophyll-a Responses



Prokaryote Biomass Responses

