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*Supplement of*

**Ocean acidification of a coastal Antarctic marine microbial  
community reveals a critical threshold for CO<sub>2</sub>  
tolerance in phytoplankton productivity**

**Stacy Deppeler et al.**

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**Table S1.** Mean carbonate chemistry conditions in minicosms

Tank	$f\text{CO}_2$ ( $\mu\text{atm}$ )	$\text{pH}_T$	DIC ( $\mu\text{mol kg}^{-1}$ )	PA ( $\mu\text{mol kg}^{-1}$ )
1	343 $\pm$ 30	8.10 $\pm$ 0.04	2188 $\pm$ 6	2324 $\pm$ 11
2	506 $\pm$ 43	7.94 $\pm$ 0.03	2243 $\pm$ 8	2325 $\pm$ 10
3	634 $\pm$ 63	7.85 $\pm$ 0.04	2270 $\pm$ 5	2325 $\pm$ 12
4	953 $\pm$ 148	7.69 $\pm$ 0.07	2314 $\pm$ 11	2321 $\pm$ 11
5	1140 $\pm$ 112	7.61 $\pm$ 0.04	2337 $\pm$ 5	2320 $\pm$ 10
6	1641 $\pm$ 140	7.45 $\pm$ 0.04	2377 $\pm$ 8	2312 $\pm$ 10

Data are mean  $\pm$  one standard deviation of triplicate pseudoreplicate measurements

**Table S2.** Initial conditions of seawater sampled from Prydz Bay, Antarctica

Condition	Value
$f\text{CO}_2$ , $\mu\text{atm}$	356 $\pm$ 6
$\text{pH}_T$	8.08
DIC, $\mu\text{mol kg}^{-1}$	2187 $\pm$ 6
PA, $\mu\text{mol kg}^{-1}$	2317 $\pm$ 6
Temperature, $^\circ\text{C}$	-1.03 $\pm$ 0.17
Salinity	34.3
NOx, $\mu\text{M}$	26.19 $\pm$ 0.74
SRP, $\mu\text{M}$	1.74 $\pm$ 0.02
Silicate, $\mu\text{M}$	60.75 $\pm$ 0.91

Data are mean  $\pm$  one standard deviation of all six minicosm measurements

**Table S3.** Average light irradiance ( $\mu\text{mol photons m}^{-2} \text{s}^{-1}$ ) in minicosms

Tank	$f\text{CO}_2$ ( $\mu\text{atm}$ )	Low light	Medium light	High light
1	343	0.94	22.02	97.41
2	506	0.60	15.95	59.68
3	634	1.04	26.41	103.24
4	953	1.19	22.53	118.33
5	1140	0.71	21.44	71.51
6	1641	0.90	22.02	92.95

Low light: quarter CT blue filter, two 90% ND filters, light-scattering filter  
 Medium light: quarter CT blue filter, one 60% ND filter, light-scattering filter  
 High light: one quarter CT blue filter, light-scattering filter

**Table S4.** ANOVA table for trends in CO<sub>2</sub> treatments over time for Chl *a*

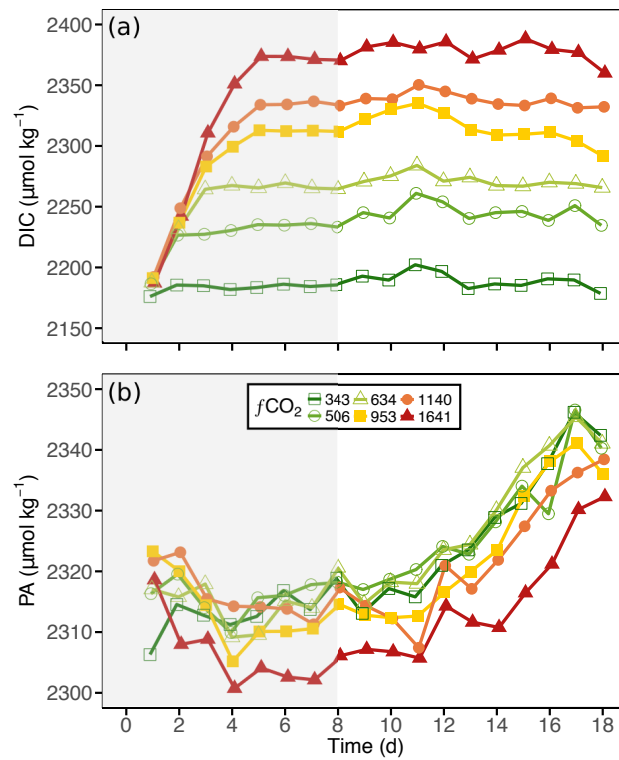
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Day	1	12304.2	12304.2	1802.5	< 0.001
I(Day <sup>2</sup> )	1	2214.5	2214.5	324.4	< 0.001
<i>f</i> CO <sub>2</sub>	5	267.0	53.4	7.8	< 0.001
Day: <i>f</i> CO <sub>2</sub>	5	186.0	37.2	5.5	0.002
Residuals	23	157.0	6.8		

**Table S5.** ANOVA table for trends in CO<sub>2</sub> treatments over time for GPP<sub>14C</sub>

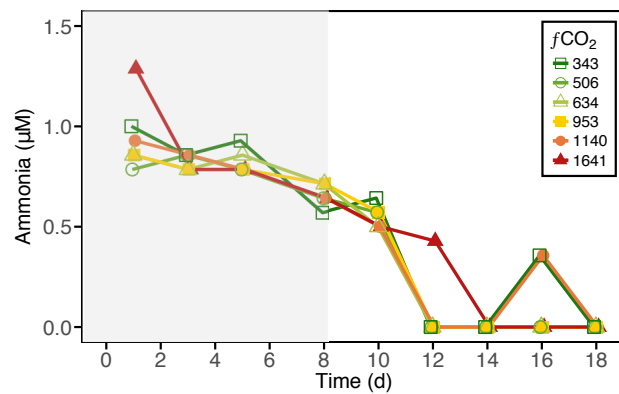
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Day	1	6405.2	6405.2	1271.6	< 0.001
I(Day <sup>2</sup> )	1	1056.1	1056.1	209.7	< 0.001
<i>f</i> CO <sub>2</sub>	5	211.9	42.4	8.4	< 0.001
Day: <i>f</i> CO <sub>2</sub>	5	124.6	24.9	4.9	0.003
Residuals	23	115.9	5.0		

**Table S6.** ANOVA table for trends in CO<sub>2</sub> treatments over time for bacterial abundance

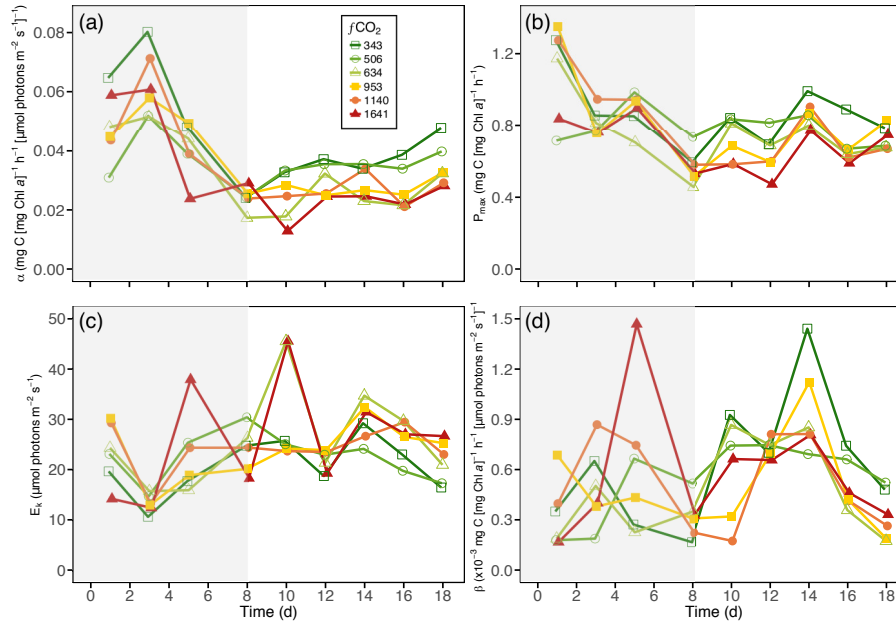
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Day	1	2.1 x10 <sup>18</sup>	2.1 x10 <sup>18</sup>	1470.6	< 0.001
I(Day <sup>2</sup> )	1	4.3 x10 <sup>16</sup>	4.3 x10 <sup>16</sup>	30.1	< 0.001
<i>f</i> CO <sub>2</sub>	5	2.0 x10 <sup>17</sup>	4.1 x10 <sup>16</sup>	28.1	< 0.001
Day: <i>f</i> CO <sub>2</sub>	5	7.1 x10 <sup>16</sup>	1.4 x10 <sup>16</sup>	9.8	< 0.001
Residuals	185	2.7 x10 <sup>17</sup>	1.5 x10 <sup>15</sup>		



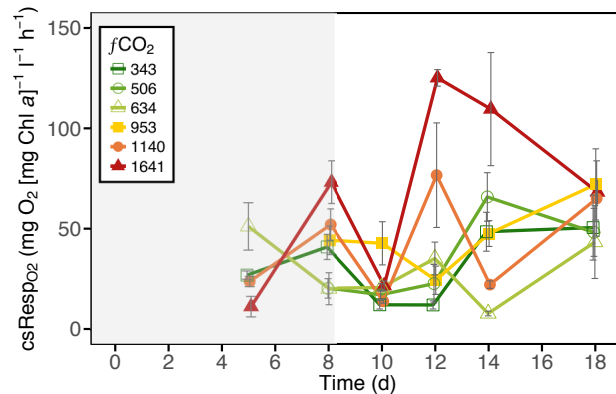
**Figure S1.** (a) Dissolved inorganic carbon (DIC) and practical alkalinity (PA) conditions within each of the minicosm treatments over time. Grey shading indicates  $\text{CO}_2$  and light acclimation period.



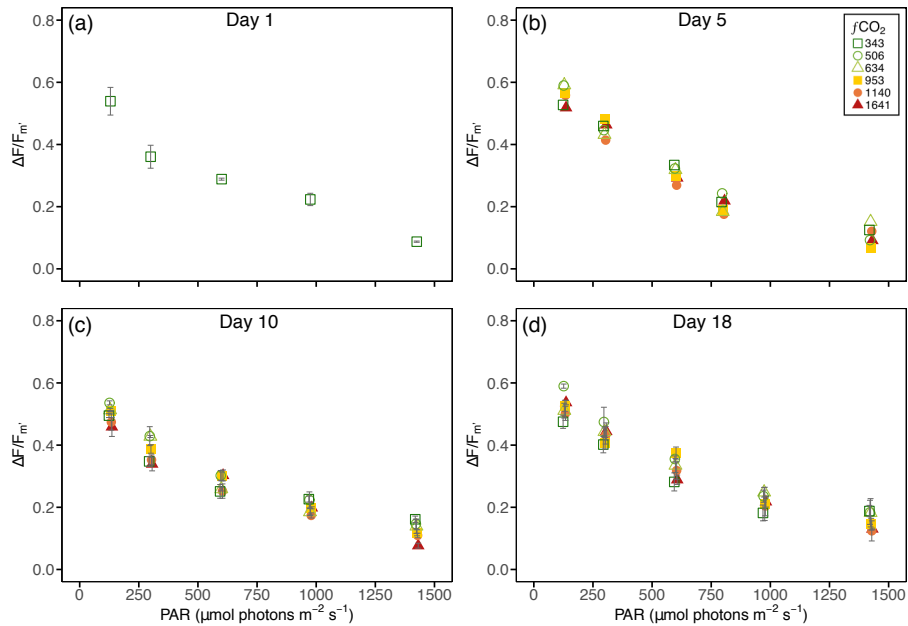
**Figure S2.** Ammonia concentration in each of the minicosm treatments over time. Grey shading indicates  $\text{CO}_2$  and light acclimation period.



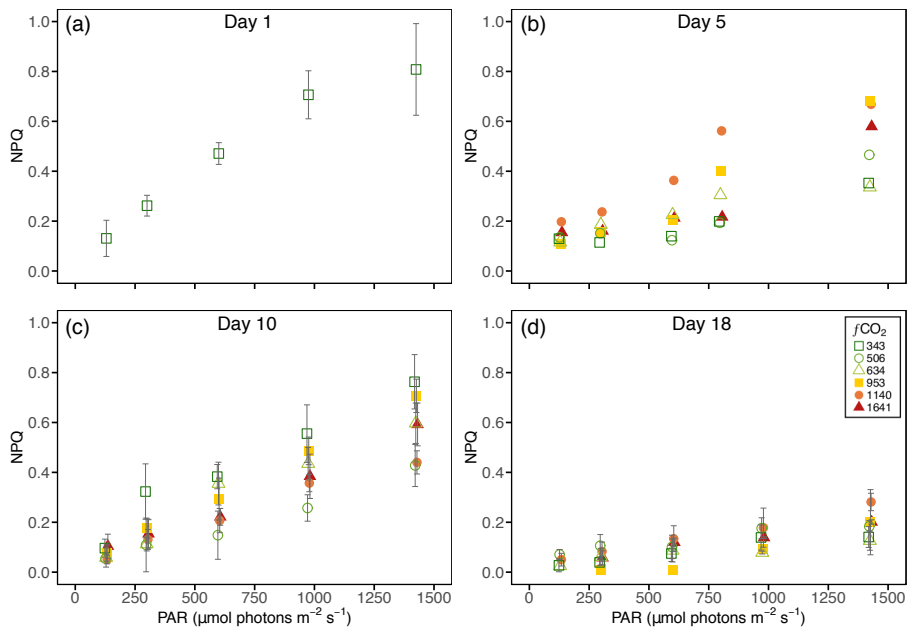
**Figure S3.** Photosynthetic parameters from  $^{14}\text{C}$ -derived photosynthesis versus irradiance (PE) curves from each of the minicosm treatments over time. (a) Maximum photosynthetic efficiency ( $\alpha$ ), (b) maximum photosynthetic rate ( $P_{max}$ ), (c) saturating irradiance ( $E_k$ ) and (d) photoinhibition rate ( $\beta$ ). Grey shading indicates  $\text{CO}_2$  and light acclimation period.



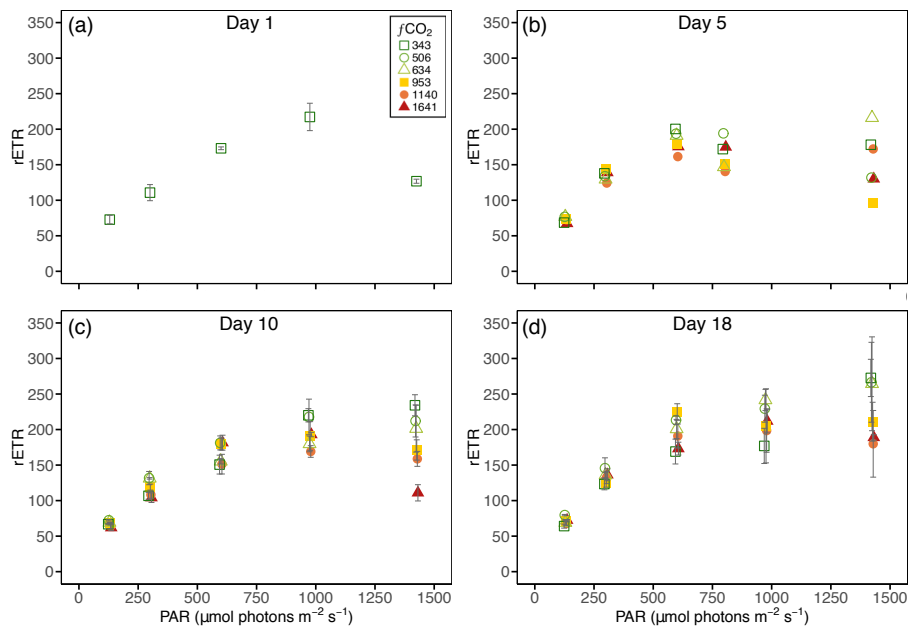
**Figure S4.**  $\text{O}_2$ -derived Chl *a*-specific community respiration ( $\text{csResp}_{\text{O}_2}$ ) within each of the minicosm treatments over time. Error bars display one standard deviation of pseudoreplicate samples. Grey shading indicates  $\text{CO}_2$  and light acclimation period.



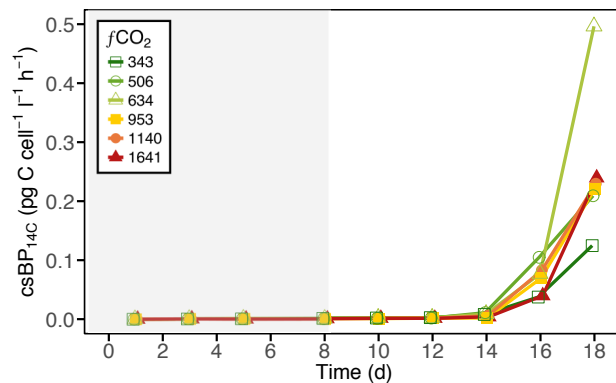
**Figure S5.** Effective quantum yield ( $\Delta F_v/F_m$ ) within minicosm treatments on days 1, 5, 10, and 18. Error bars display one standard deviation of pseudoreplicate samples.



**Figure S6.** Non-photochemical quenching (NPQ) within minicosm treatments on days 1, 5, 10, and 18. Error bars display one standard deviation of pseudoreplicate samples.



**Figure S7.** Relative electron transport rate (rETR) within minicosm treatments on days 1, 5, 10, and 18. Error bars display one standard deviation of pseudoreplicate samples.



**Figure S8.**  $^{14}\text{C}$ -derived cell-specific bacterial productivity ( $\text{csBP}_{^{14}\text{C}}$ ) within each of the minicosm treatments over time. Grey shading indicates  $\text{CO}_2$  and light acclimation period.