



Supplement of

**Resilience to temperature and pH changes in a future climate
change scenario in six strains of the polar diatom
*Fragilariopsis cylindrus***

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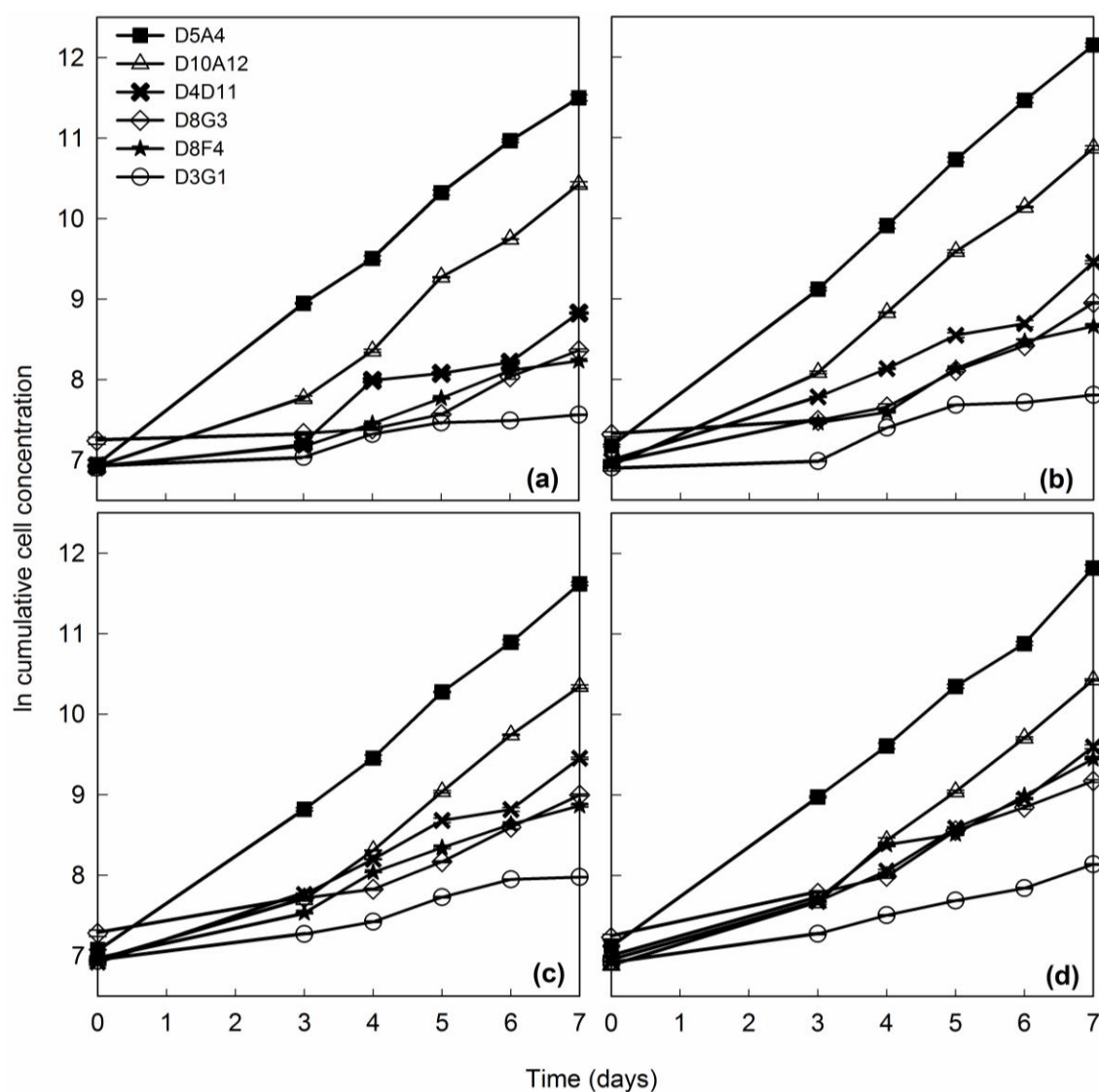


Figure S1. An example of cumulative logarithmic cell concentration versus time for strains D5A4, D10A12, D4D1, D8G3, D8F4 and D3G1, cultivated at 5 °C and a pH treatment of (a) 7.1, (b) 7.4, (c) 7.7, and (d) 8.0. Day 0 to day 3 were set as part of the acclimation period and not included in the results. Error bars represent \pm SD.

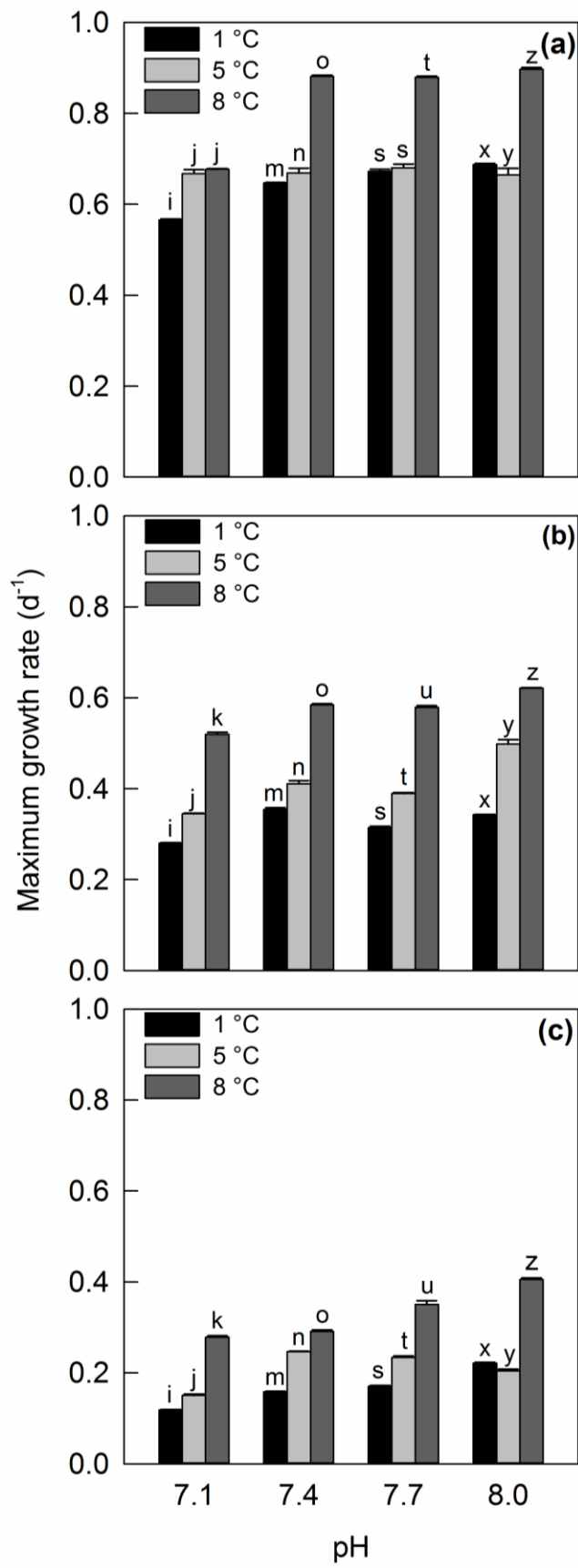
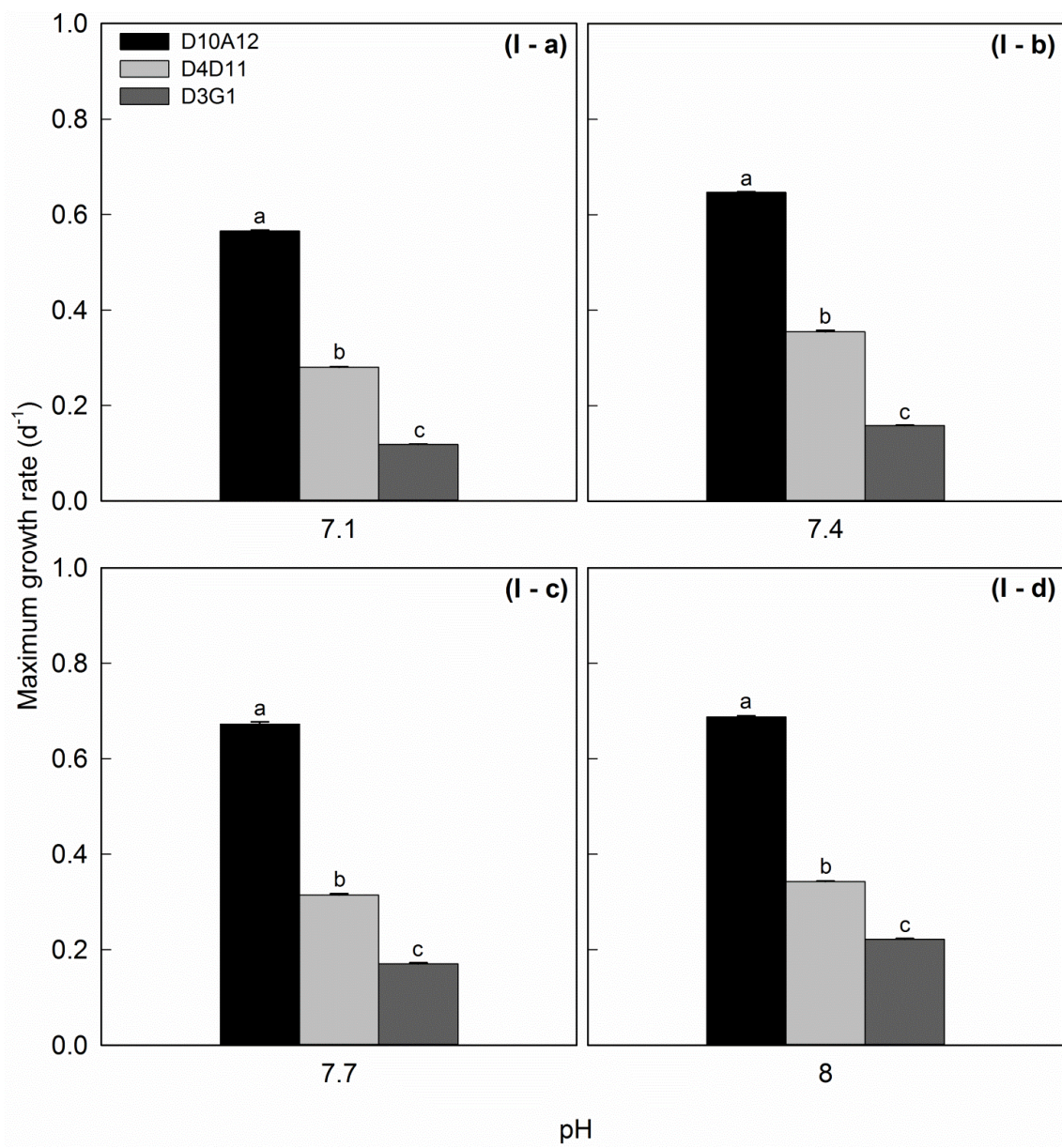
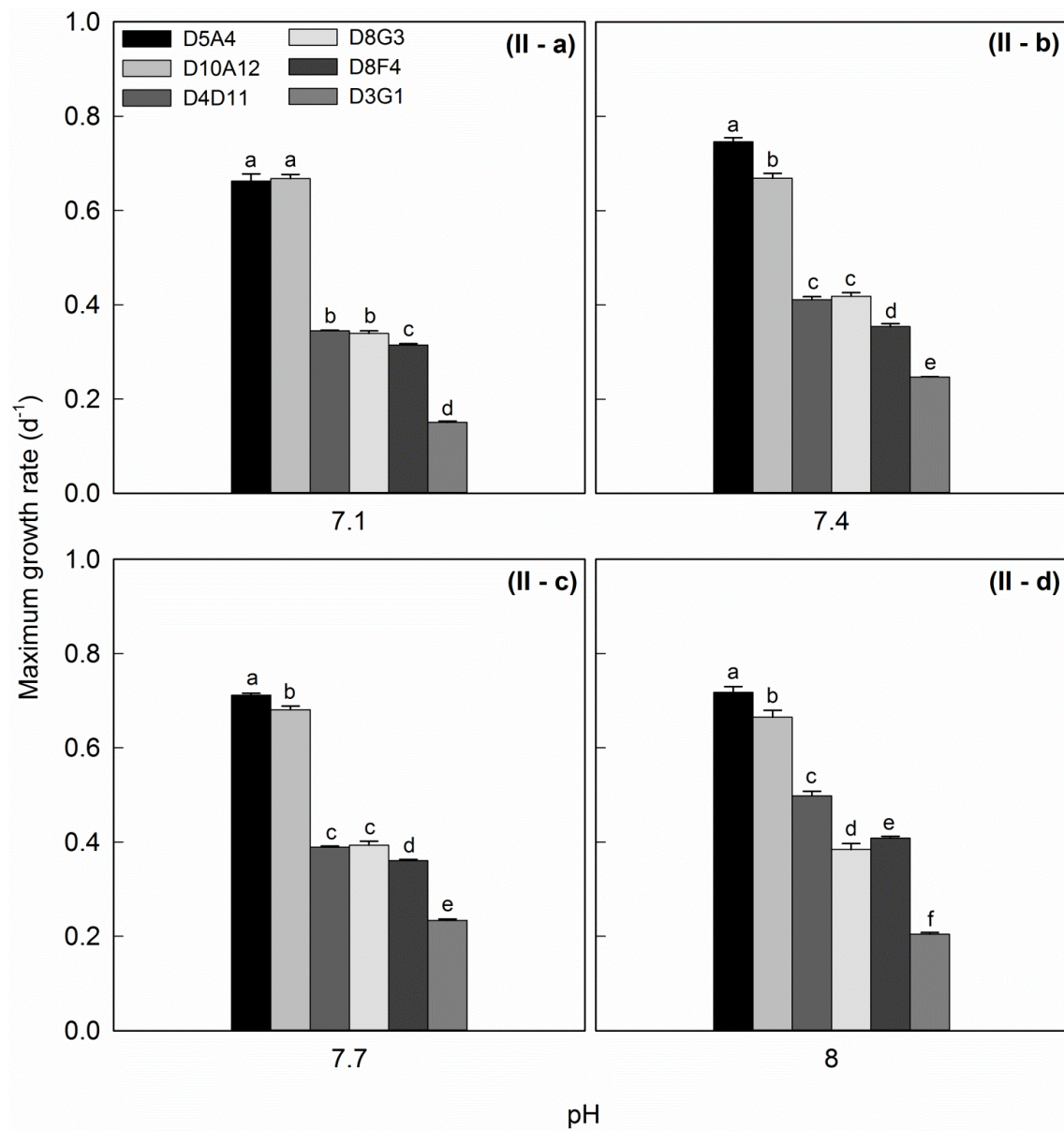


Figure S2. The mean maximum growth rates (d^{-1}) for strain **(a)** D10A12, **(b)** D4D11, and **(c)** D3G1 cultured at temperatures of 1 °C, 5 °C and 8 °C, and four pH treatments. Error bars represent \pm SD. Different letters above the bars represent significant differences in growth rates within the specific strain (three-way ANOVA, $P \leq 0.05$).

Table S1. The mean maximum growth rates \pm SD (d^{-1}) of D5A4, D10A12, D4D11, D8F4, D8G3 and D3G1 strains cultivated at 5 °C, and all four pH treatments.

pH treatments	D5A4	D10A12	D4D11	D8G3	D8F4	D3G1
7.1	0.66 ± 0.02	0.67 ± 0.01	0.34 ± 0.00	0.34 ± 0.01	0.31 ± 0.00	0.15 ± 0.00
7.4	0.75 ± 0.01	0.67 ± 0.01	0.41 ± 0.01	0.42 ± 0.01	0.35 ± 0.01	0.25 ± 0.00
7.7	0.71 ± 0.00	0.68 ± 0.01	0.39 ± 0.00	0.39 ± 0.01	0.36 ± 0.00	0.23 ± 0.00
8.0	0.72 ± 0.01	0.67 ± 0.01	0.50 ± 0.01	0.38 ± 0.01	0.41 ± 0.00	0.20 ± 0.00





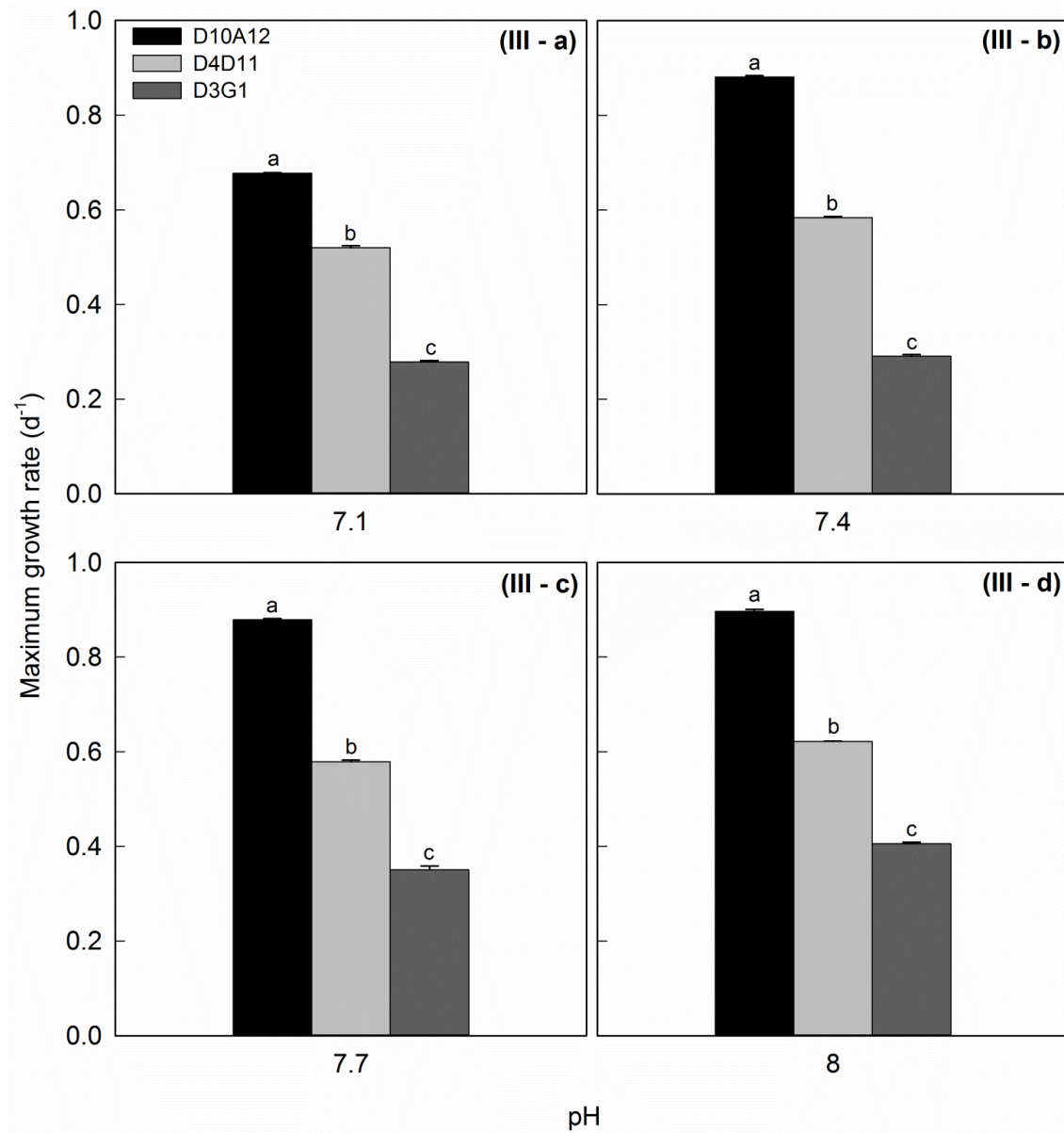


Figure S3. The mean maximum growth rates (d^{-1}) for strains D5A4, D10A12, D4D11, D8G3, D8F4 and D3G1 at a temperature of (I) 1 °C, (II) 5 °C and (III) 8 °C, and pH treatments (a) 7.1, (b) 7.4, (c) 7.7, and (d) 8.0. Error bars represent \pm SD. Different letters above the bars represent significant differences in growth rates within the specific treatment (three-way ANOVA, $P \leq 0.05$).

Table S2. The mean maximum growth rates \pm SD (d^{-1}) of D10A12, D4D11 and D3G1 strains cultivated at 1 °C, and all four pH treatments.

pH treatments	D10A12	D4D11	D3G1
7.1	0.57 ± 0.00	0.28 ± 0.00	0.12 ± 0.00
7.4	0.65 ± 0.00	0.35 ± 0.00	0.16 ± 0.00
7.7	0.67 ± 0.00	0.31 ± 0.00	0.17 ± 0.00
8.0	0.69 ± 0.00	0.34 ± 0.00	0.22 ± 0.00

Table S3. The mean maximum growth rates \pm SD (d^{-1}) of D10A12, D4D11 and D3G1 strains cultivated at 8 °C, and all four pH treatments.

pH treatments	D10A12	D4D11	D3G1
7.1	0.68 ± 0.00	0.52 ± 0.00	0.28 ± 0.00
7.4	0.88 ± 0.00	0.58 ± 0.00	0.29 ± 0.00
7.7	0.88 ± 0.00	0.58 ± 0.00	0.35 ± 0.01
8.0	0.90 ± 0.00	0.62 ± 0.00	0.41 ± 0.00

Table S4. The concentrations of $\text{DIC} \pm \text{SD}$ (mmol L^{-1}), $\text{HCO}_3^- \pm \text{SD}$ (mmol L^{-1}), $\text{CO}_3^{2-} \pm \text{SD}$ ($\mu\text{mol L}^{-1}$) and $\text{CO}_2^* \pm \text{SD}$ ($\mu\text{mol L}^{-1}$) in all four pH treatments, measured^a or calculated^b in the end of the experiments. CO_2^* is the concentration of $\text{CO}_2(\text{aq})$ and H_2CO_3 .

	7.1	7.4	7.7	8.0
$\text{DIC} (\text{mmol L}^{-1})^{\text{a}}$	2.65 ± 0.00	2.55 ± 0.01	2.36 ± 0.01	2.15 ± 0.01
$\text{HCO}_3^- (\text{mmol L}^{-1})^{\text{b}}$	2.43 ± 0.00	2.41 ± 0.00	2.25 ± 0.00	2.03 ± 0.00
$\text{CO}_3^{2-} (\mu\text{mol L}^{-1})^{\text{b}}$	16.9 ± 0.4	32.2 ± 1.2	57.2 ± 2.7	96.7 ± 4.9
$\text{CO}_2^* (\mu\text{mol L}^{-1})^{\text{b}}$	199.8 ± 4.3	103.3 ± 3.5	50.6 ± 2.5	24.3 ± 1.4