

## ***Interactive comment on “Resilience to temperature and pH changes in a future climate change scenario in six strains of the polar diatom *Fragilariopsis cylindrus*” by M. Pančić et al.***

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Dear Douglas Campbell,

We would like to thank you for your comments on the content. They are very helpful for us to improve the manuscript. Below you can find our response to your comments.

Table 1: The leftmost column is not labeled. The leftmost column displays 'pH treatments'. The column in question will be labeled accordingly.

Figure 1: The legend is wrong. Yes, the Figure 1 caption is wrong. The correct caption is 'The mean maximum growth rates (d<sup>-1</sup>) for strains (a) D10A12, (b) D4D11, and (c)

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D3G1 cultured at temperatures of 1 °C, 5 °C and 8 °C, and four different pH treatments. Error bars represent  $\pm$  one standard deviation.' It will be changed accordingly.

Figure 2: It has the same legend as Figure 1, but I think it applies only to Figure 2. Yes, the Figure 2 caption does apply only to Figure 2.

Figure 3: pH dilutions is not a good term. The term 'pH dilutions' will be changed to 'pH adjustments' both in the panel A and the caption. In panel B, the dotted line is labeled 'Expected pH', but the Y axis shows temperature. In panel B, the labels 'Expected pH' and 'Measured pH' are wrong, and will be changed to 'Expected temperature' and 'Measured temperature'.

Materials and methods: How long/how many cellular generations were cells grown before the growth rate estimates? The total acclimation period to different treatments was 5 days (as described in Materials and methods, section Experimental setup). Were they fully acclimated to the conditions? All the strains were treated the same way: 48 hours at the specific temperature and pH 8.0, followed by dividing the culture into two sub-cultures and adjusting pH to 7.7 (temperature remained the same). After 24 hours, the later sub-culture was divided into two sub-cultures again, and pH of one of them adjusted to 7.4. Again, after 24 hours the 7.4 sub-culture was divided, and pH of one of them adjusted to 7.1. From here on, all the sub-cultures at different pH treatments were grown for three days, and on the third day (day 0), the experimental flasks were inoculated with a cell concentration of 1000 cells mL<sup>-1</sup> and L1 medium of the pH-specific value. Sampling was initiated on day 3, and thus the time period from day 0 to day 3 was considered as part of the acclimation period (in total 5 days).

Discussion: pH is not the same thing as total alkalinity. The term 'alkalinity' was mis-used here (we did not measure alkalinity) and will be replaced with 'decreasing acidification'.

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Interactive comment on Biogeosciences Discuss., 12, 4627, 2015.

**BGD**

12, C1470–C1475, 2015

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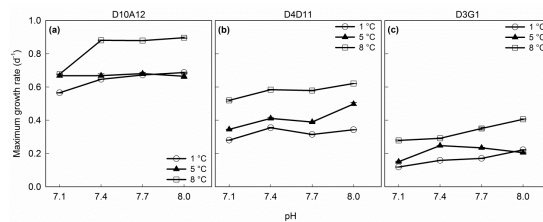
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Figure 1. The mean maximum growth rates ( $d^{-1}$ ) for strains (a) D10A12, (b) D4D11, and (c) D3G1 cultured at temperatures of 1 °C, 5 °C and 8 °C, and four different pH treatments. Error bars represent  $\pm$  one standard deviation.

Fig. 1.

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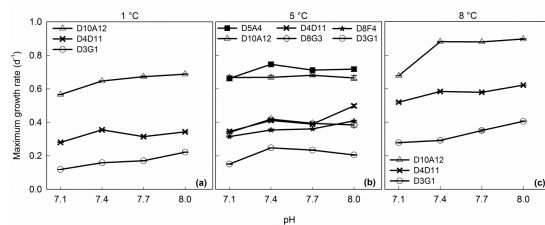


Figure 2. The mean maximum growth rates ( $d^{-1}$ ) of strains D5A4, D10A12, D4D11, D8G3, D8F4 and D3G1 cultivated at (a) 1 °C, (b) 5 °C and (c) 8 °C, and all four pH treatments. Error bars represent  $\pm$  one standard deviation.

Fig. 2.

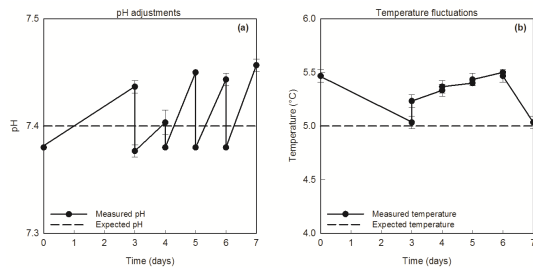


Figure 3. (a) An example of pH adjustments in the pH treatment 7.4 at 5 °C, shown as a function of time. (b) An example of temperature fluctuations in the treatment with pH 7.4, shown as a function of time. The first three days represent the acclimation period and are not included in the results. Error bars represent  $\pm$  one standard deviation.

Fig. 3.

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Table 1. The  $Q_{10}$  values (1–8 °C) for D10A12, D4D11 and D3G1 strains were calculated according to Eq. (2), based on the mean maximum growth rates displayed in Table B2 and Table B3.

| pH treatments | D10A12 | D4D11 | D3G1 |
|---------------|--------|-------|------|
| 7.1           | 1.29   | 2.42  | 3.35 |
| 7.4           | 1.54   | 2.06  | 2.34 |
| 7.7           | 1.48   | 2.45  | 2.81 |
| 8.0           | 1.46   | 2.36  | 2.43 |

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Fig. 4.