

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.

Anonymous Referee #4

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General Comments

This manuscript describes a study on the interactive effects of pH and temperature on 6 strains of Arctic diatom *Fragilariopsis cylindrus*. The authors try to predict how this diatom will response to future changes in temperature and pH based on their results. However, this is also my major concern. First, the authors should give more background information on those most important environmental factors which control dynamics of Arctic phytoplankton composition. Second, I would like the authors to think deeper about the field observations and their experimental results. Overall, this is a good paper and worth publishing in this journal, but need a little more effort on my concern.

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Specific Comments

Page 4628 line16-18, is there any field observation which can support the author's prediction?

Page 4269 line7, The paper of Feng et al. 2008 is based on experimental researches other than modeling study.

Page 4631 line15, In Fig2, the growth rates of the 6 strains showed very big differences. Did these strains also showed big differences on morphology and molecular sequences? If not, why?

Page 4632 line 17, References need to be included to support the selection of light level. In general, the light level in polar regimes is very low because of ice cover, deeper mixed layer and half year darkness.

Page 4638 line7, Page 4639 line10, Please double check the data. The SD values of temperature and pH could up to 0.6C and 0.03 unit, respectively. The daily fluctuations of temperature and pH in Fig 3 are at least 3 times of 0.05C and 0.03 units, respectively. In addition, the quality of experimental operation actually reflect on daily fluctuation.

Page 4628, line16-18, Page 4640 line 1-2, Page 4644 line 16-19, Due to the complexity of nature, laboratory experimental design is incomplete to mimic real environmental change. So the laboratory data could not simply used to predict what will happen in nature even prediction is under limited conditions. However, it helps if field observations could support author's point. In natural conditions, many marine phytoplankton can be found across a very big range of temperature, pH, light etc. A lot of *F. cylindrus* can be found at California coastal water with an annual temperature range of ~12-20C. This is a real proof which strongly support that diatom *F. cylindrus* could adapt to high temperature.

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