

Author's response

1. Comments from the referees

Anonymous reviewer:

I thank the authors for the amendments implemented in their manuscript, which help better understand their findings and distinguish them from their previous work. I have one aspect that I would appreciate if the authors could address in the discussion of model limitations. How does their implementation of adaptive/flexible response (temperature-related traits) bias or impact their interpretation/prediction and how does it differ from others (e.g. Norberg et al. 2012 and others just cited in the introduction but not discussed)?

Norberg, J., Urban, M. C., Vellend, M., Klausmeier, C. a., & Loeuille, N. (2012). Eco-evolutionary responses of biodiversity to climate change. *Nature Climate Change*, 2(10), 747–751. <https://doi.org/10.1038/nclimate1588>

Associate editor:

Dear authors,

Your revised manuscript has now been examined by one of the original reviewers, who finds that the new version makes it easier to understand your findings and clarifies the differences with your earlier article. The revised manuscript also includes a new section on biases and limitations of your model, which can help future efforts to investigate the implications of phytoplankton adaptation to global change. I am therefore recommending publication of your article subject to a minor revision, namely the inclusion in the Discussion of some comments regarding how your approach to model adaptative responses differs from those of other studies cited (e.g. Norberg et al. 2012).

Thank you for submitting your work to Biogeosciences.

Best regards,

Emilio Marañón

2. Author's response/changes in the manuscript

Dear editor and dear reviewer,

As suggested, we have added a paragraph to our discussion of model biases (Sect. 4.7) in which we discuss possible biases of our evolutionary algorithm and point out the differences between our approach and other studies cited in the Introduction (l. 508-536). To better connect this paragraph to the Introduction, we also made changes to the paragraph about evolution and ecosystem modeling in the Introduction (l.80-105). In addition, we added a copyright statement to the caption of Fig. B1 and indicated that the resuspension process

shown in the figure was disabled in our simulations (l. 588-598). Line numbers refer to the marked-up version of our manuscript.

We would like to thank you again for your constructive and helpful feedback, as well as all the people involved in processing this manuscript. We sincerely hope that you agree with our updated revision and look forward to hearing from you.

Kind regards

Isabell Hochfeld and Jana Hinnens