

Interactive comment on “Environmental controls on the elemental composition of a Southern Hemisphere strain of the coccolithophore *Emiliana huxleyi*” by Yuanyuan Feng et al.

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Dear reviewer and editors,

The authors appreciate the constructive comments from the reviewer very much. According to the reviewer’s comments, the manuscript has been thoroughly revised. The responses to the reviewer’s comments are listed below.

Response to the general comments: “Overall the manuscript is easy to follow, though there are a number of typos and inconsistencies that need to be addressed in the text and tables. The gradients across which the authors assess elemental composition

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are extensive, though regrettably there is no exploration of synergistic relationships between the variables (which the authors acknowledge). The authors state in the text that they were able to rank the importance of the different environmental variables, but the table containing that information (Table 3) was not included in the manuscript pdf, making it difficult to comment on that topic.” The typos and the inconsistencies have been carefully checked and fixed. The potential synergistic relationships between the variables have now been further explored. The missing Table 3 is also added in the revised version.

Response to the specific comments: “Not sure if this is a journal formatting issue but there should be either spaces or indentation to separate paragraphs. This is consistent throughout the manuscript.” Spaces have been added to separate paragraphs.

“Inconsistent use of serial commas” This problem has been fixed. The serial commas are now consistently used.

“The authors are inconsistent in using the modifier “cellular” when referring to the various forms of particulate organic matter. If, as I suspect, they are only referring to cellular forms of such matter, then the continual use of the “cellular” term is unnecessary.” In this manuscript, the elemental composition mainly refers to the cellular elemental contents and ratios, and the inconsistent use of the modifier “cellular” is now fixed.

“Pg7 line7: Delete ‘then.’” The word “then” has been deleted.

“Figures 1-5: If you are fitting curves through data points, would it not be better to plot all of your data points using a scatterplot as opposed to using bar plots? This would give the reader a much better sense of the variability within the data.” The bar plots instead of scatter plots are used in order to make comparisons between different treatments for each of the manipulation experiments. And the fitting curves are used to describe the variability of the trends within the data.

“Section 3.1: You don’t mention anything about the effects of nutrients on POC.” There

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were no significant effects of nutrient concentrations on the POC contents based on our experimental results.

“Why are the values for goodness of fit in the supplement and not in the manuscript?” There are 7 figures and 3 tables in the manuscript. Therefore, the table containing the fitting equations and the values for goodness of fit are in the supplement in order to keep the manuscript to a reasonable length.

“Pg9, line 15: The ‘dramatic’ decline was predominately seen between 4 and 7°C and leveled out thereafter. Maybe change the wording to more correctly state this response.” The wording has now been changed to “The C:Chl-a ratio dramatically decreased with warming, especially between 4°C and 7°C (Fig. 6d)”.

“Table 2: The meaning of bold values should be stated in the table caption, not in the manuscript text. Table 2: There are numerous values that are stated as being significantly different in the text but are not bold in the table.” The meaning of bold values has been stated in the table caption in the revised manuscript. The other significantly different values in the table have also been formatted in bold font.

“Table2: Why are these data presented as a table instead of plots as were used for the previous metrics?” The differences of the elemental ratios between different treatments are less significant compared to the cellular elemental contents. Therefore, the ratios are presented in one table and not in 3 separate figures, to keep a reasonable total number of figures of the manuscript.

“Section 3.8: I could not find the Table 3 that is referenced in the text, making it difficult to review this section.” The table has been added in the manuscript.

“Pg13, line26: typo; Pg13, line27: typo; Pg14, line2: typo” These typos have all been corrected.

“Pg14, line5: Why are cell size data not presented (in text or supplement) in either this manuscript or Feng et al., 2017?” The cell size data from the temperature manipulation

experiments is presented in the supplements as Fig. S1.

“Pg14, line8: Don’t you mean greater than 11°C, since 10°C was not tested in this study and PIC values did not appear to differ amongst the 4, 7, and 11°C treatments? The previous 10°C is now revised to 11°C.

Pg14, line10: Again referring to data (cell volume) that is not presented. Now the supplemental data in Fig. S1 is referred to.

Pg14, line11: 10°C was not a treatment level in this study. The previous 10°C is now revised to 11°C.

“Pg14, line15: The best-fit line does not follow this description. Given the poor fit based on the low R2 value, why is this fitting included?” The PIC:POC ratio at 4°C was significantly lower than the other treatments, indicating lower cellular PIC:POC production under extreme low temperature; therefore, this fitting is included.

“Pg14, line16: 24°C was not a temperature used in this study or Feng et al. (2017)” The authors agree that 24°C was not a temperature used in the experiment; however, here 24°C was the optimal temperature for photosynthetic rate from the fitting in Fig. 3d of Feng et al. (2017).

“Pg14, line23: A 74% increase is not really ‘almost double’.” The original wording of “...almost double...” has been revised to “the cellular N:P ratio of *E. huxleyi* at 20°C increased by 74%...”.

“Pg16, line2: This study did not use any isotopic labeling. I assume that this is referring to Feng et al. (2017).” Yes, this is referring to Feng et al. (2017). And the reference has been added in the text.

“Pg17, line23: You could also cite Blanco-Ameijeiras et al. (2016) in PLoS ONE since they tested 13 strains under the same environmental conditions, avoiding interlaboratory experimental variability that is an issue when comparing results from different experiments.” The reference of Blanco-Ameijeiras et al. (2016) has been cited.

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We look forward to hearing back from you again. Thank you very much.

Sincerely,

Yuanyuan Feng and the coauthors

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2017-332/bg-2017-332-AC1-supplement.pdf>

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2017-332>, 2017.

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