

Dear Editor,

We would like to thank the reviewers and editor for the careful revisions. We have taken all the comments and suggestions into consideration. We made modifications in the manuscript and figures to address them. All the changes are described point by point in the list below. The lines listed in the authors' response refer to the revised manuscript.

Sincerely yours,

Amanda Gerotto, PhD.

Associate editor decision: Publish subject to minor revisions (review by editor)

by Chiara Borrelli

Public justification (visible to the public if the article is accepted and published):
The manuscript went through another round of reviews. We have now received three reports. All the reviewers agree that the manuscript is suitable for publication in BG after some suggestions are addressed. I invite the authors to incorporate the technical corrections provided by the reviewers in a revised version of their manuscript. During their revision, they should also address the suggestions provided by Reviewer #2.

Report 1

This manuscript by Gerotto et al. has made necessary changes including the title which now highlights the novel proxy developed and changes are also notable in the figures with the continuity of color clearly displaying depth throughout the paper. The manuscript is well-written and the research clearly explained in the text. A few minor changes should be made but I feel this manuscript is suitable for publication.

Report 2

In this version 2, the authors have settled the referees' observations, although to be published I recommend to produce a new version incorporating minor corrections listed below:

Line 18: Given "Gephyrocapsa spp., > 2 μm " actually comprise all the known Gephyrocapsa species coccolith sizes, I recommend to replace it throughout the text by "small Gephyrocapsa species" or similar.

Authors response: We changed to “*Emiliana huxleyi* > 2 μm, and small *Gephyrocapsa* spp.” in line 28 and 206.

Line 20: Delete comma after (ks)

Authors response: Deleted.

Line 29: Relax the “all variations” statement using “major” or “main”

Authors response: We changed to the “the main variations”.

Evaluate migrate the section 2 into M&M

Authors response: We evaluated and decided to keep the "2. Oceanographic settings" section as it is, preceding M&M.

Line 235: After concentration add “used as a proxy of phytoplankton”

Authors response: We added “(used as a proxy of phytoplankton)”

Line 239: Replace Ph by pH

Authors response: Replaced.

Figure 2: Add tick marks at the x-axis

Authors response: We included the tick marks at the x-axis.

Figure 3: Homogenize the minor tick marks

Authors response: We changed the range of minor units on the mean length, volume, and mass charts.

Figure 4: Delete the minor tick marks

Authors response: The minor tick marks were removed. We have also standardized the font used for the axis titles.

Line 312: Indicate what parameters are autocorrelated

Authors response: To address this comment we indicated the autocorrelated parameters “Although some of the surface variables were autocorrelated (e.g., TALK-salinity, pH-pCO₂ and nitrate-phosphate), ...”

Figure 5: Fix the values label to tick marks, as well as, include in parenthesis the % variability explained by each RDA axes

Authors response: We fixed the tick marks and included the variability explained by the RDA (%) in the axis titles.

Line 392: A more recent study that Eppley et al., 1969 comparing the two species growth at different nutrient levels is: New Zealand Journal of Marine and Freshwater Research, 1995, Vol. 29: 345-357. Coccolithophores *Gephyrocapsa oceanica* and *Emiliania huxleyi* (Prymnesiophyceae = Haptophyceae) in New Zealand's coastal waters: characteristics of blooms and growth in laboratory culture.

Authors response: We included the suggested reference in line 392.

Lines 396-398: Elaborate better this sentence as sounds recursive or meaningless

Authors response: We decided to delete this sentence.

Line 408: The life cycle is not mention in Beaufort et al. 2011 study, but with species-environmental responses most related to shift in assemblage composition

Authors response: We changed "life cycle" to "physiological response".

Line 470: The statement seems correspond to Figure 4

Authors response: We fixed to "Figure 4".

Lines 478-479: Delete quotation marks

Authors response: Quotation marks were removed.

Report 3

I have noticed only two technical corrections to be fixed:

- Line 604: erase "314" from the reference

Authors response: The number was deleted.

- Line 677: correct the journal abbreviation by erasing "and". Use "Paleoceanogr. Paleoclimatology" instead.

Authors response: Fixed.

Additional comments by the authors

We fixed minor typos throughout the manuscript and named in lines 30, 217, 294, 300, 306, 383, 397, 398, and 524, the “ratio σ/k_s vs. mean k_s ” as “normalized k_s variation” as suggested in the other round of reviews to better characterize the new developed index.