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Biogeosciences
Discussions

Interactive comment on "Prioritization of the vector factors controlling *Emiliania huxleyi* blooms in subarctic and arctic seas: A multidimensional statistical approach" *by* Dmitry Kondrik et al.

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We thank the referee #2 for his/her comments, and below are our answers.

1. First of all, the present work is intended to investigate the influence of remotely retrievable co-acting factors conditioning the growth of E. huxleyi in real-life conditions. I.e. it is not intended to investigate the individual influence of changes in acting alone parameters on E. huxleyi bloom dynamics (such studies were performed in laboratory conditions by many authors with regard to different parameters, and we provided the

relevant references in the manuscript). To achieve the goal posed above, it was impossible to employ in situ data. Indeed, shipborne data even from an unrealistic large scale field campaign would not provide the desired data at a required high spatial and temporal resolution within a multidecadal time period. Understandably, investigations in laboratory /mesocosm conditions are unable to prove the sought for data on a collective influence of a significant number of co-acting causal factors, leaving alone the fact that data from laboratory/mesocosm conditions could not be regarded as faithfully reflecting the real life conditions. And of course they would not allow to investigate the interannual dimension of this phenomenon. That is why we resorted to satellite data: this approach meets the goal of reflecting the actual/real-life co-action of causal factors on E. huxleyi. blooms. Importantly, the large time period and a variety of target seas make the results obtained unapparelled. Our results are in no way limited solely by ascertaining the sea-specific causal factors prioritization in terms of their influence on E. huxleyi blooms. No similar results have ever been published before. We came up with a wealth of other findings/establishments (such as e.g. the concatenated ranges of causal factors values corresponding to pick blooms in the target seas as established over nearly 20 years, etc.) that are summarized in Conclusions. We don't think we should reiterate them here.

2. In addition to what is given in Conclusions, we draw the reviewer's attention that together with the established prioritizations the development of reliable RFC models opens the way to predict the future tendencies in E. huxleyi dynamics in conditions of ongoing climate change. Indeed, employment of both CMIP5 models predictions of the sets of prioritized causal vector and scalar factors changes over the 30 forthcoming years within the target seas and the RFC models for each respective sea, it is allows to assess the expected tendencies in the future developments of E. huxleyi-driven phenomena. This work is presently being done by us. So, at this further stage of research, it is possible to accomplish what the reviewer meant in his/her remark.

3. As for the figures, the respective interpretation and reference are given in the

manuscript according to the Biogeosciences policy: the main message of figure 3 is given in P10 L21-24, figure 2 - P8 L3-9. Please note that its purpose is not at all to illustrate “overlapping” but to display the difference in the statistical ranges of FFs inherent in the cases of large and small blooms. The three maps were chosen to show the most extensive blooms occurred in the studied seas to better compare the modelling results.

4. The reviewer’s stylistic remarks will be closely considered in preparing the revised manuscript.

We thank the reviewer for the suggestion regarding the possible application of the study performed. In Conclusion we twill point out that the results obtained will be used (as we explained in bullet 2) for the projections of E. huxley bloom temporal and spatial tendencies up to 2050 by using the CMIP5 vector and scalar modelling results in combination with our RFC models.

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