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Interactive comment on "Biogeochemical versus ecological consequences of modeled ocean physics" *by* Sophie Clayton et al.

Anonymous Referee #2

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This study compares the simulated biological differences in a "diverse ecosystem" model coupled to two different global physical model configurations, one that has a relatively high resolution and is eddy permitting and one that is much coarser and does not resolve eddies. This is an interesting starting point and the abstract of this manuscript is quite promising. I was very curious to read about the insights that might be gained from the study laid out there. However, the manuscript itself was rather superficial and disappointing and did not deliver on the study's potential. There are some similarities and some difference between the two configuration, as one might have expected. The authors do not dig deep enough in explaining the underlying reasons for the differences. In the discussion there are several occurrences of "we hypothesise that these differences result from. . ." which is rather unsatisfying in a modelling study where one can examine every process in great detail and get to the bottom of

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Discussion paper

differences. Furthermore, the mere description of differences between the two model configurations without any comparison with observations seems rather limited. Most importantly, I don't find any broadly applicable insights articulated in the manuscript. What is the novel insight that the authors are trying to present here? Given the distinguished author list, this was a particularly disappointing read.

Some specific comments:

Intro, 1st paragraph: Higher ecological complexity is not necessarily because of the potential problem of overfitting. It would be appropriate to at least mention this.

Page 2, line 25: Reference to LeQuere et al. (2005) seems inappropriate here. This paper is not describing a global biogeochemical model, but merely a plan or idea of such.

Section 2.1: What type of data assimilation was applied to the models and could this affect the results? It has been shown previously that data-assimilative physical model solutions can lead to drastically altered biogeochemical results compared to their corresponding non-assimilative model versions (see, e.g. Raghukumar et al. Progress in Oceanography, 2015).

Figures 1 and 2: I would prefer to also see the CR results, not just HR and the differences between HR and CR.

Page 4, line 17-18 and Page 5, line 13-14: Differences between both models (model physics as well as biogeochemistry) have previously been described by Clayton et al. (2013). I'm wondering what the new and distinct contribution of this publication is in comparison to Clayton et al. (2013).

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