We would like to thank Tina Treude for her insightful feedback. We have responded to the Associate Editor's suggestions, with the original comments in black and our responses in blue.

Dear Alexandre Mignot and Co-Workers,

thank you for submitting your thoroughly revised manuscript to Biogeoscience. The reviewer and I agree that the study strongly benefitted from the revision and has now matured to a full scientific manuscript.

REPLY: Thank you for your message regarding our revised manuscript submission to Biogeoscience. We are pleased to hear that the reviewer and you found the revisions to be thorough and that the study has now matured into a comprehensive scientific manuscript.

The reviewer has a couple of minor technical comments that I would like you to take into consideration.

REPLY: We appreciate the reviewer's time and effort in providing feedback on our manuscript. We would like to confirm that we have considered all of the reviewer's technical comments and have addressed them accordingly in our revised manuscript.

I further would like to ask you to revise the following:

1. Title
I find the new title a little hard to read. It is quite long and strangely structured. Try to break it up, for example:

Assessment metrics of BGC-Argo floats: Biogeochemical model performance and observing system design evaluation using an unsupervised machine learning algorithm

REPLY: Thank you for your message and for providing your feedback on the revised title of our manuscript. We have carefully considered your suggestion and have revised the title accordingly to make it more clear and concise. The title now read: "Using machine learning and BGC Argo floats to assess biogeochemical models and optimize observing system design".

2. Red-Green in Figures

Please correct the color scales in Fig 1 and 2 to accommodate red-green color weaknesses (see our figure preparation guideline)

REPLY: Thank you for bringing this to our attention. We have revised all of the figures in our manuscript to ensure that the color scales account for the red-green color deficiency, as per your figure preparation guidelines.

##

We thank the reviewer #3 for their thoughtful comments. Here we offer detailed responses to all questions. Reviewer's comments are in black, our replies are in blue.

I am satisfied with the author revisions to address my concern and recommend publication after addressing a few minor language issues I identified in the first two pages:

REPLY: We thank the reviewer for the positive assessment of our work and for recommending publication. The languages issues has been addressed in the revised version of the manuscript.

1-19 – The attribution of "However, the assessment of biogeochemical models is becoming increasingly challenging due to the continuous improvement in model structure and spatial resolution." Does not make sense to me… why does "improvement in models" make their assessment "increasingly challenging"? Rather than relating to the same metric, e.g. average surface PO4, I think the authors are trying to say that the metrics themselves are becoming more complex. Perhaps the authors mean instead something like "However, with the continuous improvement in model structure and spatial resolution, incorporation of these additional degrees of freedom into fidelity assessment has become increasingly challenging."

REPLY: Thank you, we have made the correction.

1-28 – "ensure" should be "ensures"

REPLY: Thank you, we have made the correction.

1-32 – "compare" should be "compares"

2-6 – remove "about"

REPLY: Thank you, we have made the correction.

2-7 – "network. In particular…" should be "network, in particular…" as this is not a complete sentence.

REPLY: Thank you, we have made the correction.