Thank you very much for taking the time to review my manuscript and for your valuable comments!
Below, we have provided our responses to your feedback.

Please ask someone to check for minor errors with English/typos – some things still need correcting.

We have carefully checked the manuscript for English language errors and typos, and the corrections have been marked throughout the document.

Title: add 'a' after for

"a" was added.

Abstract:

Line 8: remove 'and' before thus

"and" was removed.

Line 8: rewrite to say 'The effectiveness of the PSO toolbox is….'

It was corrected.

Line 12: 'but resulting in not much difference' should be rewritten, this sounds vague and unscientific.

It was rewritten to: "but leading to only minor variations".

Line 42: are coupled to FABM, not are available in FABM.

It was corrected.

Line 149: rewrite 'a version with a two-group version'

It was rewritten for clarity and marked accordingly in the manuscript.

Line 155: assessed not accessed.

It was corrected.

Paragraph on line 172: No need to list variables or levels you are not using.

The unused variables were removed.

191: liter not litter

It was corrected.

318: I'm not sure why higher growth rates compensate for a lack of transport away from the region. Maybe the opposite should be true?

Thank you very much for pointing this out! That was a misunderstanding on my part. I have reconsidered it and revised the explanation as follows:

"The elevated values of *muPl* and *muPs* can be attributed to limitations inherent in both the 1D model and the input data. Phytoplankton growth in the model follows Liebig's law of the minimum (Schrum et al., 2006), where the most limiting factor restricts growth. As the MERRA2 reanalysis data underestimates shortwave radiation (Yingshan et al., 2022), which is used to forcing the model, it is likely to result in lower simulated light levels compared to reality, thereby suppressing phytoplankton growth. To compensate for this reduced growth potential and reproduce the observed phytoplankton biomass, *muPl* and *muPs* were parameterised to higher values."

385: 'sloppiness' is not the right word to use here.

It was changed to "The work on sloppiness in the model simulations ....". I kept the word "sloppiness" because it is in the title of the referenced paper.

389-393: I do not think these examples are relevant to your case and they should be removed.

The irrelevant examples were removed.