

**Title: Numerical Models for Monitoring and Forecasting Ocean Biogeochemistry: a short description of present status**

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MS No.: sp-2024-8

Report: Ocean prediction: present status and state of the art

Dear Editor,

We thank the 3 reviewers for their positive comments. Their requests have been carefully considered. In the following reply letter, reviewers' comments are in **bold green**, the answers in black and the proposed revised text in **blue**.

**RC2: 'Comment on sp-2024-8', Anonymous Referee #2, 22 Oct 2024 reply**

**The authors present a review of the state-of-the-art in biogeochemical modelling, covering various aspects such as usage, complexity, limitations, cost. A list of common biogeochemical models is also provided.**

**All in all, the paper covers the topics that one would expect to find when first learning about BGC models, and thus fulfills its role as a chapter in the special issue (if I understood correctly).**

**I have only a few minor comments:**

**\* line 45, some modelled processes may not conserve mass, if some of the implied variables are not one of the model state variables (e.g. denitrification in the Bamhbi model). Thus, the sentence at it is now may be misleading**

Conservation of mass is a solid principle for tracers included in the  $R_{bio}$  term of a biogeochemical model. We will change the sentence as follows:

... and is typically based on the principle of conservation of mass ...

**\* line 78: define DMS, unless it is defined in previous chapters of the special issue ?**

The acronym will be defined when first used: dimethylsulfide (DMS)

**\* line 102: "most fitted" makes me think of fitting a curve through some points (in a statistical sense). Maybe you meant "most fit" or "fittest" (species) ?**

The sentence will be revised as follows:

... so that the fittest groups can prevail in the resulting ecosystem.

**\* line 119: define POP**

The acronym will be defined when first used: persistent organic pollutants -POPs

**\* line 150: remove "several"**

Done

**\* model list: consider adding Darwin to the list (the BGC model associated with MiTgcm) ?**

We agree Darwin is worth to be listed and described. We will add the following sentence:

**DARWIN: a complex multi-nutrient model in which the plankton community comprises hundreds of groups by taking into account cell size and functional traits to study biodiversity and biogeography (Dutkiewicz et al., 2009).**

Dutkiewicz, S., Follows, M. J., & Bragg, J. G.: Modeling the coupling of ocean ecology and biogeochemistry. *Global Biogeochemical Cycles*, 23(4), 2009