

Interactive comment on “Calibration of a simple and a complex model of global marine biogeochemistry” by Iris Kriest

F. Hoffmann (Referee)

friederike.hoffmann@uib.no

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Please consider that I do not have a background in modelling, so I cannot judge the methods and main contents of the manuscript. With a background in functional microbiology of nitrogen cycling, my comments are limited to the representation of biological processes in the proposed model.

General comments: Key processes connected to organic matter remineralisation seem to be well represented also in the simplified model Retro-MOPS. The focus on the oxidants oxygen (for aerobic mineralisation) and nitrate (for anaerobic mineralisation) takes into account key remineralisation processes in the water column.

Specific comment: Page 5, line 10-11: "The discretised flux divergence, that can actually be remineralised to phosphate and nitrate with available oxidants (oxygen and/or

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nitrate) Deff, (j), is then determined by..." - organic matter cannot be remineralized to nitrate by nitrate. In the absence of oxygen and the presence of nitrate, organic matter will be remineralized by denitrification (reducing nitrate to N₂ while oxidizing the organic carbon), but the organic nitrogen in the organic matter will be remineralised and released as ammonium. This can in turn be oxidized to nitrate in the presence of oxygen (nitrification). Under low oxygen concentration, this process can occur parallel to denitrification (coupled nitrification-denitrification). But in the absence of oxygen, ammonium will not be oxidised to nitrate. I am not sure if this is important in this context, but the sentence as it stands now is misleading.

Technical correction: Page 3, line 21/22: remove one "the"

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