Biogeosciences Discussions

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Comment on bg-2021-59

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Community comment on "Evolution of the long-term and estuary-scale phytoplankton patterns in the Scheldt estuary: the disappearance of net growth in the brackish region" by Dante M. L. Horemans et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-59-CC1, 2021

The Scheldt estuary has been studied for a long time in a context of changes in nutrient inputs by the river after improvement of wastewater treatment, especially. The long-term data sets on observed nutrients, phytoplankton and zooplankton provide indeed an opportunity for analyzing the dynamic and trends of the interactions within the food chain.

The use of a model for () interpreting such data is however essential due to the complexity of the hydro-sedimentary processes and how they drive the as much complex biological interactions.

However, despite the simplified Iflow model seems well adapted for interpreting salinity gradient, suspended solids variations, phytoplankton is poorly represented as a unique compartment and without nutrient limitation, with the hypothesis of no limitation. It is difficult to understand why the authors, well known for their work on silica, did not take this important nutrient into account, and hence the diatom and non-diatom compartments.

In addition, it is a pity to have a rather sophisticated model and not include the major variables being discussed, i.e. two types of zooplankton. Its role is treated by magic parameters that arrive at the end to spatially and temporally constrain a phytoplankton mortality rate formulated as a first-order process in relation to algal biomass.

It is even mentioned by the authors: "*reasoning still needs to be verified by a model that explicitly resolves zooplankton dynamics* ". It would be recommended to better represent phytoplankton and zooplankton in their model to address their scientific questions with a convincing approach.

Such a paper would deserve a publication in Biogeosciences. However, the above remarks call for a resubmission after deep revision of the biogeochemical modelling approach.