

Interactive comment on “C-GEM (v 1.0): a new, cost-efficient biogeochemical model for estuaries and its application to a funnel-shaped system” by C. Volta et al.

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I normally work with three-dimensional water quality models that being used for management purposes. I see the strength of this model is its simplicity, yet still being able to represent the major hydrodynamic and biogeochemical characters of a system. The level of complexity of this model is perhaps equivalent to a one-dimensional longitudinal model, the difference is that this model assumes for an ideal type of geometry that both estuary width and depth can be represented with mathematical equations (as functions of distance from estuarine mouth). However, there is trade off for taking this route. On the one hand, it makes it easier to apply the model to different type of

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estuaries, and hence as a better tool to study geometric effects on biochemical characters of a system. On the other hand, the inaccuracy of morphology representation of a system may lead to errors of biochemical simulations when the model is calibrated or validated through field data. This contradiction will limit the model usage. Instead of closely mimic the field data, the authors may consider to calibrate this model against several biochemical patterns and apply the model to different estuarine types. Figure 3 is currently presented as a concept, the model and the publication would be much strengthened if the model could realize the concept. Perhaps this manuscript is a first step on that road and for that reason I'd like to support its publication.

Some specific comments: 1. TOC includes particulate matter that settles to the estuary bed, this function seems omitted from the model. The effect of this omission to the model performance is not known and need to be discussed. 2. A full implementation of a benthic model may be challenging to the current C-GEM, but authors may consider to parameterize the major processes or fluxes between benthic-pelagic interfaces.

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