Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2018-271-RC2, 2020

Geoscientific Model Development
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Interactive comment on "Development of a Submerged Aquatic Vegetation Growth Model in a Coupled Wave-Current-Sediment-Transport Modeling System (COAWST v3.4)" *by* Tarandeep S. Kalra et al.

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Received and published: 24 February 2020

This review is being conducted by me as topical editor for this manuscript. This is an unusual and somewhat unfortunate occurrence which has been caused by two reviewers in series failing to produce their reports.

This manuscript introduces a new vegetation model in a coastal ocean model. It is within scope for GMD and is potentially a valuable contribution, however at this stage the manuscript is let down by rather serious deficiencies in the description of the model,

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Discussion paper

and in its verification and evaluation. These will need to be corrected before a revised manuscript can be accepted.

1 Mathematical notation

It is unconventional for a review to start with something this technical, however in this case the highly unconventional mathematical notation makes the equations so difficult to read that the meaning is severely impaired.

1. Mathematical symbol names should be single letters (Latin, Greek, or potentially from another alphabet if really needed). Using multi-letter names creates confusion about what is a variable name and what is a multiplication of symbols. This is a convention that very much also holds in the marine biogeochemistry modelling community, for example the NPZD model is named after the conventional (single letter) symbol names for its four prognostic quantities).

2. If it is necessary or useful to use a multi-letter subscript or superscript to further identify a variable, then this should be typeset in upright letters to avoid the confusion with a product of symbols. Using LaTeX, this can be achieved with `\mathrm`, for example T_{opt} is written as `$T_{\mathrm{opt}}$`.

3. $\exp$ is the exponential function, it takes its argument in round brackets and not as an index. e is a number, the base of natural logarithms, and can be exponentiated by writing an index. The current mix of these two notations, for example in equation 2, is at best confusing and at worst meaningless.

4. Mathematical function names are typeset upright and usually use lower case letters, for example $\exp$, $\min$ (`$\exp$`, and `$\min$` respectively).

5. Double subscripts should be avoided where possible. If they are unavoidable then they should not be separated by a hyphen, because a horizontal line universally means subtraction. A comma, possibly augmented by brackets of some type, would be a better choice.

2 Equations and discretisation

The introduction to section 2.2 claims that the remainder of the section will introduce the equations solved. In fact, we are only treated to a disconnected set of source terms for an unspecified set of equations.

Please provide the full set of differential equations being solved, before going into detail about the definition of the terms. In addition, the equations are clearly being solved numerically, so a complete model description also requires the inclusion of the discretisation used, and how the resulting discrete linear or nonlinear system is solved.

3 Verification and evaluation

There is effectively no verification or validation of the model. The test cases provided are purely descriptive: the model is run and the authors describe what happened. This does not provide suitable evidence either that the model is correctly implemented, or that it is realistic. The usual way of demonstrating the former would be using the method of manufactured solutions (MMS) to create artificial analytical solutions to the system, and then demonstrating convergence to them at the expected rate. For more information on MMS see Farrell et al. (2011) section 4.1 (https://doi.org/10.5194/gmd-4-435-2011).

In order to provide some level of evaluation of the model, it would be necessary to

present a qualitative or quantitative comparison of the model to an external reference. The external reference might be directly with observational data, or might be with the results of another well-evaluated model. In any event, an external comparator is absolutely necessary.

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2018-271, 2019.