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# Interactive comment on "S2P3-R (v1.0): a framework for efficient regional modelling of physical and biological structures and processes in shelf seas" by R. Marsh et al.

**Anonymous Referee #2**

Received and published: 11 April 2015

In this manuscript the authors apply a 1D physical-biological framework in a regional implementation in select years and select shelf regions.

General comments:

Although the manuscript is well written, I feel that the content is more suitable for a technical report appearing on a modeling website, than a peer-reviewed publication in GMD. Manuscripts within GMD are expected to "represent a substantial contribution to modeling science", which I do not feel is the case for this manuscript. Furthermore, although the modeling framework discussed here could potentially be useful in an undergraduate ocean modeling curriculum, it is not clear to me that the S2P3-R model

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has "the potential to perform calculations leading to significant scientific results" as would be required for publication in GMD.

The authors spend several pages describing the existing S2P3 model, which has already been published and is available online. The new methodology employed here appears to consist of modifying the source code so that it can run in a Unix environment and run at 5000-20000 grid points. Matlab plotting scripts are also provided. However, this in itself does not consist of a substantial advance in modeling science, or represent a particularly novel concept or idea.

The primary issue I have with the manuscript, however is that the authors are essentially attempting to study 3D physical/biological shelf processes by ignoring advection. In many/most shelf systems, advective processes play a critical role in controlling the distributions of nutrients and phytoplankton, and thus neglecting this key process is a major deficiency in the paper. Perhaps this may be why the observed chlorophyll concentrations (Fig. 4f) look nothing like the modeled chlorophyll concentrations (Fig. 4g)?

In addition, the S2P3-R implementation described here can take nearly a day to generate a year of 3D model results. Sophisticated community models including key physical processes lacking here (e.g. horizontal and vertical advection) as well as complete biogeochemical modules (rather than simply just phytoplankton and nutrient components) often take less than a day of run-time per year simulation for similar regional shelf applications. Because such commonly used models (e.g. the Regional Ocean Modeling System (ROMS)) include more key physical processes and take less time to run, it is not clear why the modeling framework described here (S2P3-R) is superior to (or even a logical alternative to) these existing and well-documented regional shelf community models.

In summary, although I fully appreciate the utility of purely 1D models such as S2P3 for the purposes of scientific inquiry and as an instructional tool, the utility of implement-

ing a 1D model regionally at 5000-20000 separate sites in an attempt to estimate 3D physical/biological maps, while ignoring key 3D physical processes such as advection, is simply not clear.

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