

## ***Interactive comment on “Using coupled hydrodynamic biogeochemical models to predict the effects of tidal turbine arrays on phytoplankton dynamics” by Pia Schuchert et al.***

**Anonymous Referee #3**

Received and published: 12 July 2016

### General Comments

This study conducted a series idealized numerical experiments to explore the effects of tidal turbine arrays on phytoplankton dynamics. The topic is of interest. However, I feel that this manuscript needs to be considerably fleshed out, and, therefore, would not recommend publication in biogeosciences at current status.

### Specific comments

The setup of idealized models is always highly simplified. This simplification, however, must have a realistic reference. Otherwise, the idealized model would be just a toy. This study designed a model domain that consists of a tidal inlet and a semi-circle coastal

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sea. Does this domain represent the typical region around the British Isles where TEDs will be deployed? Is the setup of TEDs in the inlet channel the standard design of future TED deployment? If they are not, the representativeness of this idealized numerical model is less meaningful.

As idealized models are idealized, there is no need to validate the model results. Nonetheless, the model results should “look” generally reasonable. The simulated phytoplankton concentration is almost zero during the whole year in addition to a spring bloom occurred in April. Is this a typical phytoplankton cycle around the British Isles? Specially, what is the atmospheric forcing of the model? What are the seasonal variations of the PAR scenarios? Did the model simulate the variation of water temperature that is important to phytoplankton growth?

The main founding of this study is that the deployment of TEDs reduces the phytoplankton concentration on basis of the comparison of the model results with/without TEDs. Certainly, this comparison is useful, but looks too superficial. Of importance is to explore the key processes (either physical or biological) through which the deployment of TEDs alters the phytoplankton dynamics. I feel that this manuscript would be more valuable if in-depth analysis of those processes were presented.

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Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-232, 2016.

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