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Biogeosciences Discussions

Interactive comment on "Nitrogen and carbon dynamics in the Scheldt estuary at the beginning of the 21st century – a modelling study" *by* A. F. Hofmann et al.

A. F. Hofmann et al.

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We thank Anonymous Referee # 2 for the instructive synopsis and general appreciation of our work.

Referee # 2 correctly noticed that our work bears some similarities with [Vanderborght et al.(2007)]. However, our work is also substantially different. [Vanderborght et al.(2007)] describes a tidally resolved 2-D model, i.e. it includes the transport of solutes in the estuary in great detail. This rather complex description of physical processes leads to severe limitations:

1. there is a high demand for high resolution data which makes it difficult to run the model for past decades with scarce data coverage or for predictive future scenarios,

2. the computational demand of the models is rather high, rendering it difficult to run the model for longer model times,

3. to port this model to other systems, detailed bathymetrical maps are needed which might not always be available,

4. furthermore, the complex representation of physics together with a rather crude representation of biogeochemistry in the model of [Vanderborght et al.(2007)] implicitly puts emphasis on the role of physics for the estuarine ecosystem functioning, which might perhaps not correspond to reality.

Since our model suffers from none of these drawbacks, our model code is public domain (the model codes of [Vanderborght et al.(2007)] cannot be publicly verified), and our model uses more recent data, we feel that our paper provides a complementary contribution to the scientific literature. These issues are mentioned in the revised version of our paper.

Following Referee # 2's advice, we included a section discussing the benthic proxy nature of some of our pelagically modelled processes and the consequences of this assumption for the results.

An earlier version of our manuscript contained an elaborate description of the different ways of modelling denitrification which we dropped since we felt that the different ways of modelling denitrification are common knowledge. However, as requested by Referee # 2, we added a few sentences explaining the way we model denitrification in

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the revised version of our manuscript.

We agree on the point made by Referee # 2 that “at the beginning of the 21st century” in the title might be misleading. The title has been changed to “Present nitrogen and carbon dynamics in the Schelde estuary using a novel 1-D model”.

Inspired by Referee #2’s comments we rewrote the results section, using less numbers in the text. Furthermore, we shortened the materials and methods section and the appendix, reducing the length of the manuscript considerably.

The technical corrections given by Referee # 2 have been incorporated.

References

[Vanderborght et al.(2007)] Vanderborght, J.-P., Folmer, I. M., Aguilera, D. R., Uhrenholdt, T., and Regnier, P.: Reactive-transport modelling of C, N, and O2 in a river-estuarine-coastal zone system: Application to the Scheldt estuary, Marine Chemistry Special issue: Dedicated to the memory of Professor Roland Wollast, 106, 92–110, 2007.

Interactive comment on Biogeosciences Discuss., 5, 83, 2008.