Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2018-365-RC4, 2018

Biogeosciences Discussions
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EGU

Interactive comment on "Evaluation of atmospheric nitrogen inputs into marine ecosystems of the North Sea and Baltic Sea – part B: contribution by shipping and agricultural emissions" *by* Daniel Neumann et al.

Anonymous Referee #1

Received and published: 8 December 2018

Neumann et al have attempted to estimate contribution of shipping and agricultural emissions to atmospheric nitrogen inputs into the North Sea and Baltic Sea. Their analysis is based on several models and most of these codes cannot be provided to the third parties, as mentioned by the authors. In such a situation, it is difficult to properly evaluate the findings in this study. In addition, there seems to some fundamental problems in the manuscript. I list my concerns one by one below:

1. Bioavailable PON has been mentioned at several places (such as line 21, page 1). This is a misleading term unless further qualified. Only inorganic nitrogen (dissolved

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nutrients form) and up to certain extent, DON is considered bioavailable. I have not seen any (oceanographic) study, where PON is proposed to be bioavailable. I am unsure if the authors wanted to convey the availability of nitrogen to heterotrophs (such as fish), then PON can be bioavailable. But in traditional view, we do not present the definition of bioavailable in this way.

2. Authors must specify how does their model is able to differentiate between different components of anthropogenic (for that matter natural as well) inputs?

3. No uncertainties are provided in the estimates. It is important to provide uncertainties (in all tables and texts, wherever an estimate is quoted) anyways but here it more important as % contribution difference of different processes in the two basins is not much.

4. What deposition velocities are used in the model to estimate deposition rates? These must also have large uncertainties.

5. Chlorophyll is a pigment so how does one estimate relative contribution of shipping etc to chlorophyll and what does it signify (Fig. 6)? Perhaps an estimate to primary production instead of chlorophyll would have been meaningful.

6. Why a particular year (2012) is chosen (line 5, page 20)? Will the conclusions change for another year? How does one specify a particular year in model (unless there is some time-series analysis involved, which is not the case here)?

7. Baltic Sea is also zone of nitrogen inputs through N2 fixation. Is this component taken into account in the model?

Such studies are important to advance our understanding of anthropogenic nitrogen inputs to marine ecosystems but this study, unfortunately, does not tell any important story in that direction.

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