

## ***Interactive comment on “Impact of a nitrogen emission control area (NECA) on the future air quality and nitrogen deposition to seawater in the Baltic Sea region” by Matthias Karl et al.***

### **Anonymous Referee #2**

Received and published: 30 November 2018

The paper is a modeling study to simulate the importance of present-day and future changes of shipping emissions on air quality and nitrogen deposition in and around the Baltic Sea and the North Sea. The analysis is solid and the conclusions are well supported. I recommend publication in ACP after my comments below are addressed.

My main comment is that the paper is quite dense with 13 tables and 14 figures, mostly multi-panel ones. While I acknowledge the efforts made by the authors to be thorough, some of the materials are better suited in the supplementary so that the main text is focused on the key messages. I suggest the following figures/tables and associated texts be placed in the supplementary; these are mostly model evaluations which can

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be summarized in writing and then refer to specific figures/tables in the supplementary as backups to support the write-up. These are Figure 3 and 4 (precipitation evaluation), Table 3, Table 5 or Figure 5 (both show the model performance of nitrogen deposition; it is sufficient to keep one in the main text), and Table 7-10.

Introduction: the present write-up does not mention the importance of NO<sub>x</sub> as a precursor of tropospheric ozone. This should be added, as the paper also presents the effect of shipping emissions on ozone.

Pg6, line 8-14: The writing on the treatment of sub-grid clouds is confusing. First, does the CMAQ model used for the manuscript treat sub-grid cloud or not? The last sentence seems to indicate it does not. If so, then the preceding sentences on the sub-grid clouds should be removed and replaced by a simple statement saying that sub-grid cloud treatment available in the standard CMAQ model is not used. Second, I am not convinced that the 4km x 4km resolution is sufficiently fine to resolve convective clouds. Do you have references or model simulations to support this?

Pg1, L10: “emission” should be “emissions”

Pg2, l15: Spell out the full name for MARPOL when it first appears in the paper

Pg2, l16: “;” should be “,”

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-1107>, 2018.

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