

Interactive comment on “Low frequency variability in North Sea and Baltic Sea identified through simulations with the 3-d coupled physical-biogeochemical model ECOSMO” by Ute Daewel and Corinna Schrum

Anonymous Referee #1

Received and published: 8 May 2017

General Remarks:

The paper presents results from a 61-year long hindcast simulation using a coupled hydrodynamic-ecosystem model applied to the North Sea and Baltic Sea. By means of this model system, the long-term multi-decadal variability of relevant physical and biological parameters is investigated. In addition, specific sensitivity tests have been performed in order to determine the role of single forcing functions on the detected variability.

The overall impression is that the paper is very carefully written in a clear and concise

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way. In particular, the sensitivity tests are nicely chosen to illustrate the impact of different forcing functions on the low frequency variability of physical and ecosystem related parameters. Only for some of the results, the descriptions should be expanded a little to make it easier for the reader to follow. More details and some other minor comments are given below. In summary, I can recommend the manuscript for publication after a minor revision.

Detailed Comments:

Page 2, line 22: Please be consistent throughout the text: “long term” or “long-term”.

Page 2, lines 26-27: What is meant by “causal relations to inter-annual variations”?

Page 3, line 21: Please add “spatially and temporally explicit character . . .”

Page 3, line 21: It is misleading to say that the explicit character of model data make it difficult to find major variability modes. Compared to observational data, only such an explicit character makes it possible to perform a thorough analysis.

Page 3, line 29: Quotation marks at the end of the block are missing.

Page 4, lines 7-8: I do not see a general link between spatial and temporal resolution and better chances that EOF modes are related to “real” physical modes. According to my understanding the potential that specific physical processes can be represented by orthogonally arranged EOFs, is not necessarily connected to the resolution. Also, in the cited reference Schrum et al. (2006b), no information could be found, which supports this statement. The reference seems to be misplaced here. Therefore the authors should reconsider this sentence.

Page 5, line 8: Why “60-years” simulation period? Everywhere else, 61 years are stated.

Page 6, line 2: Scale and units are missing for current vectors in Fig. 7.

Page 6, line 11: In principle, Fig. 7 already shows the current speed in form of the

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vector length. Hence, the sentence should be reformulated.

Page 6, lines 15-16: From Fig. 8a, it is not clear, whether fluctuations could not be explained or whether they are not present at all.

Page 7, lines 2-7: It would be much easier to follow this paragraph, if the specific EOFs, which are referred to and discussed in the text, are mentioned.

Pages 7 and 8: Section 3.3: This section should be extended a little in order to make the results more clear. In particular, when mentioning the different scenarios, it would be helpful if the idea behind the specific scenarios is briefly repeated in a half-sentence.

Page 8, line 39: Also THEY (Mathis et al.) found out . . .

Figs. 8 and 9: The figures showing the horizontal EOF distribution in I) and II) are too small to identify all the important features.

[Interactive comment on Earth Syst. Dynam. Discuss., doi:10.5194/esd-2017-36, 2017.](#)

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