

Interactive comment on “An Evaluation and Implementation of the Regional Coupled Ice-Ocean Model of the Baltic Sea” by Jaromir Jakacki and Sebastian Meler

Anonymous Referee #2

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The setup of a three dimensional coupled ice-ocean model for the Baltic Sea is described and some evaluation results for sea surface temperature, sea ice concentration and sea ice thickness for the period 1990-2009 are presented. The focus of the study is on the sea ice component. However, I miss a specific scientific question in the manuscript that could be addressed with the help of the introduced model. The manuscript resembles more a hasty written technical report than a peer-reviewed scientific article. Hence, I suggest to add a scientific analysis of the model results and to submit the manuscript later again, perhaps to ESD or any other journal that fits the considered, scientific question.

My comments in detail:

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1) If the authors prefer to focus on sea ice changes in time, a trend analysis together with sensitivity experiments would be interesting to disentangle the drivers. The results of the sea ice model seem to be reasonably good for such an analysis (Fig. 14) although the sea ice extent is systematically underestimated (Fig. 15). However, for such a purpose the simulated interannual variations of sea ice extent, sea ice concentration and sea ice thickness need to be evaluated. Please compare with Löptien et al. (2013, Journal of Geophysical Research –Oceans).

2) The described ocean and sea ice models are based on a version of the well-known Bryan-Cox-Semtner ocean circulation model and the sea ice model CICE, respectively. These models have been applied to the Baltic Sea in many process and climate related studies since the 1990s (e.g. Lehmann 1995, Tellus; Meier et al. 2003; Journal of Geophysical Research –Oceans). Please introduce the relevant literature and compare your setup with the setups of previous studies. Is there anything novel in your model implementation and setup that may lead to improved results compared to the earlier studies?

3) Please evaluate both the seasonal cycle and the interannual variability of model variables in more statistical means (e.g. Eilola et al., 2011, Journal of Marine Systems). For instance, Figures 11 and 12 do not allow any conclusion on model quality. For the evaluation of SSTs satellite data are not well suited (except for spatial patterns) because model results (average of the upper 5 m) and skin temperatures are usually very different (Fig. 8). I suggest to use in addition to satellite data observations from the national monitoring programs of the various Baltic Sea countries collected in the Baltic Environmental Data base (BED) or elsewhere.

4) It is rather unlikely that the recent trend in ice extent is explained by increasing winter runoff because the salinity in the northern Baltic Sea is rather low and the impact of changes in sea surface salinity on the freezing point temperature is negligible in that salinity range.

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