Geoscientific

Model Development

Discussions

[GMDD]

Interactive

comment

Interactive comment on "Sea-ice evaluation of NEMO-Nordic 1.0: a NEMO–LIM3.6 based ocean–sea ice model setup for the North Sea and Baltic Sea" *by* Per Pemberton et al.

D. Bailey (Referee)

dbailey@ucar.edu

Received and published: 6 April 2017

Overall this was an interesting description of an ice-ocean modelling system for the Baltic Sea. I do have a few concerns, but feel that the manuscript may be acceptable after some relatively minor revision. There were no scientific hypotheses in this paper, so I am simply evaluating the technical detail aspects.

1. My first concern is about the model boundary conditions. I understand that this domain is forced from a larger North Atlantic domain and that the ocean exchange is not a key part of the Baltic Sea ocean temperature and salinity structure. However, what happens with fresh water from the atmosphere and land? What impact does the river discharge have on the sea surface temperature and salinity of the Baltic? How is

this specified in the modelling system?

2. Despite the SST biases as described in the manuscript, the model does a pretty nice job at simulating the sea ice concentration, thickness, and extent. I wonder about the snow on the sea ice in this region? I know the authors present a climatological seasonal cycle of snow from the model, but I would like to see more discussion here. Can the authors add the observed snow depth information to Figure 15? Are there no other sites or model information to get snow depth? Maybe accumulating snowfall from the forcing? As the authors know, the albedo of the snow is critical to the seasonal evolution of the sea ice. Albedo formulation? Parameter settings?

3. One thing I don't know about the Baltic is whether the daily maximum sea ice extent always occurs in the same month? It is sometime in February or March. It is interesting in Figure 7 that the model maximum extent is in March, while the observations indicate February. There should be more discussion of this.

4. From Figure 8, it looks like the model has too much thin ice (less than 1m) and not enough thick ice. How does this vary from year to year? I wonder if there is a relationship to snow here. Is there a freeboard parameterization in the model? Are you getting to much or too little snow-ice formation?

5. Finally, there are a lot of figures (sixteen) given the amount of text in the manuscript. A number of the figures are very qualitative, just comparing contour plots by eye. Could some of these be condensed into more quantitative information, maybe spatial correlations or differences between the model and observations? Just a thought.

Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2017-10, 2017.