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Interactive comment on “Evaluation of numerical models by FerryBox and Fixed Platform in-situ data in the southern North Sea” by M. Haller et al.

Anonymous Referee #1

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In this work, two operational hydrodynamic models have been evaluated for different time periods using Ferrybox data and data from a Fixed Platform of the MARNET network. Results of BSHcmod v4 model are analyzed for the period 2009–2012, while simulations of FOAM AMM7 NEMO have being available from the MyOcean data base for 2011 and 2012. The analysis of model results shows that the simulation of water temperatures by both models is satisfying while limitations of the models exist, especially near the coast in the southern North Sea, where salinity is underestimated by both models. Overall, the paper is well written and clear while its topic is of interest to the Ferrybox and the hydrodynamic modeling community of the North Sea. I believe that at this stage some revisions are required to the manuscript according to the comments that follow.

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Comments

1. The introduction is rather long with a lot of general information which in my view can be condensed.
2. Section 2.1: Such detailed presentation of the FerryBox system is beyond the scope of the paper. Reference to the Petersen et al. (2003) paper should be adequate.
3. Section 2.3 “For remaining rivers, freshwater runoff climatologies are used” What is their significance in terms of flux, compared to the more accurately forced 5 German rivers mentioned above?
4. Section 2.4: “The model assimilates InSitu and satellite SST” Insitu SST data are provided by SoO as said in the conclusions. The authors should also state here that FerryBox SST data are not assimilated into the AMM7 model (it is only clarified in the conclusions).
5. Section 2.4: “The model assimilates in situ and satellite SST using an Optimal Interpolation scheme” Some additional information should be given here about the data assimilation approach. For example are insitu & SST the only observational data sets assimilated by the model? How frequently are these data sets assimilated by the model?
6. Section 2.4 “Additionally, the climatological river runoff of more than 300 rivers all around the North-West shelf..” This is a very significant difference between the two models and I think more information is required on this issue.
7. Section 2.6 “i. English coast Point at 53.553_ N 0.241_ E (p1). ii. Oyster Ground point at 54.04_ N 5_ E (p2). iii. German Bight Point 54.17_ N 7.45_ E (p3)” Coastal areas are expected to be "difficult" from the numerical modelling perspective, particularly if there are significant riverine inputs. Why not examine the performance of the model in an off shore station as well?
8. Section 2.6 “ship measurements of up to 10 km around the respective positions” It

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seems to be a particularly large radius. Please explain.

9. Section 2.6: Text repeated twice text at the end of 2.6

10. Section 2.7 “temperature measurements, it is not feasible to compare them with water samples that will be analyzed later in the laboratory” However several probes on the FerryBox provide temperature measurements. Are there significant deviations between them? Also why not compare with Satellite data?

11. Section 2.7 “It is believed that the bias is due to the relatively long way of the water pumped from outside into the FerryBox whereas MARNET temperature sensors are in close contact”

This is a serious drawback. Temperature must be recorded right in front of the inlet.

12. Section 2.7 “FerryBox water temperature measurements have been bias corrected by a simple additive correction method” This seems a very crude approach and to my view inappropriate since the problem is not linear. In other words the error in the temperature reading will be different if the sea water temperature is 6, 10, 14 etc

13. Section 4 – Summary and conclusions: “Both model results predict poorly the variations of water temperatures and salinity near the coasts, and in particular in the cold Scottish coastal current. It could be argued, that this is due to weak vertical mixing, especially at the end of summer (only for BSHcmod v4). In the German Bight, scattering of modelled and observed data is higher than for central parts of the North Sea.” The advantage of using models is that you can explore hypothesis into great depth and thus I think that the authors should go a little deeper into this and investigate which is the prevailing mechanism or its relative contribution.

14. A finding of this work is that both models have similar performance scores in terms of SST. As AMM7 model is assimilating in situ & satellite SST data and BSH does not, a more in depth discussion is needed on this issue.

15. Section 4 – Summary and conclusions: “Previously, FerryBox transect data

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...southern Aegean Sea”. This whole paragraph should be placed in Section 3 (Results and Discussion).

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