

Interactive comment on “Validation of the NEMO-ERSEM operational ecosystem model for the North West European Continental Shelf” by K. P. Edwards et al.

Anonymous Referee #1

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General comments:

This article describes the recent upgrades to the Met Office operational ecosystem model for the North West shelf and validates the new system against chlorophyll data from satellite, climatological nutrients and time-series of in-situ measurements. The validation is done on a model run simulating the period 2007-2008 and the performance of the new model system is compared to that of the old model system. For most variables the new system is much improved compared to the old system. The paper is comprehensible and has no major flaws, however I miss a more in depth discussion of why improvements or changes in the results are seen in the new model system. I also

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find it a weakness that climatological nutrients are used for validation even though they are also used as the boundary condition in this relatively small model region. An in-situ data set would have been preferred, but I get the impression that this is not available. Additionally the paper could improve from better organization, some suggestions are listed below. Overall it is a good paper and the statistical analysis and validation is sound. I am recommending the paper for publication as long as the points listed below are addressed.

Specific comments:

In most places when an upgrade to the system is described, only the new configuration is described, leaving it to the reader to look up elsewhere what the previous system configuration was. Adding this information would aid the reading of the manuscript. Specifically this occurs when describing the turbulence closure scheme, page 751, L15 and when describing the boundary conditions on page 750, L17. What was the river-scheme in MRCS-PE and how was the original light attenuation formulation in NEMO? On page 762, line 2 briefly explained what the nutrient dynamics problem in the previous version were.

The model region is relatively small and climatological nutrients are applied on the boundary, so the climatology is not ideal to use for validation and this should be mentioned as a caveat in the discussion.

New results from a run with different boundary condition suddenly show up in the discussion section, why not also present the results from this run under ‘Results’?

Abstract: In the abstract, also mention the resolution in km of the POLCOMS-ERSEM.

Abstract: It would be helpful if a sentence describing the nutrient accumulation problem in the MRCS-PE and why it is not an issue in the new model was added.

Abstract: “. . . with nutrient dynamics improved throughout the domain.”: This statement is a bit strong. In my view nutrient dynamics include the biogeochemical cycling as

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well as the physical transport and I don't think that it has been demonstrated that the overall nutrient dynamics is improved even if the new boundary conditions much improved the overall nutrient concentration values in the domain.

Page 751, L5: 'Such errors ...' please provide references for the statements in this sentence.

Page 752, line 20-22. What were the old values of these parameters and why were they changed?

Page 754, line 26-28: What is meant by 'online' in this sentence?

Page 761, line 761: This paragraph seems to fit better in the 'Conclusion'.

Minor comments/suggestions:

Page 747, line 6: change "modelling. Ecosystem models' to 'models. These'

Page 747, line 20: add 'real-time' before 'snapshot'

Page 750, line 12: In the text the resolution is 6 km, in figure 1 it is 7 km, which is correct?

Page 750, line 24: Move 'such as tides' back to before 'needed'

Page 753, line 23: Should it be "mg m⁻²"?

Page 755, line 1: It is better to refer to the figure number.

Tables:

Table 1&2: Might as well put all three nutrient in the same table.

Figures:

Figure 1 is missing colorbar.

Figure 2: It would be nice if the also 'on-shelf region' was indicated on the map.

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Figure 3-5, and 9: In these figures including only one colorbar could save some space. In Figure 9 the coastal contours are missing on the lower plots.

Interactive comment on Ocean Sci. Discuss., 9, 745, 2012.

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