

*Review of the paper untitled :*

**“Towards a regional ocean forecasting system for IBI (Iberia-Biscay-Ireland area): developments and improvements within the ECOOP project framework”**

**Answer to anonymous referee #1**

Dear Referee,

Thank you for your comments. We tried to improve our paper as the best as we could by following your advice.

*\*general comments\**

*The paper provides useful insights into the development of an operational system of nested models. The assessment of the system is OK, but does not go as far as many model validation studies go and so leaves the reader with a sense that the system is only partially explained. The structure of the paper is not bad, but the writing could in places be improved both for grammatical purposes and for readability. Some proof-reading of the text and rewriting in places would be beneficial. The figures are not of publication standard and should be reproduced using fonts and lines that are readable at publication resolutions.*

A system is never assessed enough, especially in a large regional system as IBI which gathers a lot of local physical processes and even different physical regimes between shelves and abyssal plain areas. We haven't wanted to make this paper as a validation report, so we've selected any main thermodynamical features and that we assessed in qualitative and quantitative way by using the few available observation data. The objective of this paper hasn't consisted in an exhaustive validation, as another more quantitative paper that we submitted (Maraldi et al. 2011). We have rather focus on some the most obvious improvements between the two system versions V1 and V2.

About the figures, font size has been increased in order to make labels more readable.

*It is not clear from the paper whether the ECOOP system is the regional model and the coastal models or just the Mercator regional model; the phrase seems to be used interchangeably to mean either in the paper.*

We've introduced Mercator Ocean IBI system as the regional system used for the downscaling from regional to coastal ECOOP systems. Indeed the reader has to distinguish regional system IBI alone and the ECOOP integrated system IBI which considers regional system as well as coastal ones embedded in it. We clarified this point in the introduction.

*\*specific comments\**

*The abstract is particularly poorly written and should be updated to improve the readability. Similarly, the conclusions read as though they were written very quickly and would benefit from some improvements in wording and structure.*

Following your advice, we modify the abstract and the conclusion.

*When referring to the spinup period, and comments on Fig8, the 2 week period is stated as being the best compromise between the spinup degrading the initialised fields and the improved model physics having an impact. However Fig 8 doesn't show the week 2 spinup spatial patterns so it is not clear how the improvement to the Ushant Front and the loss of the initialised state counterbalance each other. Additionally, Fig 8 is of very poor quality and should be improved.*

We added the week 2 and 3 spinup spatial patterns and increased font size for the readability.

In our case, the choice of 2 week spinup for IBI-V2 seems to be the best compromise both to constrain the mesoscale structures from the assimilated embedding basin system (PSY2V3) and to allow the own dynamics of the regional model which is not resolved by the embedding system to establish. Indeed, from about one month spinup, the memory of mesoscale structures is lost. Besides, the time characteristic of the tidal adjustment and so the occurrence of tidal fronts is in the order of 2 weeks. And finally we can note that some biases of embedding system such as the bias off Galician coasts (North-West of Spain) disappears from 2 week spinup.

These explanations have been added in the manuscript.

*The discussion on surface minus bed temperature/salinity does not give any profile comparisons, so misses the opportunity to look at specific issues with water masses. Given the number of profiles a model bias profile of T and/or S against the PELGAS data would give useful insight into the formation of stratified water masses in the model and any errors in the mixed layer depth. It should also be noted that extent to which the system is stratified will evolve through the summer season, and a useful indicator of the seasonal stratification is the timing of the onset/breakdown of stratification. It is a shame that there is no evidence from other periods in the year to see how well the system responds to surface heating/cooling. The prescription of river runoff is a key source of errors in haline stratification in ROFI rivers. The use of climatological vs real-time river data, inclusion of vertical structure in the river plume and the inclusion of salinity/temperature vs volume flows at the river mouths are all important in determining if the adjacent coastal waters are well simulated. A brief description of how the rivers are prescribed and the influence this may have on some of the coastal stratification deficits should be included.*

The diagnostics of the difference of the temperature and salinity between surface and bottom provide a first idea about the stratification obtained by the system but we added and commented mean T and S profiles vs PELGAS data to complete these diagnostics. Data are not timely and spatially homogeneous. So we can't show the winter stratification situation and so compare the seasonal mixed layer.

About rivers: monthly climatology of fresh water transports has been applied to the system at each model grid point corresponding to the river mouth. It works as an open boundary segment, where we just specify the fresh water river transport (barotropic velocity with salinity=0) since we haven't any available data about temperature, salinity and baroclinic velocity of fresh water from the rivers.

Now, in the framework of Myocean Project, we're updating the IBI system by using a merge of daily hindcast, forecast and observation runoff data. Hindcasts and forecasts are provided by the E-HYPE hydrological model from SMHI and observations are provided by PREVIMER. We added this short explanation in the part of model description in the paper.

*The first paragraph in 5.2 Technical validation is confusing to understand and is not helped that it refers to regions of the model not showing in Fig 15. The analysis of currents is useful, but it should be noted that the stations are close to the coast (how many grid points - is this a fair test of the model?) and it would be useful to know how well the total (incl tidal) currents do in the V2 system as this is what most users would be interested in.*

Indeed, Iceland and Feroe are out of the domain shown in the figure 15, it's an error, so we corrected the description.

The buoys used to validate the current are not so close to the coast since they moored near the shelf break at about 50km off the coast (about 20 grid points of IBI-V2).

We've preferred to show the daily residual current because it's easier to compare to the daily current of V1 system in which there was no tide. Besides high frequency tidal current would have made the figure less readable.

*\*technical corrections\**

*When referring to the operational cycle (and Fig 6) the term D0 is used, presumably to denote day 0, whereas Fig 6 labels things relative to J0 (jour?). This should be corrected to be consistent.*

It has been corrected

*line 8, p1950: The enhancement is net on the Armorican .. makes little sense*

It has been rewritten: "The improvement is obvious on the Armorican shelf and in the North Sea."