

Reply to Editor

manuscript number : **nhess-2021-226**

new title : *"Development of a forecast-oriented km-resolution ocean-atmosphere coupled system for Western Europe and sensitivity study for a severe weather situation"*

authors : Joris Pianezze, Jonathan Beuvier, Cindy Lebeauupin Brossier, Guillaume Samson, Ghislain Faure, and Gilles Garric

*Editor decision : Reconsider after major revisions (further review by editor and referees) - 19 Feb 2022
by Piero Lionello*

Comments to the author :

Dear Dr. Pianezze and Beuvier :

both reviewers are positive about your manuscript.

However, reviewer #2 is has two residual minor comments and is willing to read again your manuscript

Moreover, before sending your text to reviewer #2, I have the following suggestions. In case you do not agree, or I have misunderstood the text, please explain. My suggestions are :

line 10 : replace "persistent" with "constant"... otherwise clarify what you mean with "persistent"

line 11-14 I suggest to replace

"When compared to the operational-like ocean forecast, simulated oceanic fields show a large sensitivity to coupling. Forced ocean simulations highlight that this sensitivity is mainly controlled by the change in the atmospheric model used to drive NEMO (AROME vs. ECMWF IFS operational forecast)."

with

"Simulated oceanic fields show a large sensitivity to coupling when compared to the operational-like ocean forecast. However, forced ocean simulations highlight that this sensitivity is mainly controlled by the change in the atmospheric model used to drive NEMO (AROME vs. ECMWF IFS operational) forecast), and not by the coupling itself."

Line 14 The oceanic boundary layer depths can vary by more than 40%.

It is not clear respect to which reference. please rephrase.

Please ADD to the present text with track track changes also these modifications and mark them in red, without removing the previous ones. In this way all your changes with respect to the previous version will be highlighted.

Formally this will be treated as a major revision (because your revised manuscript will be sent to a reviewer). However, in practice, all comments are minor in my opinion.

*Best regards
Piero Lionello*

Dear Dr. Lionello,

Following yours and the reviewers' suggestions, we have reviewed the abstract, conclusion and Figure 2. We have also standardised the use of abbreviations.

You will find in the following our brief responses to the two anonymous reviewers and the revised version of the manuscript in the MS overview (the new text corrections appear in purple).

Sincerely,

Joris Pianezze and Jonathan Beuvier, on behalf of all the co-authors

Reply to Reviewers

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Reviewer 1 - Report #2

Suggestions for revision or reasons for rejection (will be published if the paper is accepted for final publication)

I would like to acknowledge the efforts made by the authors to thoroughly address all my comments/advice/criticisms. I found the new article largely improved and only have two minor additional comments which are :

- first, despite still being septic concerning the modelling set-up used by the authors, I think only the future operational use of the modelling suite will reveal its quality and the need (or not) for coupled atmosphere-ocean kilometer-scale models in this area of the world ;
- second, I still find difficult to properly assess the strengths of the new OA model compared to the other models forced by IFS and ARO as some results only show differences without any clue on how close to "reality" are any of the models. I don't have any suggestion concerning how to achieve a better assessment and thus I think the only potential addition to the article is to slightly change the conclusions in order to reflect that maybe the presented results can't fully show the quality of the new model.

In any case, I think the article is now worthy of publication and do not need to see any updated version of the article if the authors decide to take into account my second comment.

Thank you for your review of our article.

We agree that a pre-operational use of the coupled system is mandatory to fully investigate the quality/benefits and prone/costs of ocean-atmosphere coupled kilometer-scale forecasts for both operational oceanography and numerical weather predictions.

The conclusion of the paper has been further reviewed in order to properly assess the results, and at the end to describe the main lines of the future work needed to progress towards a fair evaluation of the new coupled system and then towards any (pre-)operational implementation.

Reviewer 2 - Report # 1

Suggestions for revision or reasons for rejection (will be published if the paper is accepted for final publication)

Figure 2 : would it be possible to improve it in the readability? In particular :

- Figure (a) has the yellow box (“b”) over the white area and it is difficult to read, same box blue (“d”) : maybe using a transparent effect on the background of the boxes could help.
- Figure (b) : legend is a bit small
- Figure (c) : missing legend to explain the 2D map and wind values are really small to read
- Figure (d) : legend is a bit small

Please check once more the consistency of all used abbreviations over the paper : for example, global CMEMS configuration at 1/12 is referred as GLO12 in Section 2.1 and then it becomes GLO in Section 3.2.

Thank you very much for your careful reading of the revised paper.

The set of colors for boxes in Figure 2 has been revised and the legends of maps b and d have been enlarged. The abbreviations in the paper have also been checked.