

Interactive comment on “Assessment of the importance of the current-wave coupling in the shelf ocean forecasts” by G. Jordà et al.

G. Jordà et al.

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First of all we want to thank the referee who has provided a useful and constructive comments. Following them some changes and clarifications have been done.

More information about the generic issue of wave-current interaction has been included in the introduction.

Following the referee suggestion, the expectations of the wave-current coupling effects in other contexts have been included in the discussion. We recommend to do a scaling analysis to have an idea about the importance of different coupling terms. We also consider that in other regions of the Western Mediterranean, the results would not differ to much. Being all microtidal environments with similar wave and current climate, we would not expect much differences when the wave-current coupling would be done.

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The results in other regions outside the Mediterranean , in particular in macrotidal environments, exceed the goal of this paper, which has been carried out in the framework of the Mediterranean Forecasting System.

We agree with the referee that a sensitivity study is a previous and necessary step before validating the wave-current coupled system against real data. In particular, to have enough data to do it properly is challenging. In the next future, more data will be available in the Catalan Sea thanks to the XIOM network expansion and some local projects specially dedicated to study current-wave interactions. We hope that data will allow us to complement and to complete this preliminary study.

The WAM model used in this study is the "complete" version of the model. No comments have been done about wave refraction by depth or dissipation by bottom friction in order to do not add too degrees of complexity to the study. However, we agree that it should be clear that the wave model include those terms. Some changes have been done in the manuscript to clarify this point.

DETAILED POINTS :

- Page 1829 lines 20-22. Are the resolution values 30 cm, 80 cm correct? They cannot be "typical" of many near-surface levels; the total 20-41 levels span depths to > 2000 m. Also contradicts page 1838 line 11 ".. the first velocity level in the OGCM is at 5 m.."

The 30cm and 80cm values are correct. This is a benefit of using a hybrid z vertical coordinate system. The levels are forced to remain at certain resolution near the surface. Namely, we have 20 levels evenly distributed in the first 200m meters. In the worst case, the first five levels would be restricted to the first 10m depth, so ensuring a good resolution in surface. If bottom is deeper than 200m (which is usually the shelf-break depth), more z levels will be added below, so we have 21 levels more to span between 200m and 2000m.

About the second comment, the OGCM model is not our model. It is the ocean general

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circulation model run operationally in the MFSTEP project for the whole domain. We have clarified it in the text.

- Page 1832 line 9 “..direction (insert "theta") ..” equation (1) and lines 12-13. R is earth's radius, “.. latitudinal (insert "phi") and longitudinal (insert "lamda") ..”

It has been corrected.

-Page 1833 equation (2). What is the significance of the subscript “r” in f_r ? It seems to be missing from the integration variable f .

Thanks. It was missed. To make the difference with f Coriolis parameter, frequencies have been defined as f_r .

-Page 1836 line 14. What is SMC-CIIRC? Why are these forecasts needed for “wave data” while WAM is being run?

You are right it is a bit confusing. We have clarified it in the text. The wave model we use is, in fact, operationally run by the Servei Meteorològic de Catalunya/ Centre Internacional de Recursos Costaners (SMC-CIIRC). In the pre-operational configuration of the coupled model, the wave forecasts we use are the SMC-CIIRC ones.

-Page 1847 lines 16-25. Also in areas where the waves are often of lower frequency and so longer, waves can affect bottom friction over more of the shelf area because the wave currents extend deeper.

Thank you for the comment. We have included a note about the impact of larger waves.

-Figure 1. The stars for time-series locations need to be clearer.

We have improved the figure

-Figure 4 has poor quality as it presently appears.

We have improved the figure

-Figure 10a,b have poor quality as they presently appear and in figure 10c I cannot

distinguish between “whole domain” and “inner shelf” curves.

They have been improved and change the curve colours.

DETAILED ENGLISH COMMENTS:

They have all been corrected.

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