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Reply to Jeffrey Paduan

Jaime Hernandez-Lasheras et al.

Author comment on "Evaluating high-frequency radar data assimilation impact in coastal ocean operational modelling" by Jaime Hernandez-Lasheras et al., Ocean Sci. Discuss., <https://doi.org/10.5194/os-2021-34-AC1>, 2021

Dear Jeffrey,

Thank you for your time to review the manuscript. We very much appreciate your feedback and comments.

Regarding your main concern about the impact of HF radar data assimilation outside the range of HFR observations, we would like to clarify our results and conclusions as they may have been misleading in the way they were expressed in the original manuscript. Our results (see Fig 9 and Table 3) show that: 1) the skill score is higher outside the area of HFR coverage for all simulations, 2) assimilating HFR data does not lead to any degradation of the model performance outside this coverage area with respect to GNR.

As you suggest the first point is related to the nature of the currents driving the drifters outside the HFR coverage area, which are more defined and steady and hence better described in the simulations, even with a limited number of assimilated data. The dependence of this result on the available dataset and specificities of the area are more clearly explained in the revised version of the manuscript. On the other hand, what we wanted to point out in the abstract and the conclusions is the fact that HFR DA helps to correct the currents inside the area covered by both antennas and that it does neither improve nor degrade them outside it in comparison to the GNR simulation. Our conclusions concerning the impact of HF radar data assimilation outside the coverage area have been clarified and tempered in that sense in the revised version of the manuscript.

The new text in the results part reads as follows:

"...The SS of all simulations is higher outside the coverage area than inside due to the different nature of the currents, which are more defined and steady north of Ibiza Island and hence better described in the simulations. All data-assimilative simulations lead to a similar performance outside the coverage area (SS around 0.58), representing an improvement with respect to CR (SS=0.36). Assimilating HFR data does not lead to any significant nor degradation of the model performance outside this coverage area with respect to GNR"

The sentence in the abstract has been removed to avoid confusion and a sentence has been added in the conclusions to try to clarify this.

"The Lagrangian validation reveals the capacity of HFR data assimilation to significantly improve the forecasting of surface currents inside the area covered by both antennas, while maintaining beyond this area the performance achieved by assimilating the generic observation sources."

Thank you for the minor comment corrections. We have included them in the revised manuscript.