GENERAL COMMENTS

In this contribution, the authors describe the operational implementation of a very high-resolution coastal ROMS-based model, nested to CMEMS-IBI regional system, in order to monitor water quality within Alfacs Bay (NW Mediterranean Sea). 1-year validation exercise is presented along with two numerical simulations to analyze the impact of proposed interventions.

This work addresses an interesting topic. I particularly appreciate the development of tailored CMEMS downstream services in coastal and port-approach areas with subsequent societal benefits. The paper is mostly well written and organized, just a few English slips, and will be of interest to readers of this journal. The results of water residence times are consistent and nicely interpreted. However, the overall impression is that the paper, although adequately conceived, is too short in some sections. My main concern is that sections 2.2 (Observations) and 2.4 (Validation) are not well resolved and therefore should be improved.

In summary, I believe that the paper can be made acceptable for publication **upon minor revision**. In the following lines I provide some comments, which should hopefully strengthen the manuscript.

SPECIFIC COMMENTS

-Section 2.2: Observations

1. I definitively do not understand why the first paragraph was placed in this section. It should be better moved to other section, perhaps to "Results".

2. I miss a brief description of the most basic technical features of the in situ and remote-sensing instrument used in this work: CTD, moored buoy, HFR, etc… Maybe a table summarizing those details would be useful (together with the time periods used in the validation exercise), similar to Table 1 where information about the different simulations was gathered.

3. Most of the audience will not be familiarized with HFR shore-based technology. Please add a brief paragraph describing basic characteristics: frequency at which it operates, time sampling (1 hour?), horizontal resolution of the grid, spatial coverage, number of radar sites, date of deployment, sources of uncertainties in the remotely-sensed observations, etc.

4. Likewise, no information about the data treatment was provided. There were gaps in observational time series? If so, small gaps (let´s say, < 6 hours) were linearly interpolated?

- Section 2.4: Validation

1. As previous step to validate your model, you must be sure that the parent system is consistent and accurate enough, able to provide coherent open boundary conditions to the nested system you are implementing. In this context, has CMEMS-IBI system been previously validated in Ebro Delta area using a multi-platform approach? If so, please add the reference and briefly mention the statistical results derived from IBI validation in this coastal area.

2. The validation is performed on a very basic level, only form a qualitative perspective. The conclusions are drawn according to the visual resemblance of time series. I miss the number of hourly observations and some skill metrics such as the (relative) bias, (normalized) root mean squared error (RMSE), temporal correlation, complex correlation, mean percentage error, scatter and quantile-quantile plots, current roses, Taylor diagrams, percentiles, etc. in order to provide a quantitative perspective of the model performance. I am not asking to compute all of them, but a deeper insight should be welcome. You could add some skill metrics to Figures 2 and 3, for instance.

3. Why both SST and SSS validations were performed on an annual basis (2014), but the validation against the HFR was only performed from approximately mid-January to end of March? Please provide and explanation. There was a radar break down?

4. A specific HFR grid point was selected to conduct the comparison against modeled currents. Which one? Please provide longitude and latitude. Why this grid point was selected and no other one? Maybe because the data temporal coverage was optimal? If so, explain it please.

5. The time series of zonal and meridional currents shown in Figure 3 (a-b) were raw or low-pass filtered?

6. As far as I know, the HFR deployed in Ebro Delta operates at a nominal frequency of 13.5 MHz and provides hourly current estimations which are representative of the first meter of the upper water column. In this context, the current meter installed in PdE buoy provides in situ measurements of currents at which depth? This was not explicitly described in the manuscript and could partially explain some of the HFR-model discrepancies observed. I think it is worthwhile mentioning this in the Discussion section.

Conclusions

1. Future prospects are not provided in the conclusions.

2. Besides, in "future work" section I miss a mention to the inter-comparison of the high-resolution coastal model against its parent regional system (IBI) in order to thoroughly quantify the potential added value of the dynamical downscaling approach adopted.

Figures

1. I suggest splitting Figure 3 into two different Figures, adding also the skill metrics derived from the comparison.

2. It could be useful to show the mean surface circulation patterns in D-B domain during inflow/outflow phases. This is also partially related to the residual and mean circulation (last paragraph, page 6) you mentioned in the text: since only six figures were provided in the manuscript, an additional image showing this could enrich the work.

TECHNICAL CORRECTIONS:

I am fully aware that the authors are not English native speakers (neither am I) and therefore I appreciate the considerable effort made to write down a research paper. However, I would suggest some professional English editing to improve the quality of the manuscript.

 Abstract

- For consistency reasons, please replace "Delta Ebro" by "Ebro Delta"

- Replace "leading high rates" by "leading to high rates"

- For consistency reasons, please replace "modelled" by "modeled"

1. Introduction:

- Wrong definition of CMEMS acronym: it should be "Copernicus Marine Environment Monitoring Service" instead of "Copernicus Marine Environment Monitoring System".

2.3. Numerical model

- Please specify the atmospheric model, implemented by AEMET, used to force the coastal ocean model: HIRLAM, HARMONIE-AROME, etc?

2.4. Validation

- Replace "Ebro plume" by "Ebro River plume".

- **"HF-radar"** and "High-Frequency radar" are found in the text, "HF" in Figure 1-b. Please use an unified nomenclature: Define firstly "High-Frequency radar (HFR)" and use the acronym afterwards.

- Please define the acronym IRTA in the text since it was only previously described in the list of institutions involved in the present manuscript.

4. Discussion:

- For consistency reasons, please replace "modelled" by "modeled"

5. Conclusions:

- It should be "effectiveness in increasing" instead of "effectiveness in increase".

- Replace "related to water temperature peaks during some days" by "related to occasional extremely high temperatures"

- Replace "allowed for the first time" by "allowed for first time"

Figure 1, caption:

- For consistency reasons, please replace "Delta Ebro" by "Ebro Delta"

- Replace "Pde" by "PdE"

-Replace "Data from High frequency Radar used to…" by "Location of the HFR grid point used to…"

Figure 2, caption:

- You mention "Puertos del Estado" and define here the acronym PdE. Such acronym, used several times along the document, should be defined in the main body of the text, not in a Figure caption.

Figure 3:

- In the text, you defined CMEMS-IB but in the legend "IBI-CMEMS" is shown. Please correct this inconsistency.

- Specify that model (red line) represent DA model

- Which is the frequency of observations (blue dots)?

Figure 4, caption:

Replace "a) Shows the time-evolution" by "a) Time evolution"

Figure 6:

Please redefine the color palette (maybe from -0.5 to 0.5) because the details can not be readily inferred.