

Review 1

Recommendation : Major Revisions.

The manuscript discusses the physics behind the flooding of Venice and the state of the art of the storm surge forecasting in the Adriatic Sea as well as European coasts. Authors draw conclusions and recommendations for storm surge forecasting and its uncertainties in the Adriatic Sea based on several results from other works. Particularly, the focus is made on the improvement of forecast (and its uncertainty) to aid stakeholders in the opening or closing of the building mobile barriers, called "MOSE", that protect Venice.

Although the topic is interesting and they make a deep and adequate description of the oceanographic dynamic of the Adriatic Sea and the state of the art of forecasting, I think the manuscript writing/structure needs further work. The manuscript needs a better organization of the main results related to the aspects of the dynamic and the forecasting systems. This review is critical, nonetheless the authors have the potential to have a great manuscript and I want to encourage them in their progress.

We thank the reviewer for his comments and his recommendations. Below we detail how we want to handle the requested changes.

Major comments

1. Due to the aim of the manuscript is to review the Adriatic Sea, Venice lagoon and Venice city dynamic and forecasting, I think a map of the region with the bathymetry and the principal cities is mandatory for people unfamiliar with the area of study. Despite the referring to a figure in another paper, a map will facilitate to understand the general descriptions without the need to visit other works.

We agree with the reviewer that a map will be very useful, and we will insert one in order to show the physical setting and all the names mentioned in the text.

2. There are repetitive descriptions of some aspects of the oceanographic dynamic and the atmospheric forcing throughout the manuscript. The authors should avoid the reiterative descriptions and they should reference to the corresponding section. For instance, wind phenomena are defined at line 99, Section 3.2. and Section 5.1.

Because many authors have contributed to the writing of the manuscript, some repetition arose. We will carefully edit the manuscript and eliminate all places where such repetitions occur.

3. Even though some values are scattered throughout the manuscript, please provide water level references as tidal range, tidal datums (and its definition) or variability range when you discuss the amplitude of the events. These references will make it easier to understand the impact of the storm surges. For instance at lines: 45, 209, 313.

We think this is a very good recommendation and we will insert more information about the amplitude of the events. This will make it easier for a reader, not acquainted with the Venice setting, to get a better understand of the importance of single storm surges.

4. I agree with the need to compare the state of the art of the Adriatic Sea forecasting systems with the European one; however, I don't think it is a good idea to consider a

section for an extensive discussion. Section 4 presents a good review of ocean forecasting in Europe but I lost the focus along the reading. Since the Adriatic Sea is the main region, I suggest that Section 4 starts at Subsection 4.5 and its results to be compared with the European forecast systems.

We understand the worries of the reviewer that the section on European storm surge forecasting systems was too long. However, starting with the discussion of the Adriatic Sea would make the structure of the article still more complicated. After the Adriatic Sea, we would have first to discuss the Venice Lagoon, and only then introduce the European picture. We propose to still start with the European case, but merge section 4.1-4.4 into one first section on European forecasting systems, and having as subsections The Atlantic, North Sea, Baltic Sea and the Mediterranean. This new section will be reduced in length and more streamlined to not disturb the focus on the Adriatic Sea and the Venice Lagoon.

5. As the manuscript reasoning goes, I think Sections 6 and 7 should be together because their discussions are directly linked. In addition, I suggest starting the "Discussion and conclusions" section with the paragraph of line 733. It recaps one the main and current motivations of the storm surge forecasting.

As the reviewer has requested, we will merge the discussion and conclusion section into one.

Minor comments

We thank the reviewer for the careful reading of the text, and we will handle all requested changes. We are not going to discuss all points here, but only the major ones that have been raised.

24. Line 143: This paragraph is more adequate for the introduction or the final conclusions.

We will shift the paragraph as requested.

37. Line 257: For unfamiliar readers, it's worthwhile to mention what type of models are FES2012 and GFS. Beside, please clarify what model has a resolution of about 250 m.

Will be done.

42. Line 428: Since HYPSE and System based on Delft-3D are no longer operative, it should be as a comment instead part of the list.

Yes, will be done.

51. Line 610: The definition should be wider. For instance, Flowerdew et al. (2009) say: Each forecast uses slightly different initial conditions, boundary conditions, and/or model physics (collectively, model inputs), with the aim of sampling the range of forecast results that are consistent with the uncertainty in the model and observations (Palmer, 2006).

Flowerdew et al. (2009): <https://doi.org/10.1080/01490410902869151>

Palmer (2006): "Predictability of weather and climate: from theory to practice". In Predictability of weather and climate , Edited by: Palmer, Tim and Hagedorn, Renate. Chapter 1. Cambridge: Cambridge University Press.

Thank you for the information. We will incorporate it into the new revision.