

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.

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.
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.

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.
  
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.
  
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.

#### Minor comments

1. Line 34: What does MOSE stand for?
2. Line 42: *Acqua Alta* should be in italic.
3. Line 42: I assume that there is a typing error in the Bibtex file for Lionello et al.
4. Line 43: Please reword this sentence, I understand the idea but it is twisted.
5. Line 44: Typing error in the Bibtex.
6. Line 57: The comma is not necessary.
7. Line 58: Please rework this sentence, it is hard to understand.

8. Line 64: It should be “to warn”
9. Line 64: The comma is not necessary.
10. Line 91: Some reference should be worthwhile.
11. Line 99: Since it is the first time that Sirocco appears, it should be in italic.
12. Line 100: As Sirocco, Bora should be in italic, at least the first time.
13. Line 104: A value of mean or extreme amplitude would be worthwhile.
14. Line 108: ... has a peak ...
15. Line 108: “with the Adriatic Sea”?
16. Line 113: What is the tidal range?
17. Line 123: The comma is not necessary.
18. Line 125: “However”?
19. Line 125: “the first one” ... “the second one”
20. Line 133: What is the tidal range?
21. Line 135: “during” instead “in”
22. Line 140: Please, provide an amplitude value as reference
23. Line 142: Typing error in the Bibtex.
24. Line 143: This paragraph is more adequate for the introduction or the final conclusions.
25. Line 151: Please, provide a cite.
26. Line 169: I assume that it is about Latex typing, homogenize the uses of “”.
27. Line 170: Please homogenize the references to atmospheric sea level pressure. I noted many differences throughout the manuscript.
28. Line 173: “For this reason” sounds awkward, maybe “As consequence” or something like that.
29. Line 175: This sentence should be at the beginning of the paragraph.
30. Line 176: Why?
31. Line 189: “reaching gusts of about 100 km/h and up to 200 km/h”
32. Line 181: This paragraph continues with the same idea of the previous one. It should be a single paragraph.
33. Line 184: Space after period.
34. Line 196: Semicolon between references.
35. Line 203: Please, remove the parentheses, both statements should be part of the text.
36. Line 238: What does SRL stand for?
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.

38. Line 260: What does “H” stand in “2DH”?
39. Line 264: Please provide a cite for Charnock approach.
40. Line 383: Rissaga should be in italic.
41. Line 424: the phrase inside the parentheses should be as part of the text after the “but”.
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.
43. Line 440: Space between a and Centre.
44. Line 449: “MedFS” should not be in italic.
45. Line 491: Please provide a cite for the Tiresias model.
46. Line 535: Throughout the manuscript storm surge was written without the dash.
47. Line 537: Is there any work about nonlinear interaction between those phenomena in the region?
48. Line 556: Please provide a cite for COSMO-I.
49. Line 558: The period should be after the parentheses.
50. Line 574: Space after the period.
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.

52. Line 651: What does ZMPS stand for?
53. Line 681: Typing error in the Bibtex.
54. Line 693: This paragraph should be at the beginning of the subsection.
55. Line 726: Remove the comma after Krzysztofowicz.