

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1  
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## Comment on nhess-2021-244

Anonymous Referee #1

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Referee comment on "Storm surges and storm wind waves in the Caspian Sea in the present and future climate" by Anna Pavlova et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-244-RC1>, 2021

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I have read the manuscript entitled "Storm surges and storm wind waves in the Caspian Sea in the present and future climate" from Pavlova et al. with interest. The authors use ADCIRC + SWAN to study the interplay between storm surge, flooding and winds at the Caspian Sea between 1979 and 2020, and validate their results against data from a lake level station. With additional statistical analysis, the authors quantify extreme levels and their associated return periods. The authors also study the wave climate of the area using WAVEWATCH III, and with additional statistical analysis the authors determine the trends associated with significant wave heights.

The topic of the manuscript is interesting and of both societal and scientific interest. However, as written the manuscript is hard to follow and it does not make justice to the amount of work that the authors might have devoted to produce the analysis and the results. I recommend this manuscript is rejected and the authors more carefully motivate their work, describe their methods, and discuss the implications and novelty of their approach. Below I include some comments aimed to improve the quality of the manuscript in a future submission:

Line 9: "from 1979 to 2017-2020" is unclear. The time period should be delimited by two dates, not three.

Line 10: Acronyms in this sentence have not been previously defined.

Line 10-11: ...with grid size in the range between 300 and 700m... (if I understand correctly)

Line 12: Acronym not defined.

Line 20: Undefined acronym.

Introduction: Overall I am missing a clear motivation of this work in terms of natural hazards. Are there vulnerable communities along the lake shoreline? What is the level of development? Is the rate of erosion along the lake line high? Are there erosion hotspots? The manuscript seems to be missing a significant body of literature tackling these questions.

Line 29: coastal protection strategies?

Line 39-40: What climatic conditions? What anthropogenic factors? References?

Line 41-42: This sentence seems out of place. Perhaps bring it to line 35 in order to define what anemobaric-surges are at front.

Line 45: Unclear what the authors mean by "covered"

Line 57: Undefined acronyms.

Line 60: Undefined acronym.

Line 86-89: This paragraph would benefit from some specific references on the Caspian Sea.

Data and methods: I suggest the authors consider the possibility of including flowcharts to better describe the inputs and outputs of the models used. Perhaps it will also help reduce the number of equations included in this section, which are already extensively discussed in separate publications.

Line 124: grid spacing is 500 m, but in the abstract 300 m?

Line 154-155: These equations seem distorted.

Line 158: I suggest replacing "the authors of the present paper" by "We".

Line 165: Undefined acronym.

Line 200: 2.3?