

Dear Reviewer,

We thank you for your willingness to review our manuscript and for your thorough and helpful comments on the manuscript, which once again has helped to improve on this work.

Please find our responses to your comments in [blue](#) below with the **line number in the revised manuscript**.

Best regards,

Elin Andrée, Jian Su, Morten Andreas Dahl Larsen, Martin Drews, Martin Stendel and Kristine Skovgaard Madsen

I think the quality of the manuscript has much improved; the revised paper is much clearer.

However, please note there are a few comments that the Authors have not yet addressed:

- Line 6: the paragraph in the Authors' reply does not match that in the revised text, i.e., "historically observed circumstances" vs. "antecedent circumstances"

We have revised the sentence, and are now using 'precondition circumstances'. Line 5-7.

"We design numerical experiments by imposing a range of precondition circumstances as boundary conditions to numerical ocean model simulations. This allows us to quantify the change in peak water levels that arise due to alternative preconditioning of the sea level before the storm surge".

- From line 23 on: I still believe that the examples about wildfires and landslide are not relevant for the research, which is indeed about sea levels and coastal hazards. Anyway, if you want to leave those in the text, please at least add "[...] from days to months or even years, depending on the event considered"

We have added the suggested sentence at Line 23.

"The time scales of such "preconditioning" can vary from days to months or even years".

- Figure 1 is too busy. I know I am being picky about this, but it is crucial that it is clearer to fully understand what is being discussed further on in the paper. Perhaps the close-up's size could be increased, and Authors could use different colors to label cities, islands, and straights

Thank you for this nice suggestion. As instructed, we have enlarged the size of the zoomed map and use different colours to label cities, islands and straits. Page 3.

- Authors claim they modified Figure 1 (now Figure 2) according to my suggestions, but it doesn't look so. Same for Figure 5 (Figure 4 in the first version of the manuscript), which has not been modified

Thank you for pointing them out again. We have now extended the colour bars and changed the marker colour of Landsort in Figures 2 and 5.

- Perhaps it would be easier to understand Figure 3 if Authors clearly specified why they used different preconditioning periods between the scenarios FLs and S in Sect. 2.2.1.

This is a very good point. In response, we now state the motivation of these three experiments at Line 202-204.

“As previously mentioned, the filling level of the Baltic Sea in November 1872 was fairly moderate. To demonstrate the implications for extreme sea levels if the Baltic had been preconditioned differently, we formed scenarios by imposing the atmospheric forcing of 1872 onto three alternative cases where the sea-level patterns were different (Fig. 2)”.

Besides, I still think that the English grammar still needs a thorough check before the paper is accepted for publication. See below a few typos:

Thank you for pointing this out. All authors have helped thoroughly check the manuscript and improvements have been implemented as indicated in the track changes version (including the grammar items indicated below, which were specifically pointed out by the reviewer).

- At line 4: you cannot say “may influence” as the event occurred in the past, rather you should say “[...] different prior conditions may had influenced peak [...]”

This has been changed. Line 4-5.

“Here, we explore how various prior conditions could have influenced peak water levels for the devastating coastal flooding event in the western Baltic Sea in 1872”.

- The term “precondition” is widely used and recurrent in the text, though I have never heard it before in the context of geophysical studies. As such, I wonder whether it is appropriate (if so, just overlook this comment and move ahead but please check this out)

Thank you for this suggestion. We have checked and find that the word “precondition” is used as much as other phrases in the oceanographic and geophysical literatures. Therefore, we have kept the word “precondition” in the manuscript.

- Line 8: was the increase modelled, or it was observed? You say that it “occurred” after saying “simulated”, which is totally confusing

We acknowledge that the sentence could be confusing, and have re-written it. Line 7-8.

“As an example, a simulated increase of 36 cm compared to the 1872 event was seen in Køge”.

- Line 65: I am not sure that “propose” is well suited there. Perhaps “suggest”?

Reviewer’s suggestion has been implemented. Line 65.

- Line 135: “during the original experiment, i.e., for” should be replaced with “for”. Actually, you did not make an experiment, so the term is not appropriate

Thank you for pointing this out. Accordingly, the text has been changed, so we do not refer to the “original experiment” but to the “reference simulation”. Line 135-136.

“The following section describes the atmospheric conditions during the reference simulation, i.e., for the unperturbed simulation of the 1872 storm surge as reconstructed by our model system. We denote this simulation O”.

- Line 167: remove commas after “we” and “therefore”

Done.

- Line 309: this whole sentence is still unclear to me: “we assess the entire observation period (1886-2021) and each scenario for the occurrence pattern between elevated sea levels and their corresponding duration”. What is that you are assessing?

This has been clarified. Line 311-312.

“We analyzed the occurrence pattern between elevated sea levels and their corresponding duration for the entire observation period (1886-2021)”.