

Review of “Combining probability distributions of sea level variations and wave run-up to evaluate coastal flooding risks”

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The manuscript aims at providing estimates of extreme sea level return values based on combining probability distributions for mean sea level changes on shorter and longer time scales and wave run-up for a specific location at the Finish coast. It addresses issues relevant within the scope of the Journal and of potential interest to readers. I recommend to address the following the issues before publication.

1. As a general comment, the approaches taken for estimating the wave run-up are rather bold and general. There are definitely a number of not necessarily better but similarly justified choices and I wonder how big the uncertainty from making such choices might be relative to issues discussed in this text. My assumption would be that it is probably a major source for uncertainty. I suggest that this should at least be discussed and conclusions should be put into perspective.
2. I would appreciate if the authors could better motivate the sensitivity experiments described in section 5. I understand technically what was done but cannot see the added value. For the discussion of results and significance of differences, confidence intervals should be provided otherwise statements regarding the significance of the results such as on page 15, line 8 are difficult to assess.
3. Page 5, Lines 6-7: Contribution from rivers to the water balance in particular the seasonal or longer variability should be mentioned.
4. Page 5, Line 19: There are higher waves reported for the North Sea in chapter 7 of “State and Evolution of the Baltic Sea, 1952-2005: A Detailed 50-Year Survey of Meteorology and Climate, Physics, Chemistry, Biology, and Marine Environment” (doi: 10.1002/9780470283134)
5. Page 7, Lines 4, 5: Please use projections instead of predictions here and at several other places in the manuscript.
6. Page 7, Figure 3 and Lines 1-3: Please explain a bit more detailed. I cannot immediately infer the numbers given in the text from the Figure. Please also mention the baseline; that is, the year relative to which changes were computed.
7. Figure 4: I would appreciate a comment on the extent to which the extrapolation is justified. The data seem to suggest an upper (physically based?) limit of about 150 cm.
8. Page 12, Line 23: The authors introduce “SL-distribution” to refer to sea level variations but mainly use “still water levels” hereafter. This should be made consistent.
9. Page 13, Table 1: Prediction should be replaced by projection. Confidence intervals would be helpful.
10. Section 8 “conclusions” is rather a summary of results.
11. Page 23, Line 14: It could also be that none of them is eventually realized.