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Comment on nhess-2021-75

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Referee comment on "Still normal? Near-real-time evaluation of storm surge events in the context of climate change" by Xin Liu et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-75-RC1, 2021

Synopsis

The paper describes a website presenting sea level observations along the German coasts. The intention is to put actual observations (today!) into a historical perspective in a form that is easily accessible for the non-scientist. The site does so by providing a set of easy-to-understand statistics and compares the actual measurements with that statistic. For instance, the actual water level measurement is placed on a return-time plot, which allows to say 'this measurement is expected to occur very n years'. The relevant statistics are re-calculated after each event, keeping them up-to-date. Besides water levels, the site also provides the annual number of events exceeding a given threshold, their length and their severity.

Discussion

The website allows an easy and quick assessment of how (un)usual the present situation is in the perspective of historical observations. By recalculating the relevant statistics after each event, it is always up-to-date. I can imagine that the site meets the needs of the general public as well as of managers of coastal-defense systems for easy and quick information. Extending the geographical scope of the website, as suggested by the authors, is certainly a good idea that should be perused.
I wonder, however, whether a scientific journal is the right place to present this service. The bulk of the paper is formed by lengthy descriptions of the time-evolution of the four parameters (water level, number, length and severity of events) at five of the ten stations available, without making any effort to explain or interpret the measurements. If the paper is accepted for publication, this part (essentially section 3) should be much shortened.

Detailed comments

- p 3, l 94 : unsuable -> unusual (?)
- p 4, l 121: putting -> put
- p 9, l 223: de-clustering: how robust are the results to other choices of the de-clustering interval?
- p 9, l 227: Start a new paragraph after MLE. Start it with something like "This choice is motivated by ...", or another way to say that what follows is an explanation of the choices (GEV + MLE) made.
- p 11, l 279/80: "... and as a solid line when it is significant at the level of 95 ": The line is solid everywhere! You shouldn't place a general description of a figure in the caption of a specific figure.
  This remark applies to all figures!
- p 11, l 289: has -> have
- p 11, l 299: The 'blue' event (2 Dec) has a return time longer than 5 years.
- p 12, l 308: could -> can (?)
- p 12, l 313: add 'number of' before 'historical monthly maximum'
- p 13, l 328: particular -> the
- p 14, l 371: spatially -> space
- p 15, l 384: increasement -> increase
- p 15, l 386-388: "... not fully explored ..." - you mean "... not fully explored *here*, ..."? I mean, there must be a lot of literature about the reasons for increasing water levels in Hamburg, e.g., von Storch & Woth (2008) (doi: 10.1007/s11625-008-0044-2) and references therein, but certainly there are more recent ones.
- p 19, l 486-88: But heights were very modest. Sow hat does this long series of events mean in terms of threat for coastal defences?
- p 20, l 523-27: This seems inconsistent: max water levels have no trend, which is consistent with results based on annual data. Presumably, this means that annual data show no trend either. However, in the next sentence you state that sea level in the Baltic did increase. So what is true? Or what do you want to say, but what I do not understand? Besides, isn't it remarkable that the mean water level increased, but the maxima did not? What does this say about other drivers of water level variability?
- p 22, l 560-62: However ... sea level rise was excluded in those studies: At first sight, this looks contradictory, but after some thinking I find that it can happen: If the frequency of exceeding a threshold has no trend while the mean sea level increases, the strength of other (meteorological?) drivers of sea level variations must have decreased. That is interesting and would deserve more investigation. - This is an example of what I meant by "without making any effort to explain or interpret the measurements" above.
- p 22, l 567: "notably increase at Warnemünde" - notably? The increase is not significant!
- p 22, l 571-73: This is a repetition. Refer back to earlier figures. Applies to the following figures, too.
- p 22/23, l 580-83: Strange. You find no trend in surge duration, but Weidemann, who excludes sea level rise from is analysis, finds an increase. I would expect sea level rise to increase the duration of events above a threshold to increase if the mean sea level rises, so if Weidemann finds an increase, you should find an even larger one.