Response to the questions of reviewer two

First of all I would like thank the referee for his/her thoughtful comments, time and interest in the manuscript. I have put the referees comments in italics and my answers are given in plain text.

Review Hieronymus. The sea level simulator

This paper describes a simple statistical tool that combines trends in mean sea level and extremes for planning purposes. The paper is reasonably easy to access but requires here and there a bit more context to ensure proper use of the simulator. Below some suggestions for change which are all easy to accommodate in my view.

Line 73. A more conceptual introduction to the simulator is needed. You can not expect the reader to be familiar with Hieronymous 2021 and Hieronymous 2023.

I will add a more conceptual introduction through an extension of the paragraph starting on L38.

Line 75. From the blue sky you start to discuss the parallelization aspects of the simulator. It is good to mention them somewhere in the paper, but not right at the start. In the end, being used to using large models, I don't think the parallelization is critical for the users to decide whether they use the tool or not. So please move backward in the paper or to an appendix.

I will move the paralellization part further back toward the end of Sect. 2.

Line 86 define what a planning period is.

A definition is given on L42.

Line 95 Explain in more detail how mean sea level is combined with extreme information this can be done in various ways. A paragraph of discussion is needed. In the literature a lot of studies on extreme sea level have long discussion whether a GEV or Pareto distribution should be used and whether joined variability issues should be treated and which peak threshold are to be used and what declustering of the data. This is relevant to discuss as for many applications the GEV is maybe not the best strategy, so make the reader aware or better, but demanding expand the tool in this direction.

I will expand the section with some discussion on how the simulator could be expanded to work also with GPD distributions. In fact, any distribution can be used in practice. I don't really have much to add to the discussion about best thresholds and declustering. Generally speaking I think these parameters

are site specific and that it is hard to generalize.

Line 98 please rephrase"is goes"

This will be fixed.

Line 115. If I understand correctly the GEV itself is not changing over time due to the climate change itself. Probably the only thing you can do, but likely to be incorrect as well. Most climate variables change in the mean and in the pdf. So you at least have to create awareness among your readers of this point.

I will add a discussion about this. From a technical standpoint it would be easy to implement SSP based trends in the yearly sea level maximum as a part of the mean sea level projection. This requires no changes to the code at all. The problem, of course, is that suitable values for such trends are almost never known. I recently looked at trends in yearly sea level maximum in an ensemble of downscaled CMIP5 projections at a number of Swedish tide gauge locations. In that ensemble, natural variability was so much larger than any possible emission driven trend that detection was not possible. I expect this to be the case at many locations.

Line 141 you have to mention that SSP scenarios don't have a probability in their definition, but you implicitly use a probability that they are equally likely if I understand correctly, this is not how they are defined

I will make sure to mention that they have not been given probabilities by their makers in the revised version. However, I don't assume them to be equally likely. One of the key capabilities of the simulator is that the user can use his/her personal probabilities. The choice of probabilities is free and the simulator is an excellent tool to determine how changing these probabilities affect the flood risk. Hieronymus (2021) investigates this in more detail and I will add a more detailed explanation in the revised manuscript.

Line 164 rephrase ones?
I will rephrase.

Line 195 That seems a trivial discussion. It is always correct in the extremes. At t=0 the trend is zero so extremes rule. If t goes to infinity SLR goes to extreme large values at least for high scenarios and the trend will rule. Explain this better in forehand and than show your examples where results are a mixture and both components might be important.

I agree that this is a trivial point in the asymptotic sense of comparing $t = 0$ to $t = \infty$. However, where the simulator is helpful is over much shorter planning periods than that ending in $t = \infty$. I would argue that it is not trivial to determine when the flood risk transitions from being extreme to mean

sea level dominated. Clearly, this is both a location and scenario probability dependent problem. I will also argue that this type of knowledge is useful and could be used to improve coastal spatial planning so I think it is an important point to push.