

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC4
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Comment on nhess-2021-406

Anonymous Referee #4

Referee comment on "Incorporating historical information to improve extreme sea level estimates" by Leigh R. MacPherson et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-406-RC4>, 2022

I think this paper addresses an important issue for statistical modelling of extreme values and the characterization of coastal flooding hazard, which is to partially overcome the inevitable scarcity of data on extreme events and to account for outliers by incorporating historical information. Indeed, this paper shows how the use of historical information can improve the probabilistic and statistical modeling of extreme sea levels. This has been achieved by combining systematic (observed & artificial) ESLs with historical information using a bias reducing method based on a MC resampling method. I can see that this work could be used in many applications and bring improvement on the approaches already available for such applications.

On the whole, I felt able to follow the proposed method. I did, however, reach the end of subsection 3.2 and realize that I was uncertain about the used method of bias reduction (from the initial intermediate GPd to the last one) and how the first intermediate GPd can be used to continue the processes of bias reduction.

Please also note the supplement to this comment:

<https://nhess.copernicus.org/preprints/nhess-2021-406/nhess-2021-406-RC4-supplement.pdf>