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Comment on nhess-2020-412

Anonymous Referee #2

Referee comment on "Deep uncertainties in shoreline change projections: an extra-probabilistic approach applied to sandy beaches" by Rémi Thiéblemont et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2020-412-RC2, 2021

The study 'Deep uncertainties in shoreline change projections: an extra-probabilistic approach applied to sandy beaches' explores an elegant method to deal with a combination of a aleatoric (intrinsic) and epistemic (deep) uncertainties. The methods are well explained and seem easy to apply and very helpful to better understand different kind of uncertainties. And so, the manuscript convincingly illustates the methods' attractiveness.

Given the attractiveness of the method and well-written manuscript (as discussed in the last section), I am a little surprised that some major sources of (deep) uncertainties are not included. Especially, the choice to only use one set of sea-level projections that do not include high-end scenarios seems a little odd. There are multiple recent sea-level projections that explicitly included high-end contributions of the W-AIS (e.g. Le Bars et al. 2016, Wong et al., 2017).

Minor:

- the applied sea-level projections need a little more explanation. Do I understand well that 21 minus 2 CMIP projections were used? Could you explain in one sentence why two runs were judged 'unrealistic' with respect to sterodynamic behaviour (and others not). And could you explain how sources of uncertainty other than sterodynamical were included (or were they excluded)?

- In figure 4, could you explain how the linear fit was made? In 4b, the fist black dot (yr=1989, shore line change ~ -491) seems to be excluded. Otherwise, I would expect a very different R2.

References:

Dewi Le Bars *et al* 2017 *Environ. Res. Lett.* **12** 044013

Wong, T.E., Bakker, A.M.R. & Keller, K. Impacts of Antarctic fast dynamics on sea-level projections and coastal flood defense. Climatic Change 144, 347–364 (2017). https://doi.org/10.1007/s10584-017-2039-4