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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Uncertainties in Coastal Flood Risk Assessments in Small Island Developing States" *by* Matteo U. Parodi et al.

Anonymous Referee #2

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The paper is interesting and definitely of interest to the journal's audience. Overall I am positive but I think some work is needed to make it publication-ready. The main issue is that the manuscript gives the impression to have been written in a hurry, as several aspects of the methodology and the findings are not being properly explained. More specifically: The methodology to estimate the uncertainty is not clearly described. Do the authors simulate all possible combinations? How do they discretize their parameter space? I assume that they keep all factors but the tested one to 'baseline' values and allow only the tested parameter to fluctuate. However, this is not clearly explained in the manuscript. Also in what way does the bathymetry and Hs result in damages? Section 3.2.2: Considering only SLR is an acceptable assumption but the authors should at least mention other studies which discuss the other uncertainty sources (astronomical

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and meteorological tides). Note also that the text is almost the same as in the discussion (page 12, line 7). SSPs: there is literature on the compatibility of certain SSPs and RCPs and the authors should justify why they combine SSP2 with RCP8.5. The use of 5th and 95th percentile values is an assumption which may be inevitable but has limitations and should be discussed. It's not said that the 95th Hs will result in the 95th damage and to assess this properly a Monte Carlo framework is needed considering the whole PDF and more cases. I expect that the computational effort is prohibitive but this should be at least discussed. Also as the methodology is not sufficiently explained it is not easy to follow what simulations have been really done. The Hs uncertainty sources are not fully covered. Given that values come from a reanalysis one should also include model error and EVA uncertainties beyond the one related to fitting (e.g. other pdfs). These aspects should be discussed. All bathymetry related uncertainty is also not addressed: e.g. effect on wave/storm surge simulations. Again discuss

Other minor comments: I would recommend expressing EAD in USD since EUR is not relevant to people living outside of the EU and in this case so the study areas are also out of EU territory. Page 1, Line 24: Rephrase 'which challenges the safety and sustainability of their society and the growth of their economies' page 2, Line 18: 2017)and CoastalDEM page 4, Line 20: I am a bit skeptical about whether direct damages are dominant. I would suggest removing this statement unless the authors can support it with references/data Page 6, Line 1: The work of Bove et al (https://doi.org/10.1016/j.scitotenv.2019.136162) is also relevant to the present study and should be discussed. Page 6, Line 26: correct 'being most representatives' Table 1: SLR projections columns 3 and 4, is this correct? Also it is not clear where exactly SLR comes from. Vousdoukas et al. 2016 is cited but not with sufficient details. Maybe the data come from the 2018 Nature Communications paper? Figure 7 would be easier to follow with x labels explaining each bar Explain the vertical datum used for the UAV DEM Figure 10 compares the damages driven by socioeconomic vs climate change so I would suggest expressing that way

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