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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 #1

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The paper assesses uncertainty in coastal flood risk from various influencing drivers in two developing island states in the Gulf of Guinea in Africa. The proposed methodology can aid in developing flood management strategies, especially in insular states. Although the study has implications for flood risk assessment, a few issues should be addressed before accepting the work, which I have summarized below: Major comments: (1) Page 4, line 20, the authors straight away analyzed a 100-year return period for the analyzed region. Although for most of the developed nations, flood protection standard assumes 100-year as the benchmark, however, for pristine locality like the two analyzed here, directly moving to a 100-year return level may lead to erroneous results based on a limited number of records available. Further, the study uses data from different sources, such as GTSR data, which is based on a 35-year record, which

may not be equivalent to the length of other available records used in the analysis. Hence, data from different sources with varying record lengths would impart additional uncertainty in the analysis. Although the return period could approximate the hazard potential beyond the record length, however, in this case, the uncertainty bound would be larger with longer return period estimates. Hence, it would be interesting to know the hazard potential on smaller return levels such as 10-year or 25-year first, that covers the analysis period before moving to the larger one.

(2) Throughout the manuscript, no-where the start year and the end year is mentioned for any of the dataset except pointing to either 30- or 35-year. In that way, it is rather abstract, what was the baseline period.

(3) For sampling extreme, authors directly have taken 98th percentile as the threshold criterion for significant wave height. For fixing threshold, authors need to ensure the sampled extremes are un-autocorrelated and iid. Further, for any coastal storms, 3-day consecutive extremes should not be sampled together. Hence, authors should ensure sampled extremes follow iid behavior.

(4) On page 4, line 15, please specify the temporal resolution of storm surges, which is 6-hourly I guess, please check. And also please explain the time frame.

(5) Please specify the source and download the link for the SSP scenario.

(6) On page 11, in the present-day scenario, interdependency between various ESL components are neglected. For example, surge and tide are often correlated (Devlin et al., 2017): Devlin, A. T., Jay, D. A., Talke, S. A., Zaron, E. D., Pan, J. and Lin, H.: Coupling of sea level and tidal range changes, with implications for future water levels, Scientific reports, 7(1), 17021, 2017.

(7) In page 11, please also include the factor, "technological advancement" since this also affects future flood risk assessment.

Minor comments: (1) Authors have cited several studies related to coastal and riverine

flood risk assessment and associated uncertainties. However, in the low-lying deltas, the compound flooding resulting from both coastal and riverine floods during a major storm episode can cause significant damage. A few references on this could broaden the scope of the article.

(2) Page 4, line 10, no citation is available for De Ridder et al., 2019 in the reference section.

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