

Interactive comment on “Quantifying processes contributing to coastal hazards to inform coastal climate resilience assessments, demonstrated for the Caribbean Sea” by Svetlana Jevrejeva et al.

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Reply to Reviewer 2 comments

The manuscript details a methodology for regional assessment of coastal impacts due to waves, storm surges and sea level rise. The study focuses on Caribbean SIDS (Small Island Developing States), which are particularly vulnerable to coastal climate change, since they strongly rely on the preservation of the coastal zone and they are also prone to natural disasters. The adopted approach can provide information for the design and implementation of the requisite coastal adaptation strategies. I recommend the publication of the manuscript following some clarifications and minor corrections.

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1. The terms risk, exposure and vulnerability are used in a confusing way (e.g. Pg. 1 lines 18-19: “We introduce a Combined Vulnerability Index, which allows a quantitative assessment of relative risk across the region, showing that sea level rise is the most important risk factor everywhere” and Pg. 13 lines 404-405: “we can calculate an external physical exposure factor, including the rate of sea level rise, the wave climate and tidal range, which we here refer to as a Combined Vulnerability Index (CBVI)”). Please clarify better these concepts.

Reply:

Section 5 has been modified to clarify the terms and concepts.

2. An analysis was made regarding hurricane induced storm surges and a Combined Vulnerability Index (CBVI) is proposed for marine hazards; however storm surges are not included on the proposed CBVI. Could the authors comment on that?

Reply: Text in chapter 5 and Discussion has been modified.

The vulnerability index uses tidal range as the variable to describe the vulnerability of the coastline to time-varying water level. In a microtidal area like in most of the Caribbean this makes most of the coastlines vulnerable to surges. We added a wind-speed variable into the CVI in order to allow for the occurrence of hurricanes, which will have direct and indirect (surge) impacts.

3. The names of the countries and the locations mentioned in section 2 should be added in Figure 1.

Reply: As suggested Figure 1 has been updated to include the country names.

4. Figure 5 does not include very important information for the manuscript; it could be transferred in the supplementary material or it could be combined with figure 6.

Reply: Following the suggestion from Reviewer 1 Figure 5 has been moved into SI.

5. The caption in Figure 7 (Pg.27, line 686) mentions “Locations of wave buoys used

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for model validation are marked as filled red circles” but the locations are missing from the figure. The map in Figure 7 looks deformed, the scale of the figure should be corrected.

Reply: Figure caption has been corrected.

6. Caption of figure 8 (Pg. 28, lines 696-697): It is not clear that Fig. 8c and 8d concern Hurricane Tomas.

Reply: As suggested the caption to Figure 8 has been updated to improve clarity.

7. Figure 11 is not very clear, needs to be improved.

Reply: This figure 11 (figure 10 in our updated manuscript) has been modified to improve clarity as requested.

8. Figure SI1 and Table SI1 of the supplementary material is not mentioned in the manuscript.

Reply: Table SI1 is now mentioned in Line 107

9. Pg. 9, lines 250-251: “Future sea level projections for RCP8.5, including the low probability/ high impact scenario (the 95th percentile) are shown on Figure SI4”. It’s Figure SI5 not Figure SI4.

Reply: Done

10. Pg. 10, line 307: “Fig. 11 show maximum non-tidal residual envelopes for the case study events discussed in Section 3.3.1”. It’s Fig. 10 that depicts the non-tidal residual envelopes, not Fig. 11.

Reply: Done

11. Caption of figure 6 (Pg. 26, line 680): Please correct the typing error “(whereas the global mean trend is 3.00+/-0.4mm yr-1 is removed)”

Reply: Done

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