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Geoscientific Model Development Discussions

Interactive comment on "CLIMADA – a global weather and climate risk assessment platform" *by* Gabriela Aznar-Siguan and David N. Bresch

Anonymous Referee #2

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The authors present the open source software CLIMADA, a python-based tool to assess global weather and climate risk, as well as an application of this tool to tropical cyclone risks in the Caribbean. The CLIMADA tool is very useful and timely tool as it allows to address the full modeling chain of climate impacts within a single tool in a very efficient manner. The paper is well written. However, I do have some comments I would like the authors to consider, in particular with respect to the uncertainty assessment:

Major comments:

1. The authors choose to use the term "impact function" instead of vulnerability (function) because an impact function is not directly associated with negative impacts, as discussed on p. 4, line 5-6. This is slightly confusing as the term vulnerability is repeatedly used prior to this, e.g., in Figure 1 and in the equation on page 4. Moreover,

I would like the authors to elaborate on some examples for the option of opportunities/negative damages that could be captured by their impact function that assesses direct impacts of climate extremes.

2. p. 6, line 28: Could the authors clarify how PMI is calculated from v(x)? What is "h" in eq. 6. Moreover, I am unable to follow the last equality in eq. 6.

3. p. 7, section 3.1: The authors motivate their application by a study of non-sovereign countries and do present some results throughout the paper. However, the motivation remains vague and the results are never interpreted in this context. Please add relevant discussion parts or remove this motivation initially.

4. p. 8, line 13: BlackMarble seems to be a very relevant part of the model but it discussed only vaguely. I would suggest to create a separate section for BlackMarble and introduce this method more thoroughly.

5. p. 9, line 15: Why is this sentence needed "Their GDP data is from 2011 and their spatial resolution is of 5km." ? Is exposure hence also based on 2011 values? If so, I strongly suggest to compare exposure values for 2011 in Table 2 (and not across different years), e.g., by rescaling exposure. Otherwise this comparison is not very useful.

6. p. 10, line 21: Please state the impact function here explicitly. What parameters were used? How did choice of parameters influence the result? There is an uncertainty assessment later on, but it remains totally unclear what and how the impact function is changed.

7. p. 10, line 25: Are the damages generated by Irma based on CLIMADA or based on observations? Adjust caption to Fig. 3 accordingly.

8. p. 12, line 2: I am missing a complete uncertainty discussion of the assessment here, see also comment on impact function above. It is not sufficient to change one parameter at random but rather the whole change of uncertainties needs to be discussed.

How sensitive is the assessment to changing parameters in the impact function and what is the impact on damage estimates? What about storm surge effects? I assume that the fraction of surge-related losses might be substantial for small island states and cannot be neglected here.

9. p. 12, line 10: I doubt that the aggregated return period for the countries in Fig.5 (based on eq. 6) adds up to 3,500 years in reality. The assessments for each island are not independent as tropical cyclone tracks follow a usual pattern and therefore tend to affect several islands at once on a regular basis. The discussion here and around Eq. 6 should be extended to account for uncorrelated and correlated occurrence of events.

Minor comments:

1. p. 5, line 4; correct sentence

2. p. 7, line 4; remove colon in the middle of the sentence

3. reference in caption to Table 2 missing

4. p. 10, line 23: stick to original BlackMarble way of writing

5. p. 12, line 2: correct sentence

6. p. 12, line 5: correct sentence: “are represented...”

7. p. 14, table 3: make table more readable by aligning values and uncertainty in separate columns

8. p. 15, line 23: “Using a cluster ...” sounds pretty sloppy and not very specific. You probably mean parallel execution on 300 nodes?

9. Add enumeration to subfigures/panels in order to make orientation and referencing easier

10. regarding the bibliography: - the citation of Cardona et al 2017 is incomplete - the citation of Geiger et al 2017 needs to be updated

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