

## ***Interactive comment on “Assessing storm surge hazard and impact of sea level rise in Lesser Antilles-Case study of Martinique” by Yann Krien et al.***

**Anonymous Referee #1**

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Chapter 1 and 2: Dean as the most recent hurricane had strong impacts even though it was only category 2. Add a table that lists the main parameters of Dean and other recent (e.g. Hugo) or major historical hurricanes (e.g. 1780) that affected Martinique. Include parameters such as the distance of track from the shore, wind speeds and category and wave heights at closest position to the island, surge height, duration of inundation, inundation distance and height on land, flow speeds, ... How many of the recent or historical hurricanes actually made landfall on Martinique? Are more storms passing north or south of the island? Add a map that depicts recent and historical hurricane tracks. <https://coast.noaa.gov/hurricanes/> Setting: reefs and mangrove forests should be addressed in more detail, as they have a significant influence as

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natural coastal protection. Reef type (fringing, patch)? Add the location of the reef and the mangroves in Fig. 1. In order to get an idea of the inundation risk: how wide are coastal plains on Martinique (max., min.)? A profile showing the bathymetry and onshore topography would be helpful, especially as the nearshore bathymetry has a significant influence on the potential storm surge and wave setup. Lines 17-18 (page 1): the importance of operational storm surge warning systems is stressed - are there plans for or already operating systems on Martinique? Have there been any evacuation trainings? How gets the population currently alerted? Are there any evacuation routes assigned? Line 13 (page 3): development is probably not the right term here - recolonization? Line 16 (page 3): add a reference for the 1780 event.

Chapter 3: Which hurricane categories were used? You mention cat 4-5 in chapter 5, but it should already be stated here. Line 39 (page 4): add a reference for the database; add a table with the input data used to set up your predictions. Line 46 (page 4): global mean sea level change (1 m) is cited which is very general. Are there any studies that predict a more local sea level? For a global or more local sea level: what are the max, average or min predictions?

Chapter 4: Is there any wave height data of Dean available? Which max heights and speeds were observed / measured? Line 32 (page 5): observations are mentioned but not explained – what was observed? Better add this to chapter 2. Why did the authors not select any additional scenario with an east-west track?

Chapter 5: Add a table that lists and compares the results of the 13 different scenarios. Include parameters like the modeled surge height, wave height, inundation distance, category, distance of storm track from the shore, and any other simulated parameters.

Chapter 6: Divide this chapter into separate chapters for the discussion and the conclusions. The discussion is far too short. For example it lacks a discussion on a Haiyan-like bore. The setting with a step bathymetry and reefs may allow the set up of infragravity waves on Martinique. Line 11 (page 10): the role of mangroves and reefs

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as potential natural coastal protection has not been mentioned before. It should be discussed in greater detail. Also see comments to chapter 1 and 2.

Fig. 1 a and b have a bad resolution. White yellow and cyan lines can hardly be seen. Location of reefs and mangroves should be added.

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