

***Interactive comment on* “Tidal flood area mapping fronts the climate change scenarios: case study in a tropical estuary of Brazilian semiarid” by Paulo Victor N. Araújo et al.**

Anonymous Referee #2

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General comments: I have just finished reviewing the manuscript entitled ‘Tidal flood area mapping fronts the climate change scenarios: case study in a tropical estuary of Brazilian semiarid’ by Araújo et al. Overall the deals with a very interest subject in an area with little published information. I believe that the article is of interest and within the scope of the journal but in my opinion needs significant improvements before publishing both methodological and scientific (see detailed comments). The most important of the problems is that the hazard methodology and classification is not presented correctly (looks confusing) and it needs further improvements. The data and methods used are presented in a way that is not easy to judge is the analysis used is correct. Abstract and Introduction sections very general and they do not help the reader to understand

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the processes related. Finally, the objective presented at the end of the Introduction are rather technical. Study area has a lot of information that is not necessary or related with the objectives of the article and results and discussion need further work.

Specific comments:

Abstract 'Previous studies on tidal flood mapping are mostly with continental and/or global scale approaches' this statement is not correct. There are far more local scale flooding studies, it is true that the impact of the global or continental wide studies tends to be higher but the number of studies is not. Introduction LINE 26: 'has occurred at an accelerating rate' is occurring, as it continues to occur.

LINES 33-34: 'Decades ago, the flooding usually happened only during a powerful or localized storm now can happen when a steady breeze or a change in coastal current overlaps with high tide (NOAA, 2019).' This statement is only valid for the US area and for 'sunny day flooding' no storm conditions. It cannot be extrapolated to other areas since local environmental and infrastructure (drainage system) parameters are important. Please rephrase. Also explain in the introduction with what type of flooding this work is focused marine flooding, flooding through the drainage system or both.

LINE 35: 'In Brazil, the current panorama of coastal flooding is extremely worrying (Losada et al., 2013).' In what terms, this statement is not supported by the paper. Please explain which is the worrying factors according to Losada et al. Since this is a local study please provide information related with the specific study area.

LINE 55: the objective as it expressed looks more technical than scientific. Please try to reformulate it.

Study Site

The first and the third paragraph have a lot of repeated information (in the first one without proper referencing). Please remove.

LINES 82-87: The tidal information is not properly provided. What is the mean tidal

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range, the mean high water spring tide and the mean high water neap tides? The reduction level (RT) is a national level that is not explained until the methods section. Please refer ranges relative to MSL

LINE 103: 'been suffering lately' what do you mean by lately? Since when? How many events per year?

LINE 116: It is not possible to have a one line section. Please provide more information on the tidal data. Length of the record, precise location, gaps in the record frequency of data recording, reference level and data treatment. LINE 120: provide model resolution and other models parameters. Any indicators on the ability of this model to predict correctly the observed storm surge? Please provide calibration and validation information.

LINE 124: No need to define the Astronomical tide

LINE 130: It is not clear if the data are measured or predicted water levels. If the data are max and min measured then they are not purely astronomical data but they have also meteorological and judging by the figure 1 also river components. If on the other hand the data are predicted max. and min. values from tidal constituents then there is no reason to calculate the return period of the data there is no probabilistic part only deterministic. Please describe better the data and adjust the statistical methods used in the text.

LINE 141: see comment above

LINE 153: change 'payback' with 'return'

LINE 195: 'Church et al., 2013)' not in the reference list. Also is this a global MSL estimation? Since it is a local study a local estimate would be better. You do not explain where you use the climate change data. Their use in Table 1 is confusing since extreme climate change scenarios are related with low hazard level. In general the use of CC scenarios in Hazard levels is confusing.

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LINE 205-210: It is not clear on how you select your hazard levels and also which is your hazard indicator (see Ferreria et al., 2017 Process-based indicators to assess storm induced coastal hazards. Earth-Science Reviews 173). It is always better to select a proxy that is a measure of hazard (e.g. inundation depth instead of total water level.). Table 1 is not easy to understand as RCP8.5 is a low hazard scenario. In general this section is not clear and needs more work. Normally hazard can take a value of 0 'no hazard'.

LINE 212: The vulnerability is actually land use vulnerability. Which were the parameters used for the classification. Economic importance or other? The classification was based on regional or national stakeholders or was made by the authors?

LINES 230-237: It is not easy to observe trend with relative short time-series. Have you checked if there is a correlation with any of the large weather patterns and indices that affect the area? It is important to explain what kind of tidal data you present see my comment in methods section. Is it possible to extend the surge and tidal data to cover the events you have measurements?

LINES 240-247: this information is better in the study area.

LINES 251_301: it is difficult to comment on the results since the hazard classification is not clear. Up to the results you do not mention which is the process of inundation (flooding from the sea or drainage water). Please introduce this earlier in the text with the appropriate information of the type and location of the drainage system. Also how do you do the mapping in GIS? Are you using an algorithm with hydraulic connectivity or it is a bathtub model?

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