First, we want to thank the reviewer for the insightful detailed comments and recommendations. We appreciate your outlook on the potential of our study.

Following the suggestions, we will revise the manuscript accordingly. Below we provide responses detailing the revision actions we plan to take to address the reviewers' comments.

Note: Below is our response (italics) to each reviewer's comment (regular font)

Major Comments:

1. The authors state in their paper objectives and title that they are exploring the impact of major storm events on flood hazard through changes in channel capacity. However, the explanatory variables used in their machine learning models include not only storm-related properties but also hydrologic and geomorphologic variables. It's unclear how the authors discern from the ML models that the changes in channel capacity are primarily attributed to storm properties and not influenced by other factors. Additionally, the analysis is focused on the dataset containing "major storm events," which implies that changes in channel capacity are associated in the ML to major events. What about changes in channel capacity during non-storm events? In other words, can the ML capture changes in channel capacity without storm property variables (variables as described by Falcone, 2011)?

Response: *we thank the reviewer for this comment. The ML model was trained considering both storm properties and watershed properties. We do not make distinction on which element triggers the change, nonetheless in the paper we provided an assessment of feature importance, highlighting that the shifts, for how the model works, are mostly explained by a combination of storm and watershed properties. We would not suggest using the model, as it is trained currently, to predict changes without having information on the storm properties. We will highlight this in the revised manuscript.*

2. The overall organization of the introduction and methods sections lacks necessary details. To better understand the techniques used to estimate the residuals and the various simplifications (such as manual filtering of outliers) required for the methodology, I had to refer to Slater et al., (2015). For example, in Figure 3, panel b, the authors mention outliers but do not clearly identify them or provide specific details.

Response: *we thank the reviewer for this comment. We will provide a more detailed description for the revised paper.*

3. The results and discussion sections need to be reorganized. It is recommended to create a separate section for the discussion. Additionally, for improved readability, it is advisable to create a single section dedicated to limitations and future work.

Response: *we thank the reviewer for this comment. We will reorganize the work into separate sections for discussion and results.*

<u>Minor Comments:</u>

Figure 3: It would be helpful to include a time series with streamflow data to illustrate the magnitude of the April 2007 flood. Panels c and d are confusing since they may give the impression that there's only one change in flood capacity per gauge, which might not be the case.

Response: *we thank the reviewer for this comment. We will improve the clarity of the figure*

Line [15]: Please clarify what you mean by "geomorphologic impacts."

Consider adding a schematic figure that explains the core concept of conveyance capacity before and after a storm event. Real data examples would be beneficial in illustrating this concept. Slater et al., 2015, offers a useful example in this regard.

Response: *we thank the reviewer for this comment. We will try and create a figure to express this.*

Figure 9: Please provide information on how the 95% confidence bound of the current stage-discharge relationship was calculated.

Response: *we thank the reviewer for this comment. We will clarify this. The fitting is performed using a loess fit, and the R packet for this provides the estimation of the 95% confidence interval.*