Dear Editor, first we want to thank you for your constructive, in-depth and clear questions and comments. Below you can find our answers point-by-point to your comments. We also highlight (where possible) the part of the original submitted manuscript that have been modified to address your comments. To facilitate the reading, we added our responses to your comments in red. If changes to the text are proposed, changes are underlined.

1. Please ,clarify what is new in your study. Methodologically what is new? What is the relevance of providing estimates of damages considering only a single event in different operational configurations and SLR scenarios? I suggest that you advocate more connivingly in the manuscript the value and practical utility of your study

Thank you for this comment. We propose the following section being added to advocate more explicitly for the value of the study:

At the end of line 71: "*As such, no risk assessment framework is accessible that captures the flood dynamics or allow for a comprehensive adjustment of exposure and vulnerability due to urban developments for potential long-term use of such frameworks. Flood dynamics might be altered in future because of the operation of the MOSE barrier influencing the bathymetry and thus hydrodynamics of floods in the Venetian lagoon (Tognin et al. 2022)."*

At the end of line 78: *"The framework is tested using the second highest recorded flood event for which damage claim data have been collected and made available by the municipality. Those most-recent damage claim data were used to analyse and discuss the suitability of the framework by comparing these empirical data with the simulated flood damages of the framework."*

Moreover, we propose the following addition in line 540: "*[…] in accordance with available damage claim data. While the use of a hydrodynamic model posed some numerical challenges and resulted in similar flood damage estimates than based on a bathtub model, the opportunity to integrate additional elements such as wave-effects or a 1D-flow path-component representing the sewage system in the low-lying city might allow for a more accurate flood hazard estimation beneficial for efficient flood risk management."*

Finally, we propose the following addition in line 541: "*[…] limited knowledge about the system and damage processes. Various existing approaches and elements (hydraulics, damage model, interventions, sea level rise scenarios) were integrated to develop and test a novel approach to risk assessment for Venice. While the application focus of this study focuses on events with a single return period the framework can be easily used to consider other events (with other return periods) to come to a complete risk assessment in current and future conditions and for various interventions. Given the complexity of the system and the large numbers of possible interventions, it would be a study by itself to evaluate all the (combinations) of interventions (Berchum et al. 2019). Thus, in this paper we have focussed on the introduction of the framework and its illustration for a limited number of events and interventions."*

2. Line 3 replace mitigate with reduce (see IPCC glossary for the meaning of "mitigation"). Further at different points you mention "exposure … characteristics from typical residential buildings". This concept is not clear. Please check the IPCC glossary for the meaning of exposure and revise the text (eventually delete the term "exposure")

Thank you for this comment. We replaced the word "mitigate" in line 3 and further revised the use of exposure characteristics. Accordingly, we propose changes of the following lines:

l.201f: Consequently, the chosen model was selected with special care to allow for an inclusion of differing ~~exposure and~~ vulnerability characteristics.

l.212f: INSYDE is a multi-parametric model adopting 23 parameters to describe hazard, ~~exposure~~ and vulnerability characteristics of buildings

l.217f: The INSYDE model also makes use of building-type categorization to account for differences in the ~~exposure or~~ vulnerability characteristics between typical buildings in a study area.

l.257f: […] was added to account for observed differences in the ~~exposure and~~ vulnerability characteristics from typical residential buildings […]

l.464: […] preparation and protection measures on structure and neighborhood level, as well as other vulnerability characteristics, in Venice […]

l.562: Also, a better understanding of the spatial distribution of protection measures and other damage mediating characteristics […]

3. Line 97 replace "ever recorded " with a more precise statement, such as that this event is the second highest water height since the beginning of the 150 year long instrumental record, (ref: Lionello et al., 2020, already cited by the authors)

Thank you very much for this comment. We adjusted the sentence in line 97 as follows: "*On 12 November 2019, the second highest sea level since the beginning of measurements (1872) flooded the old-town of Venice and other parts of the Venetian lagoon."*

4. Line 159-165. comment to which extent the lack of interaction among nested models may lead to inconsistencies in flow velocity and water level among the different areas and whether this is relevant for estimating the damages

We agree with your suggestion and propose adding the following sentence in line 166: *[…] not exchange information among each other but were run independently. Inconsistencies in flow velocities and water levels due to the lack of interaction between the sub-models were neglected given that most interaction was assumed to occur through the canals which were sufficiently captured already in the parent model using a resolution of 2.6m within the city.*

5. Line 322-331 and table 8. To which extent the lack of c3dfm result for the "Castelo" sub-model are relevant for table 8. In other terms what is the weight of the Castelo's results in the damage costs and claims? Please comment and add a sentence explain this

Thank you for this comment. While we can give an indication of the effect of lack of d3dfm results in "Castello" for the immediate response claims, the more extensive claims were provided by the city of Venice only aggregated preventing any indication of the effect of different water depth estimates. We propose the following addition in line 324: "*A total of 94 immediate response claims (2.5 % of immediate response claims, amounting for 656,264 EUR in claim volume) were located in the sub-model "Castello". As indicated before, we used flood depth estimates from the bathtub model resulting in minor effects on the structure-wise results. "*

And also in line 461: "[…] to address the mentioned limitations of the framework. *While the structure-wise analysis of immediate response claims allowed for a comparison of the bathtub model and hydrodynamic model, the high-aggregation level of all damage claims in*

combination with the numerical challenges in the hydrodynamic sub-models, did not allow to confirm findings of this comparison."

6. Line 429 clarify what is meant for "proper calibration"

We propose the following rephrasing: *"a fully functioning hydrodynamic model may add additional benefits to the flood risk assessment framework as it can account for (changing) physical characteristics explicitly, allow for a calibration based on flood depth information, and incorporate additional flow path-components such as a 1D sewage system, which might lead to different flooding patterns"*

7. Line 420-430 this paragraph suggests that the feasibility of using an hydrodynamic model has been hampered by numerical problems. Further, the sentence 425-426 suggests that in general there might be a limited advantage running a fluid dynamic model with respect to a bathtub model. To which extent it is important to use a dynamic model with respect to a bathtub model? This study provides little evidence for this and the text of the "conclusions" section is not clear about this.

We propose the following addition in line 540: "*[…] in accordance with available damage claim data. While the use of a hydrodynamic model posed some numerical challenges and resulted in similar damage estimates than based on a bathtub model, the opportunity to integrate additional elements such as a 1D-flow path-component representing the sewage system in the low-lying city might allow for a more accurate hazard estimation beneficial for efficient flood risk management."*

8. Line 246-253 please include information on how the building information assessed from Google streetview was evaluated and to which extent this add uncertainty to the estimates of the damage

We propose the following additional sentence at the end of line 248: *[…] at ten random locations in different districts of the old-town. At each of the random locations, we regarded house fronts on both sides up to a distance of 50 to 250m in various directions from the starting point. In this way, we obtained information regarding an estimate of 300 buildings. Length information were estimated based on expert judgment, available scales (e.g. door dimensions). In this way, a first-order estimation of building information was obtained in absence of available statistical data. These building characterstics were confirmed with local inhabitants.*

Additional alterations:

- Based on feedback we received from the editorial board, we adjusted Table 5 to avoid the use oft he colours red and green.
- We have provided some updated references in some part of the paper
- We have updated the affiliation of one of the two authors (Julius Schlumberger, Manuel Andres Diaz Loaiza)