Please note that in this rebuttal, *italics* refer to the text of the reviewer' comments, the detailed response is in **bold red**.

AUTHOR RESPONSE TO REVIEWER #2:

GENERAL COMMENTS

This is a very pleasant and informative study. It sets a clear objective and exposes its results in a way that leaves little room for debate. A few typos and language imprecisions to be edited before final publication. I note a few (definitely not all) in the line-by-line comments, but overall the manuscript is a pleasant read. Some sentences could be divided in two for clarity.

The author thanks the reviewer for the positive evaluation of the manuscript and for the precious recommendations.

ABSTRACT

I feel like the abstract is slightly out of balance: strong focus on the rationale but vary succinct on the methods and results. In that sense it almost feels more like an introduction. Maybe shift the focus toward more methods/results.

The author agrees with the reviewer. In the new version of the manuscript the abstract will be corrected accordingly.

INTRODUCTION

Very well referenced and structured.

Thank you for the positive evaluation.

METHODS

Not much to say, this is clearly explained and based on a sound reasoning. The base model is also tried and tested.

In run (b): do you re-open the gates at any point during the ebb tide? If so it needs to be mentioned otherwise its seems like the tide is left to flow out of only the Malamocco and Chioggia inlet

Run (b) is used to determine the intragate infiltration. Run (c) is used to determine the optimal re-opening time of the Lido inlet (i.e., when the SL at Lido is lower in the sea). Accordingly, in both runs (b) and (c) the tide begins to flow out through only the Malamocco and Chioggia inlets, while Lido inlet is kept closed.

In run (d): you do mean that each gate is opened separately on the condition that the water level difference is 0?

As during the flood tide under the PCL the (lagoonal) SL difference between the Treporti and San Nicolò inlet is not negligible, each gate is opened separately when the SL difference between the sea and the lagoon sides is null.

My only question would be: how does the timing of gate closure affect your results? Probably not within the scope of this paper, but worth mentioning for further contributions.

A slight advance/delay of the closure of the Lido inlet (up to one hour) would not significantly affect the effect of the PCL. Conversely, it is more important (but operationally easier, i.e., a null SL difference to gauge and a faster manoeuvre of the gates during the re-opening phase) to identify the correct re-opening time.

RESULTS

Very clearly presented. The results fit the objectives determined in the introduction.

Thank you for the positive evaluation.

FIGURE COMMENTS

Fig1: a rough indication of the delimitations of the sub-basins would add interesting information without adding too much clutter to the figure. Not a necessary modification though as these delimitations are seen in figure 6. I missed the legend for the control sections 1-3, since their description comes quite a bit later in the text.

In the new version of the manuscript the figure will be corrected accordingly. Thank you for noting.

Fig3: (d) The effect of the tidal semi-period is not immediately visible. While it is visible that it is represented by the filled polygons, some text to indicate the effect of the shorter period vs. the longer one could help the reader.

The small effect of the tidal (semi-) period within the range of study is not proportional to the tidal period itself. The maximum effect of the PCL on the SL peak reduction will be achieved with a tidal period of about 5.5 hours. In the new version of the manuscript this result will be reported. Thank you for noting.

Fig4: This is a very nice and clear figure, it is immediately comprehensible.

Thank you.

Fig5: idem

Thank you.

LINE-BY-LINE SUGGESTIONS

l9. Detail a bit more for readers (impact of sea level rise and subsidence)

l12. "sediment flushing"

l15: with respect => compared to

l21. does the population do the adapting or is it the flood management system?

l33. delete either "prevented" or "fixed"

l48. You do not mention changes in storm regimes. I'm aware the change in storm regime is debated but a mention of publications on the subject could address a reader's questions on the subject.

l71. "rose" => "raised".

l174. I wonder if is worth mentioning that the bathymetry inside the lagoon (not at the inlets) predates 2012.

l230. "contribute"=>"contribution"

l278. "(a)=>"(i)"

l290. Even though events involving more than 1 tidal cycle are rare, a discussion on the effect of these rare events would be interesting in this case: what would be the decision criteria to close the gate for long periods?

In the new version of the manuscript all these line-by-line suggestions will be carefully taken in account. Thank you.

As concern the comment on line 290, the optimal operation on the gates for the events that involve more than one tidal cycle should be carefully identified. As a first note, the PCL will not be effective, as stated in the manuscript. The decision criteria to close the (three) inlets for long periods is fully debated in the following paper, cited in the present manuscript:

Mel, R., Carniello, L., and D'Alpaos, L.: How long the Mo.S.E. barriers will be effective in protecting all urban settlements within the Venice lagoon? The wind setup constraint. Coastal engineering, 168, 103923, doi:10.1016/j.coastaleng .2021.103923, 2021a.