Response to Reviewer #1

We thank you for your careful read of our manuscript and probing comments; they have improved the manuscript. We appreciate the time this has taken and have addressed all comments. Our responses are below in blue. The line numbers refer to those in the revised manuscript.
Best regards, The authors

The article by Familkhalili et al. examines the interactions among river discharge, storm surge, and tide in an idealized converging channel. Overall, in my opinion, the study provides insights and good explanations to results that are long found in numerical studies, e.g. the increased storm surge with a deepened river channel. Overall, I don't find any major issues. Here are some of my suggestions.

Thanks for the close read of the text.

A discussion about the impact of wave reflection will be very helpful and broaden the readership of the paper, since in many estuaries and coastal bays, reflection of tidal wave (even the storm surge, which is also a wave) is very normal.

This is a good point, and it would surely be interesting to extend our model to look more directly at reflection and partial reflection effects. We have added some additional text and clarification to the model development section. We note that a convergent geometry already includes an incident and reflected wave, but that we do not consider partial or total reflections off of abrupt geometric shifts. We reference some studies that have shown this to be important for tides. We write: "Though a reflected wave is produced by convergent geometry in analytical models (Jay, 1991), we neglect the partial reflections caused by depth and width changes, and do not consider the case of a reflective upstream boundary. Such factors are important for tidal changes in many estuaries, particular locations that are near resonance such as the Ems (see Ensing et al., 2015) or near where total reflections occur (see Ralston et al., 2019)."

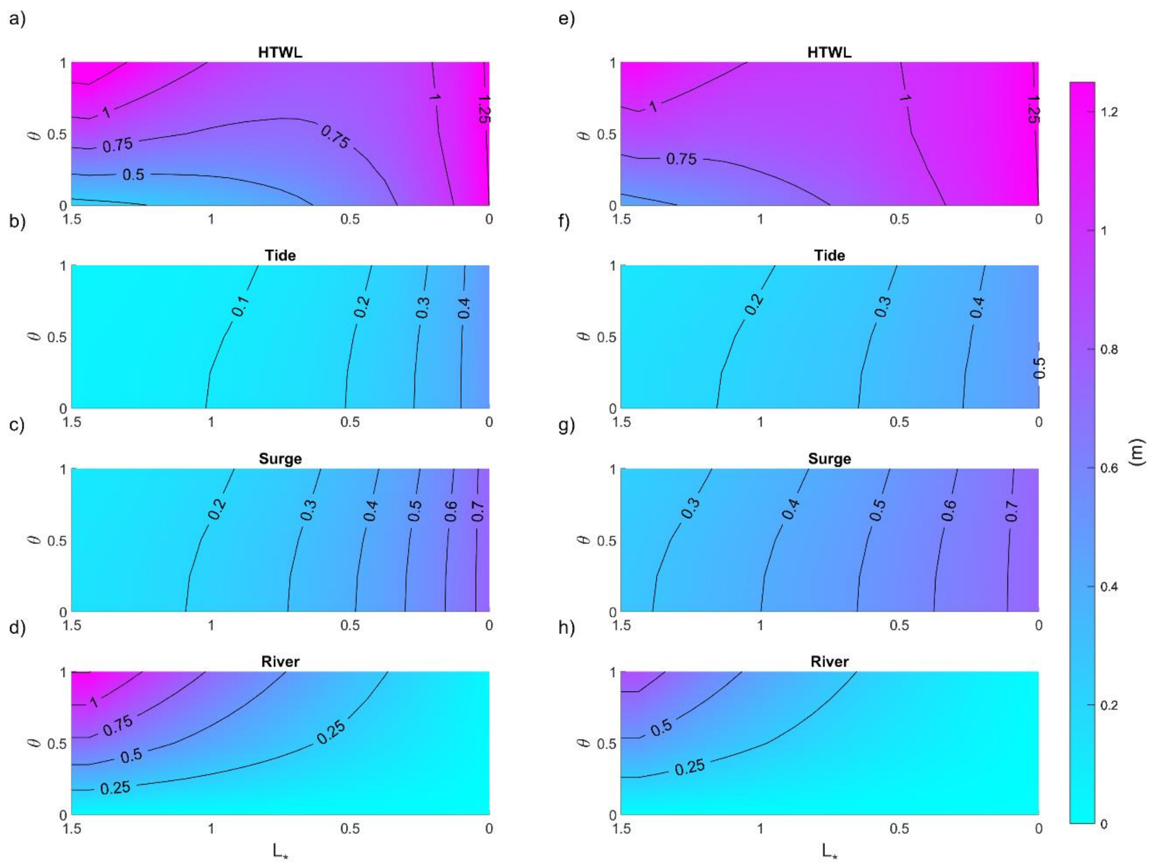
In the idealized model, there no flooding over the shallow area (i.e., a hard shoreline), which make the sea-level rise have the same impact as with channel deepening. But in reality, the inundation and related wave dissipation over the shallow banks could lead to a very different story. Please clarify such limitations of the current analytical model.

The reviewer is certainly correct that the hard shoreline assumption is a limitation, and that future flooding of low-lying areas will modify the results discussed here. We have chosen to analyze the simplest, hard shoreline, case for several reasons. Perhaps the most important are: a) confining the flow to a channel is in some sense "worst case"; i.e., showing the largest impacts; b) any attempt to include overland flooding greatly expands the relevant parameter space, depending on the configuration of the inundated area; and c) engineered responses to higher sea levels would have to be considered, but this would require treating specific cases, not a general parameter space. Also, our 1D modeling framework does not allow consideration of wind-waves; that would require a 2D numerical model. We highlight the assumptions involved as: "Our approach idealizes storm surge as the sum of two sinusoids, and neglects factors, such as the potential role of wetlands and the floodplain, in order to gain insight into some of the important, along-channel factors that govern the system response to a compound event."

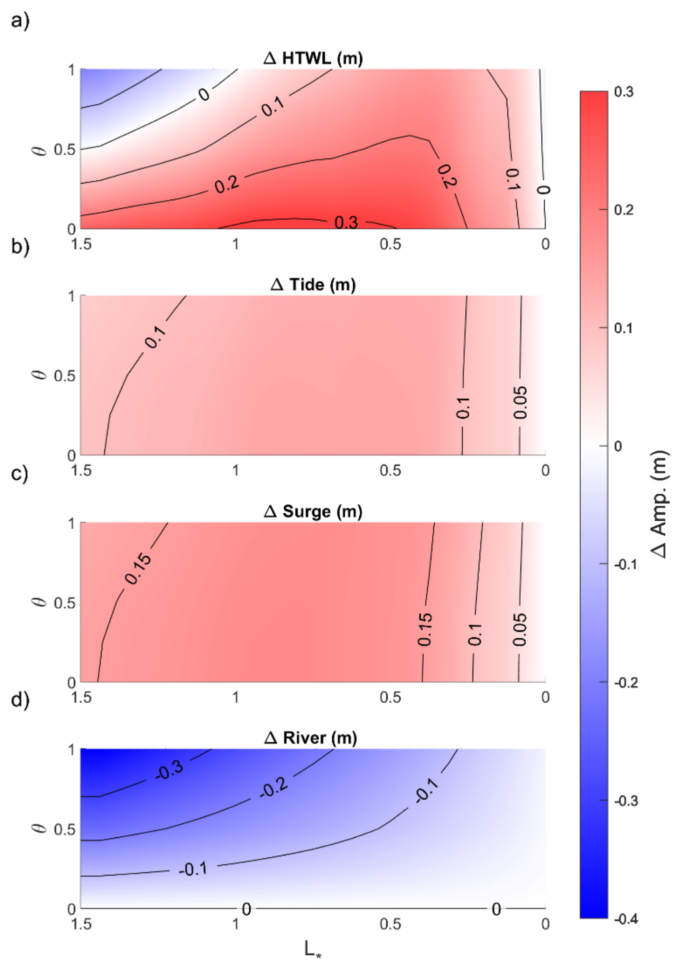
We also mention the modelling approach assumptions as: "Similarly, we neglect processes such as Coriolis acceleration, wind waves, and gravity waves, and focus on the specific case of an incident long-wave that propagates from the coast in the landward direction and is eventually completely damped out."

I suggest to use same color scale for subplots in Fig. 9 and 10. It is a bit of misleading when using different color scale within one plots. Using just contours instead of colored contours is also an option.

We now use one colorbar-scale for all subplots within a figure to avoid any confusion (see below). Also, we used a lighter colormap that allows the contour text to be read better.



We used blue-white-red colorbar for Figure 11 (see below); zero always corresponds to white color where the crossover point is located. Therefore, location of crossover point is highlighted in Figure 11a.


a)
Δ HTWL (m)
b)
Δ Tide (m)
c)
Δ Surge (m)
d)
Δ River (m)
θ
L*
Δ Amp. (m)
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
0.15
0.05
1.5
1
0.5