RC 2

I can definitely say I enjoyed reading the paper that is well written, well organized, concise but exhaustive in describing the methodology and in presenting and discussing the results.

Based on scaled flume experiments the study investigates the relative roles of abiotic and biotic processes in the development of tidal landscapes. Experiments are indeed novel as, for the first time (to my knowledge) they combine the analysis of the role of vegetation on the channel network formation and development in an intertidal basin context.

The experiments highlighted the role of vegetation in driving the development and evolution of channel networks investigating the differences associated with two different mechanisms of plant colonization (patchy and hydrochorous). Based on my personal experience I know the effort necessary to design, set up, and carry out physical experiments which made me further appreciate the study. I particularly appreciated the interesting way of concluding the introduction saying what the Authors expect (hypothesize) from their experiments.

Globally speaking I can say I recommend the manuscript for publication in Earth Surface Dynamics after minor revision. I provide the following few suggestions that are mostly issues of clarification and comments aimed, I hope, at further improving the readability and the quality of an already very good paper. No need to stay anonymous I am Luca Carniello.

Reply: We thank the reviewer very much for the compliments.

SPECIFIC POINTS

Line 45: “Such channels are ebb-dominant in the unvegetated state, …” I suggest supporting this statement in some way. Being in the introduction the best option is to add some references.

Reply: We will add some references such as Stark et al. (2017), Kleinhans et al. (2009) and Gao et al. (2022).

Line 60: “history traits, such as plant recruitment strategies, can influence” I suggest adding two commas.

Reply: Done.

Line 160: “The first 10 tidal cycles were necessary to wet the tidal basin and re-establish a normal flow pattern.” Why is this necessary? Did you stop the experiment before each sowing event? I suppose not as at the beginning you state "During the experiment, Lotus seeds were dropped..." so, why do you need to re-establish the flow pattern? please clarify.

Reply: We will explain this in the revised manuscript as follows. Before every sowing event, a DSM is acquired, which requires a dry sand bed. Afterwards, the first 10 tidal cycles were run without adding seeds to re-establish a normal tidal flow so that the seeds would be spread adequately by the subsequent tidal cycles.

Line 165: “Around 160 000 seeds (i.e., 200 g) were supplied per sowing event to obtain a vegetation cover equaling about half the tidal basin at the end of the experiment.” Please explain why 160000 seeds are necessary to cover half of the basin.

Reply: We will discuss the sowing procedure in more detail. The number of seeds supplied to the tidal inlet was based on the vegetation protocol used in Weisscher et al. (2022). In this study, the authors aimed to obtain vegetation covering half the Metronome flume using 400 000 seeds per sowing event.

Since, in our case, only one-half of the flume was used, we decided to use the same quantity supplied at the tidal inlet in the study of Weisscher et al. (i.e., 160 000 seeds –240 000 seeds were supplied at the river inlet).

Line 170: “while tilting of the flume was halted.” How long was the tilting halted? For the Hydrochloric sowing experiment, you say the experiment was stopped for 4 days. What happened when adopting the patchy sowing procedure? This important piece of information is actually missing.

Reply: The flume was also halted for four days in the patchy experiment. We will make changes to the text to clarify this part.

Line 190: Can you explain the rationale that suggested you to run longer only one of the experiments with vegetation to check if the morphodynamic equilibrium was indeed reached? Why did you choose the patchy one? This is just a curiosity.

Reply: We ran the patchy experiment after the hydrochorous experiment to use information from the hydrochorous experiment to decide what plant density we wanted to obtain in the patchy experiment. Since it was not feasible to run both experiments for 10 000 tidal cycles (too time consuming), we decided only to run the last experiment for a more extended period.

Line 201: “First, the raw laser line scanner data underwent a calibration and correction process for the laser-camera system.” Can you specify a little bit more in detail what the calibration and correction process consists of?

Reply: The lens distortion was corrected in Matlab. A pinhole camera model was applied for calibration, which uses calibration techniques involving the checkerboard method. Afterward, the “undistortImage” function was used to correct the images for lens distortion. This can be added in the methods description of the revised manuscript.

Line 201: “If the difference between the window median and the local pixel elevation was below a certain threshold (respectively, 0.0015, 0.005 and 0.0055 m) for at least one window size, the local pixel was identified as a channel.” I do not understand why this occurrence can ensure the selected pixel is in a channel. I suppose that the difference between the window median and the local pixel elevation can be below a certain threshold also for pixels pertaining to the adjacent flat areas. Can you clarify, please?

Reply: We will discuss the channel network extraction procedure in more detail. During the initial step in which a raw skeleton of the channel network is extracted, some “parasite” skeleton sections that do not belong to the channel network can slip in. This skeleton is cleaned in another step by applying a threshold ratio (i.e., skeleton section length divided by the distance between the downstream node and the remaining skeleton). If a skeleton section length is below this threshold, it is removed. To put it simply, a skeleton section will be removed if the distance between this skeleton section and the remaining skeleton is above a set threshold ratio between section length and distance to the channel bank (1.7 in this case).

Line 286: “we observed that the left channel bend (as seen from vertical top-view)” I guess this is to explain to the reader what you mean by "left" channel bend but it is not clear to me what vertical means. I suggest defining left and right for example assuming an observer looking the experiment from the inlet landward.

Reply: We will change this to clarify the sentence by stating how we define the direction. In this case, we define left and right based on the assumption that the observer looks from the inlet to the landward direction.

Line 337: I suggest remembering here that "DL" is the local drainage densities. It has been defined quite far above and I personally forgot.

Reply: We have adjusted this in the text.

Line 380: "In the hydrochorous seeding experiment, the vegetation cover increased slowly over time and remained lower than in the patchy seeding experiment." It would be very interesting the investigate the effect of increasing the amount of seeds supplied per sowing event performing other hydrochorous seeding experiments. This is of course not a request of integration for this contribution but a suggestion for a further paper.

Reply: Thank you for your suggestion. Another hydrochorous seeding experiment as part of the Msc thesis of Thomas Veerman has been carried out with a higher amount of seeds, while using two more plant species (*Veronica beccabunga* and *Medicago sativa*). The final vegetation cover in this multispecies experiment also stayed very low (20%) even though double to triple the amount of seeds were supplied. However, here we do not have sufficient control over the effects of the different species so we chose not to include this experiment in the paper.