

## ***Interactive comment on “Morphological effects of vegetation on the fluvial-tidal transition in Holocene estuaries” by Ivar Lokhorst et al.***

### **Anonymous Referee #1**

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This schematic numerical study conducted by the authors focuses on the morphological impacts of vegetation and mud on estuarine morphodynamics. Their model results indicated that vegetation cover reaches its largest extent in mixed energy zone of the estuary, which is generally consistent with natural systems. Mud is shown to play a key role in the stabilization and accretion of intertidal areas, favoring the expansion of marshes. In my opinion, this contribution is nicely-designed, well-written, and its topic/content is fully covered by the journal of Earth Surface Dynamics. Model results are useful for future estuarine management under sea level rise and human interventions. Overall, I recommend its publication after some minor revisions. Below, I list my comments in detail.

Page 1 Line 3. replace “while” with “on the other hand”.

C1

Page 2 Line 34. Water height is not clear, please rephrase.

Page 3 Figure 1. Please specifically state what the green color and red lines stand for in the title. It is not very clear how the authors determine the “tide dominated”, “mixed energy”, and “river dominated” zones? Is there an objective way of doing this?

Page 4 Line 3. Salinity is neglected in this study, although the authors realize the importance of this parameter. In the fluvial-tidal transition, spatial salinity distribution can vary quickly and may affect the biological cycle of marshes. While this factor is not included in the model, I recommend the authors to specifically add some text in the Discussion section to address this simplification.

Page 4 Line 19. “Cohesive is more difficult to erode than sand” is not entirely true particularly if no consolidation occurs. Please rephrase here to make this statement clearer.

Page 5 Line 5-9. It would be nice if the authors add some text describing how effective the model is when the external coupling is needed between Delft3D and Matlab code.

Page 8 Line 24. 50 m by 80 m, 120 m by 230 m, unit missing.

Page 9 Line 3. Delete “a” before 100 years.

Page 10 Table 2. The model considers the marsh species “*Spartina Anglica*”, while the model parameters are chosen based on “*Spartina Alterniflora*”. Albeit the exploratory nature of the model, I think it is still good to use common parameters based on *Anglica*, which would be more convincing.

Page 11 Line 8. The format of citation Leuven et al. is not right, put names outside of ().

Page 14 Figure 4. Not clear the label of the y-axis in the left two panels. Page 19 Line 6-8. I do not think this introduction is very useful, not sure if it is better to delete this and use some sub-sections, so that the Discussion section is clearer.

C2

Discussion section in general. Although the comparison with natural systems is not perfect, I particularly enjoyed reading this part. It would be nice if the authors expand the model limitations and further research by pointing out the potential effects of missing processes e.g. waves, salinity, biochemistry etc, so that the deviation from natural systems can be better explained.

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