

## ***Interactive comment on “Drainage of soft cohesive sediment with and without *Phragmites australis* as an ecological engineer” by Rémon M. Saaltink et al.***

### **Anonymous Referee #1**

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The manuscript presents a study to explore the use of vegetation to increase drainage with a possible effect on soil consolidation. The experimental results show that *Phragmites australis* affected pore water pressures via root water uptake, thus possibly affecting the process of drainage and consolidation.

Although the study might be interesting for the readers of HESS, I found that there are several shortcomings that, at the moment, make the manuscript unsuitable for publication in HESS.

My main concerns are:

- The presentation of the experiment and the results is not very clear. This makes it

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sometime difficult to interpret results.

- It looks like parts of the results rely on data from one non-vegetated and one vegetated column (Experiment 2). Having only data from a single column in each treatment makes the result weak; a repetition of the experiment with multiple columns as done for Experiment 1 would have strengthened the results considerably.

I have listed below specific comments as they appeared in the text.

- Page 3, lines 8-18: from the description of the experiment and Figure 1 it was not very clear to me how the drainage pipe works and how it maintains a constant water table level. It is said that Figure 1 presents a sketch of the setup, but it really does not.

- P4, L22: the cited work is not in the reference list (perhaps the year is just missing in the reference list). Check all the references.

-P4, L35-38: this needs to be justified. Because it was not clear to me how the drainage pipe works, this statement was not clear as well.

- P5, subsection 2.3: the title of this subsection is the same as subsection 2.2. It is not clear why photosynthetic parameters are reported here and in Table 2. They do not seem to add any information to the study.

- P6: check the sequence of figures. Figure 3 is discussed before Figure 2b and Figure 8 is discussed here before Figure 4.

- P6, L2-3: the value of root biomass seems different from Table 1.

- Table 3: check the units of the variables. Those for the roots do not seem correct. For example, root area should be in  $\text{cm}^2$ .

- Figure 2a: why is root surface area per unit of leaf area reported here? The leaf area in different days is constant across the sediment height; perhaps it would be better to show just the root length or root area profile.

- Figure 2b: this panel seems unrelated to panel 2a. Perhaps, it would be better to have this as a panel a for Figure 3, while the current Figure 3 could be panel b for the same figure. What are the points in Fig. 3b? It would be good to differentiate between Experiment 1 and 2 (use different symbols), and explain what the points are and the time when they were estimated.

- Figures 4-8: as I understand, these figures refer to Experiment 2, with a single vegetated and a single non-vegetated column. Having only one column per treatment is not really informative, because results could just be associated with that individual experiment. I believe this is really a big limitation for the study and it makes it difficult to publish these data in a journal like HESS.

- Figure 4: the pressures shown here are relative to a reference water column. It would be good to report here the actual pore pressure instead of the relative pore pressure. As I understand, the column is completely filled with water up to 77 cm. Therefore, the pore water pressure should be positive along most of the column (apart from the top). Indicating pore pressure in the axis and having negative pressures suggests that the column became unsaturated in some parts over the vertical depth. This was rather confusing.

- Figure 5: there are more labels in the legend (every 10 cm from 0 to 80 cm) than curves. Also, the labels are different from what reported in the text and in Figure S4. Fig. 5 b reports relative pore pressures up to -5 kPa, while in Fig. 4 the pressure did not go below -2 kPa. This is not clear.

- Figure 7: panels a and b should be switch to have the same sequence (i.e., control and vegetated) as in previous figures. Also, looking at Figure S6, it is not really clear how differences in hydraulic conductivity were determined, since they appear to be roughly the same in the two treatments.

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