#Reviewer 1

The manuscript by Zhang and Nepf provides an overview of the results of laboratory experiments on the effect of the vegetation typical of salt marshes on the attenuation of waves and currents. The results reported are from several experiments conducted in recent years and already published in the recent 2021 and 2022 papers, but results of new, never before published experiments are also reported.

I believe that the data produced and the experiments conducted are of excellent quality and that the importance of this dataset is of absolute value to the international scientific community. The impact of vegetation on coastal dynamics is a key issue from both engineering and ecological perspective. However, I believe that the manuscript needs to be revised, especially with regard to some technical aspects of both the paper and the dataset. These changes are necessary to bring the work more in line with the ESSD policy and to make it more usable for the international scientific community.

Reply

The authors thank the reviewer for their recognition of the value of our work and we appreciate the comments that improved the usability of the data. We have modified the manuscript following each comment. The changes in the manuscript were referenced by the relevant line number. In terms of the dataset, we've generated a netcdf metadata file, named SMCW.nc, which was added to the original dataset at the original link. The specification of the additional netcdf metadata file was described in a the read.pdf file, which was also included in the original link.

Specifically, I propose the following changes:

In the introduction, in line 97, the authors mention *Spartina alterniflora*, which is used as a model plant because it is a typical species of salt marshes. I think it is necessary to add to this by emphasing the distribution and importance of this species in global salt marshes. In this way, the experiments can clearly take on global significance.

Reply

The suggestion to add information about the distribution of *Spartina alterniflora* is a good point. We have added the following, "The *Spartina spp*. family is distributed widely along the coasts of the Eastern United States, Europe, South America, and China (see the global distribution in figure 1B in Borges et al., 2021)" in **line 103**.

From line 100 to the end of the introduction, the details of the experiments are given, but I think that in this section it is necessary to talk only about the general aspects (only the total number of experiments and the two main categories of experiments - IE and ME, living plants and models) and move the rest of the description to the first section on the method (2).

Reply

Thanks for this suggestion. We have moved the lines originally starting after 102 to the methods section, beginning after the first sentence of this section.

In sections 2.1 and 2.2, the detailed description of the experiments is too difficult to follow in this way. I think it would be better to create a table (similar to the tables in the readme.pdf document in the web repository) describing each test case to make the text clearer, more concise and easier to follow.

Reply

This is a good point. We have added tables summarizing all the cases in the main text in Table 1 and Table 2. The description of the tables is given in **Line 164** and **Line 206**.

In line 135, the quote refers to Zhang and Nepf, 2021 a or b?

Reply

That is Zhang and Nepf, 2021b. Thanks for pointing out the missing information.

Line 157 better specifies which are the seven tested wave amplitudes

Reply

The wave heights are now shown in table 1 and stated in **Line 166** "a_w ranging from 0.9 to 4.9 cm".

In line 159 the authors mention 28 new, unreported cases. In my opinion, the authors should emphasise in the paper what these cases are and what new and never before published results they have obtained. Indeed, it is difficult to understand in the paper whether there are differences between the results of these new cases compared to the already published cases, or otherwise specify their contribution to the results.

Reply

We apologize for not being clearer about the new data added. There are 23 new cases (28 was a typo), including 6 model plant cases and 17 live plant tests. These cases were indicated with **bold font case names** in Table 1. The added conditions are now described in **Line 173** "The new live plant tests included emergent conditions which can be used to explore the plant drag dependence on the degree of submergence. The new model plant cases included a stronger wave condition ($a_w = 4.7$ cm) and 5 conditions within the published range of wave height. These new cases expanded the range of published flow conditions".

A key issue is the accessibility, reusability and interoperability of the dataset in its current format.

Apart from the videos of the Flume experiments, which I think are perfect in this form, the data results in *,mat cannot be made accessible without Matlab, and this is an important limitation for three key points of the FAIR principle.

The accessibility, reusability and interoperability of the dataset as currently not guaranteed.

In my opinion, the NetCDF file with metadata is the best format for organising and distributing data, as it ensures accessibility and interoperability and is an internationally recognised format. In addition, the accompanying metadata enables the best understanding of the data contained, which ensures reusability. Authors can follow a generic file structure categorised into General Attributes, Dimensions, Variables and Attribute Variables.

This format is particularly used in oceanographic data archives, for which there are known standards (Es Oceansite and SeaDataNet) to standardise data archives worldwide.

Even though it is laboratory data, it is data that provides important information related to oceanography and coastal dynamics. Therefore, I think it is appropriate

to refer to a common format along the lines of the formats mentioned above, where variables and datasets are accompanied by appropriate metadata in which we specify for each variable: where, when, how (sampling method, instrument types, type of experiment, test case), who, what (details of processing applied, algorithms used to calculate derived parameters).

I have not found any reference examples for this type of data, but authors can generally follow one of the most common reference formats for the creation of NETCDF files and adapt them to this data by providing the necessary information useful for a better conformity of the data with the FAIR principles.

An example of the structure of a NETCDF file can be found in the attached file

Reply

The authors appreciate the reviewer's perspective on the limits of the previous data format. We had prepared the data following a previous publication in ESSD (Hu et al. 2021), which used the .mat format. We have now added a NETCDF file, named SMCW.nc, to the original link, as recommended by the reviewer. We also added instructions about the SMCW.nc to the readme.pdf file. We kept the .mat file format, because we think that many researchers in our field (Hu et al. for example) are more familiar with the .mat file. This file format can also be read by the open-access Python programming language.

In accordance, specification was added to the Data availability section “To enhance the accessibility of the data, we prepared the data in two formats, i.e., the SMCW.mat file and the SMCW.nc file, both of which were included in the Figshare link. The SMCW.mat can be directly imported into MATLAB and Python. The SMCW.nc file is a NetCDF file with metadata that can be accessed by C, C++, Fortran, Python as well as Matlab.”

Although it may sounds easy, saving all data to a NETCDF file took a very long time because the authors were not familiar with this type of file before. We hope it is worth the effort.

Hu, Z., Lian, S., Wei, H., Li, Y., Stive, M., Suzuki, T., 2021. Laboratory data on wave propagation through vegetation with following and opposing currents. Earth Syst. Sci. Data 13, 4987–4999. https://doi.org/10.5194/essd-13-4987-2021

#Reviewer 2

General comments:

This paper presents a valuable dataset comprising forces, plant motions, free surface elevation, velocity profiles, and kinetic energy measured during laboratory experiments involving waves, following currents, and flexible vegetation. This dataset serves as a valuable resource for validating numerical plant dynamic models and gaining insights into the mutual effects between vegetation reconfiguration and wave / flow dynamics.

Reply

The authors thank the reviewer for acknowledging the value of our paper and data.

Specific comments:

1. This study emphasizes the significant contribution of leaves to the plant resistance and, consequently, the wave energy dissipation. It is crucial to note, however, that this assertion holds true when the leaves exhibit a certain level of rigidity, as indicated by the Young's modulus in Figure 2. Zhu et al. (2023) highlighted that the contribution of leaves to wave damping is influenced by leaf-related parameters, including the population density and leaf rigidity. Given the considerable spatial variability in leaf rigidity, even within the same species (i.e., Spartina alterniflora), it is necessary for the authors to acknowledge the potential restrictions associated with this statement.

(Reference: Ling Zhu, Qin Chen, Yan Ding, Navid Jafari, Hongqing Wang, Bradley D. Johnson, 2023. Towards a unified drag coefficient formula for quantifying wave energy reduction by salt marshes, Coastal Engineering, 180, 104256.)

Reply

Thanks for recommending this relavant publication. Yes, the contribution of leaves depends on the leaf rigidity, geometrical properties, and the number of leaves per bed area. We agree that these parameters could vary significantly in the field, and we agree with the recommendation of Zhu et al (2023) that these parameters should be measured in future field studies. We have addressed these points in **Line 63** "the rigidity and geometrical properties as well as the density of the leaves and stem affect the drag and hence the wave dissipation by the plants (Zhu et al., 2023)" and **Line 72** "The plant rigidity, morphology, and spatial distribution vary significantly in the field, which makes the estimation of plant drag and wave dissipation difficult in practice. Fortunately, average values of plant properties have been shown to produce reasonable estimation for field measurements of wave dissipation (Zhang and Nepf, 2021b; Zhang et al., 2022, 2021; Zhu et al., 2023)"

2. The vegetation motion videos are valuable. What is the size of red box in the background of videos? Knowing the size of red boxes can help readers to understand the magnitude of deflection.

Reply

Thanks for pointing out the missing information. The distance between the two red lines are 10 or 5 cm. To give a more detailed scale for the videos, we now added the videos shot with a ruler next to each model plant in the video link (https://doi.org/10.6084/m9.figshare.24117324). Note that the videos with a ruler were shot with the same window as the corresponding model plant. This additional information was added in **Line 521**.

3. Line 310-311: it is not straightforward to draw the conclusion of "sheltering and interaction among the leaves and stem decreased the force exerted on the full plant compared to the leaves and stem" from Fig. 6a.

Reply

To make a clearer connection, we modified the sentence in **Line 328** to "The force measurements suggested that the force on the full plant was smaller than the sum of forces on all the leaves and stem acting alone, suggesting that sheltering and interaction among the leaves and stem decreased the force exerted on the full plant compared to the leaves and stem in isolation (Fig. 6a)".

4. Fig. 6a: model and stem use very similar symbols, making them hard to distinguish.

Reply

We apologize for the choice of symbols. We modified Fig. 6 so that it is clear.