

ESURFD-2019-39 (Lazarus, Davenport & Matias)

Preliminary Reply to R1 (Ratliff)

Reviewer comments in *italics*; authors' preliminary reply in **bold**.

I found the similarities in scaling relationships between the experimental and natural washover deposits remarkable, especially given the simplicity of the experimental setup relative to the natural setting (e.g., lack of dunes, vegetation, back-barrier marsh, etc). Although these findings are discussed, I did feel like the somewhat lengthy and more general discussion of scaling laws in the Implications section, albeit interesting, diluted what could be a more impactful presentation of the study's experimental and comparative results. Perhaps some of this information is better suited in the Introduction, or including a conclusions section that more explicitly addresses the work presented here, would better highlight the manuscript's scientific contribution.

We can certainly make adjustments across the Introduction, Implications, and possible Conclusions sections to achieve, as R1 describes, a more impactful presentation of the study' findings.

II. 17-19: Last sentence of abstract – the importance of initial conditions does not appear to be a focus of the manuscript

Noted. We can reinforce this point (which is part of why the results are interesting) in the Introduction and elsewhere, in keeping with R1's overarching comment above.

I. 79: Does this mean that the barrier width varied alongshore or between trials?

We will amend. The barrier width did not vary alongshore; for the trials presented, the stated range is unnecessary.

Section 2.2: Some more general information about the Ria Formosa barrier system (e.g., average dimensions, how densely vegetated, average overwash/inundation frequency) would be useful for comparison with the experimental washover setup.

Noted. We can expand this description of the field site. (In general, the Ria Formosa system bears no direct relationship to the experimental set-up, aside from both being sandy barriers.)

II. 142-144: These two sentences are generally true, but there are also marked gaps between washover deposits that persist over the course of the experiments, particularly in trial 2 (Fig. 4c). Can you address why this irregular spacing can also be seemingly stable over time? And could this partly be the cause of differences between the trials' dynamic allometry, seen in Fig. 4a?

We will clarify with further explanation. The large gaps alongshore have to do with competition for flow capture. In that trial, the throats were able to accommodate all of the inundation flow, obviating the need for further breaches. Deeper inundation could have overwhelmed the pattern. The pattern presented in Fig. 4c was stable under those conditions.

II. 156-158: Couldn't allogenic factors also affect washover deposit morphology over the time scales of multiple decades, e.g., relative sea-level rise, erosion of the back- barrier marsh, changing sediment supply, etc.?

Absolutely. We will revise to clarify this point (which is one of the roles vegetation plays, for example).

II. 226-227: Sentence needs rewording

Noted – will revise.

II. 234-236: This excerpt from Perron and Fagherazzi (2012) is referencing different landscape features tending towards equilibrium states, i.e., comparing a drainage divide vs. valley arrangement. Here, only one landscape feature (washover) is being considered, and although these features are in different stages towards equilibrium, the comparison is not entirely clear since it is one type of feature.

We will revise to clarify that these sorts of features are effectively the downstream result of the kind of divide described (in various works) by Perron and colleagues. Imagine valleys draining into a basin (e.g., Death Valley), where their alluvial fans can interact. This system is analogous, as the depositional mirror-image of the erosional example.

I. 281: suggest replacing “to” with “we”

Noted – will revise.

Fig 4: reference to Fig. 2b in caption seems incorrect

Noted – will revise.