

Interactive comment on “Vegetation controls on maximum coastal foredune “hummockiness” and annealing time” by Evan B. Goldstein et al.

Anonymous Referee #2

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The authors build upon their previously developed numerical ecomorphodynamic models, to demonstrate some of the factors controlling the hummockiness of a foredune, at the absence of external forcing. This is a good paper, and it would be very interesting to see the model compared to field and remote sensing observations of foredunes, so as to provide some validation to the model.

Following are some more detailed comments:

The term “annealing” may be mistakenly interpreted as if a foredune is annealed and washed by waves, whereas the authors mean that the hummockiness is annealed, not the foredune. I suggest that the authors use a different term throughout the paper.

Add a table showing all variables, abbreviations and their meaning, to make it easier for the readers to follow the equations which are developed

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p. 2. l. 21: Continuous dune ridges may also become less continuous and hummocky with time, see: Levin, N., Tsoar, H., Herrmann, H. J., Maia, L. P., & Claudino-Sales, V. (2009). Modelling the formation of residual dune ridges behind barchan dunes in North-East Brazil. *Sedimentology*, 56(6), 1623-1641.

p.4 l. 12-13: Is it a reasonable assumption, that plants establish “only by lateral propagation”?

Figures 4, 5: State in the figure captions what does H_v represent.

Discussion: While hummocky foredunes may indeed anneal to form continuous foredunes at their early life stages, later on, foredunes often “lose” their continuous form, as large shrubs and trees start to develop, and additional process of erosion take place. See Figure 8 in Levin, N., Jablon, P. E., Phinn, S., & Collins, K. (2017). Coastal dune activity and foredune formation on Moreton Island, Australia, 1944–2015. *Aeolian Research*, 25, 107-121. I also refer the authors to Castellte et al. (2017), who show that following a storm, foredune vegetation recovery time may be much longer than sand volume recovery time: Castelle, B., Bujan, S., Ferreira, S., & Dodet, G. (2017). Fore-dune morphological changes and beach recovery from the extreme 2013/2014 winter at a high-energy sandy coast. *Marine Geology*, 385, 41-55.

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