# Author comments are in BOLD ESurfD Manuscript text is in *italics* Added Text is in *Bold Italics*

A flurry of recent foredune papers was published since our discussion paper was put online, and we have added in text citations and references for several of them. In addition we were alerted to several other papers by emails from colleagues and fellow researchers (after they had seen our discussion paper) — one benefit of the 'Open Review' process.

## Below are the additions:

## In the Introduction, page 2; line 13-16:

"Geological and geomorphic templates have also been used to explain variability in dune height. Low areas without dunes can remain low because of shell or coarse-grained lags, a high water table that causes plant stress, and/or climatic conditions such as cold temperatures prohibiting plant growth (e.g., Mountney and Russell, 2006; 2009; Wolner et al., 2012; **Ruz and Hesp, 2014; Ruz et al., 2017a).**"

## In the Discussion, Page 8 line 6-16:

"In addition to storms, other factors such as a high water table, low sediment supply, grain size variability, development of shell lag, and climatic conditions may also result in suppression of the coalescing of coastal foredunes (Mountney and Russell, 2006; 2009; Wolner et al., 2012; Hoonhout and de Vries, 2016; **Ruz and Hesp, 2014; Ruz et al., 2017a**). Feedbacks between the wind, dune vegetation and sediment transport that are specific to hummocky dunes may also alter the rates of coalescing (Barrineau and Ellis, 2013; Gilles et al., 2014), such as the development of high wind velocity regions located adjacent to hummocky dune forms (Hesp and Smyth, 2017). Work here does not address observations of older foredune ridges that lose their continuous morphology as a result of plant succession, erosion via rain and flow in rivulets, or trampling (Levin et al 2009; 2017). Additionally the potential for lag between 'fast' cross-shore beach recovery time vs. slower cross-shore vegetation recovery time (e.g., Castelle et al 2016; Keijsers et al., 2016; Ruz et al., 2017b) could introduce novel dynamics that are not explored in this work."

## Page 8 Line 20-24:

"A warming climate might lead to further northward expansion of U. paniculata, which is currently restricted in northward extent by temperature (Seneca, 1972; Godfrey, 1977)—northern expansion of the range has already been observed (Zinnert et al., 2011; Stalter and Lamont, 1990; 2000) and is being sought in selective breeding trials (USDA, 2013). Additionally, glasshouse experiments have reported that A. breviligulata is negatively impacted by competition with U. paniculata (Harris et al. 2017; Brown et al., 2017)." Page 8; line 31-35:

"Although beyond the scope of this effort, observational work aimed at assessing the relationships among storm frequency/magnitude, species composition of dune-building vegetation and dune development (e.g., van Puijenbroek et al., 2017a; 2017b) will be useful in addressing the future implications of model results presented here as climate change is anticipated to alter each of these factors. "

We also noticed an error in two of our equations: two Heaviside functions terms were inadvertently shown as 'max' functions, this has been fixed:

### Page 3 line 26 - Page 4, line 8

"The intrinsic growth rate  $(G_0)$  is assumed to increase with the deposition rate  $\max(\frac{dh}{dt}, 0)$  and to vanish near to the shoreline  $(x < L_{veg})$ , where x is the distance to the shoreline). This is represented by a Heaviside function ( $\Theta$ ) that is unity when distance to the shoreline is sufficient for plant growth  $((x - L_{veg}) > 0)$ , and 0 otherwise:

$$G_0 = H_v^{-1} max \left(\frac{dh}{dt}, 0\right) \boldsymbol{\Theta}(x - L_{veg}),$$
(2)

The lateral vegetation propagation rate *C* is also assumed to increase with the deposition rate and to vanish for steep slopes  $(\tan \theta_c < |\nabla h|;$  where  $\theta_c$  is 15 degrees and is based on field observations from Moore et al., (2016). This is represented by a Heaviside function ( $\Theta$ ) that is unity when the slope of the land surface is not beyond a threshold  $((\tan \theta_c - |\nabla h|) > 0)$  and 0 otherwise:

$$C = \beta \max\left(\frac{dh}{dt}, 0\right) \boldsymbol{\Theta}(\tan \theta_c - |\nabla h|)$$