

Spreading of grains during barchan-barchan collisions

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Barchans are crescent-shaped dunes found on deserts, under water, and even on other celestial bodies, and they are commonly grouped in barchan fields. Within those fields, we observe corridors of size-selected barchans whose sizes are regulated by barchan-barchan collisions (Durán et al., 2009; Génois et al., 2013; Hersen and Douady, 2005). In a previous work (Assis and Franklin, 2020), we performed exhaustive experiments on barchan-barchan interactions and found five interaction patterns (including collisions). Now, we investigate the spreading of grains of an impacting barchan over the downstream one for two collision patterns at both the dune and grain scales. We find two stages for the spreading: a first one where the impacting barchan is stretched and becomes a longitudinal stripe, and a second one where the stripe widens slowly along time. For the second stage, we follow grains originally in the impacting barchan and show that they move over the target dune with an erratic component transverse to the flow direction, the transverse velocities scaling with the front velocity of the stripe. We propose a diffusion-like mechanism for the spreading, for which we find a diffusion length l_d .



Figure 1: Spreading of grains from an impacting barchan over the target one during the first stage of the diffusion-like mechanism (Assis and Franklin, submitted).

References

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