

Abstract Submitted
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Wind-transport of barchan dunes in modulated gravity DANIEL SNOUCK, WILLEM VAN DE WATER, Eindhoven University of Technology, the Netherlands — Barchan dunes can be found in sand barren regions under steady wind conditions. They translate in the direction of the wind while their shape remains unchanged. They have a minimal length in the order of ten meters, which renders laboratory experiments almost impossible. The length scale is set by the details of the sand-wind interaction. Smaller dunes do not evolve into the typical barchan dune shape. Our experimental approach produces dramatically scaled down barchan dunes. The idea is to modulate gravity by vertical oscillation of the sand bed. We produce small dunes that travel in the turbulent boundary layer of an open windtunnel. Particle image velocimetry on the surface of moving dunes reveals the flux of creeping sand, while measurement of sand grains flying through the air quantifies the key mechanism that moves sand by wind: saltation. While the amount of sand flying with the flow does not vary strongly in an oscillation cycle, the sand creeping over the dune surface is only in motion when the effective gravity is smaller than g . Thus, modulation of gravity provides a unique view on sand transport in wind. Saltation is an activation process, and we demonstrate the importance of turbulence.

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