

## Bedform dynamics: interaction, attraction and repulsion of dunes

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Bedforms are fascinating and captivating self-organising patterns; from wind-blown dunes on Earth and other planets to regular ripple patterns on riverbeds or coastal beaches. Loose sediment reorganizes when the aeolian (wind-driven) or aqueous (fluid-driven) forcing exceeds a critical value for mobilization of grains. The resulting sediment ripples can coarsen into larger-scale dunes. The migration speed of individual dunes depends inversely on their dimensions: the larger the dune, the slower it migrates.

Here, we present a unique, recirculating, laboratory experiment in which we create and trace aqueous dunes over long times. We examine the interaction between two dunes of different sizes, and present a phase space diagram with outcomes of the resulting interaction. Furthermore, we explore the feedback mechanism between a bedform and the flow providing the forcing, and identify a repulsion mechanism that ensures that bedforms do not coarsen without limit.

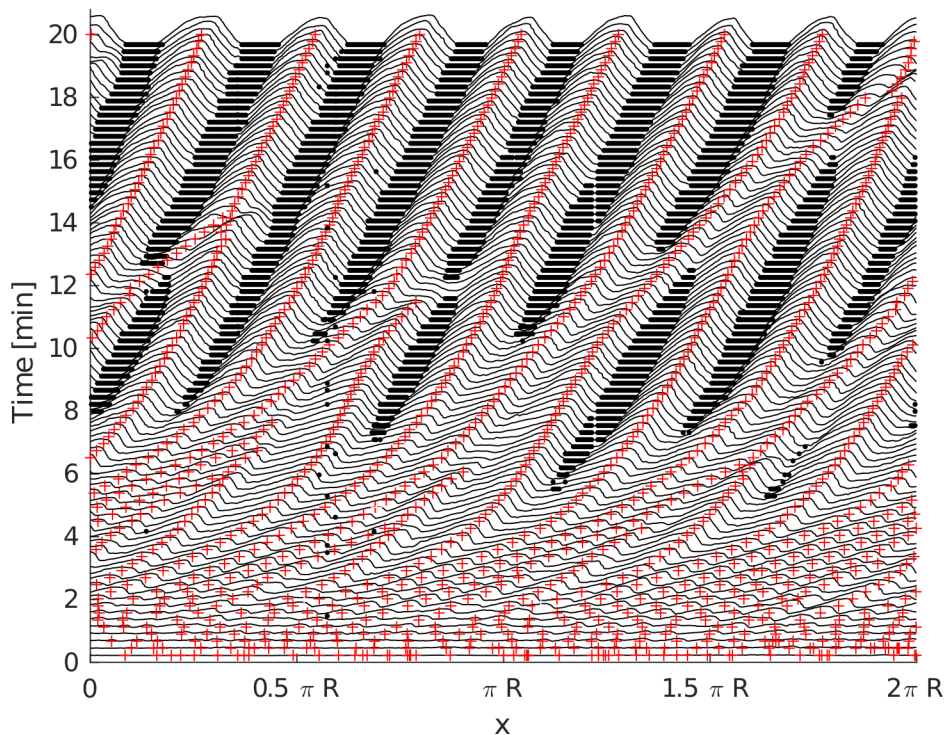


Figure 1: Experimental data of bedform coarsening from a flat layer of sediment.