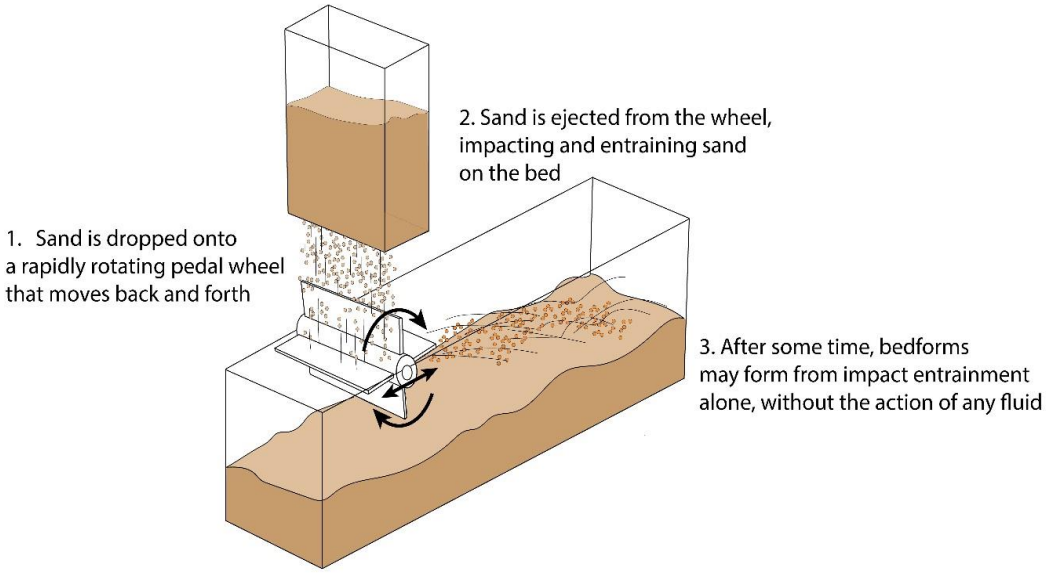
Bedforms without a fluid

Department: Physical Geography
Research Group: Water Climate and Future Deltas
Supervisor: Dr. Daan Beelen
Email address: d.beelen@uu.nl

Project description

Bedforms such as ripples and dunes are ubiquitous in almost every sedimentary environment. Despite extensive studies on these formations, questions remain regarding their genesis. Most theories on bedform formation focus on the interplay between fluids (air or water) and sediment. However, recent research on sediment entrainment has demonstrated that grain-to-grain interactions play a dominant role in sediment motion in most systems, despite not directly requiring any fluid. Moreover, geometric bedform theory posits that the geometric qualities of sediment can cause a sediment-covered bed to tilt, resulting in bedform development without necessitating interactions with fluids.

This leads to a critical question: can bedforms form without any fluid? In this pioneering experiment, we aim to test this hypothesis by launching sediment grains onto a sediment-covered bed. This approach will entrain resting sediments, and by moving the grain launcher back and forth across the bed, we may achieve homogeneous sediment entrainment without the need for a fluid. We hypothesize that this consistent and homogeneous entrainment could lead to the formation of ripples over time.
In this project, the student/employee will design, build and run an experiment to test the hypothesis: *bedforms can be formed without a fluid*. The student/employee will document his or her workflow, observations and interpretations. If bedforms are made in the proposed setup, a subsequent test in a vacuum chamber may provide definite proof of the concept.



Job requirements

Completed coursework on sedimentology or related field, proficiency in scientific analysis techniques, strong affinity for tinkering and construction of laboratory setups.