Aeolian Sediment Sorting

MSc Thesis Proposal

Introduction

Much is known about how sandy coasts erode during storm surges. However, coasts also accumulate sand and reinforce themselves in between storms. It is expected that reinforcement of the coast occurs during particular events and from particular source locations. The objective of this proposal is to analyze transport pathways based on sediment sorting patterns and thereby determine the source of Aeolian sediment.

Approach

Measurement data has been collected at the Dutch coast on grain size distributions at the research site around the Sand Motor. Instead of using traditional time-consuming techniques based on physical samples (e.g. sieving, backscatter laser), we used in-situ macro photography to obtain high-resolution data in both time and space on grain size distributions. Small grains are transported more easily than large grains. Therefore the origin of sediment is often coarser than the destination. Due to the high resolution of the data, we will be able to infer transport pathways from the grain size distribution and determine the source of the sediment and how it was transported.

So far the data collection focused on validation of the macro photography technique. New data has still to be collected before and after one or more events. Data collection can be part of the thesis. Alternatively, process-based modeling can be included to simulate the derived transport pathways.

A selection of the following can be part of the research:

- Data collection
- Statistical inference of pathways
- Aeolian model set-up and calibration
- Simulations based on field data
- Determination of source areas
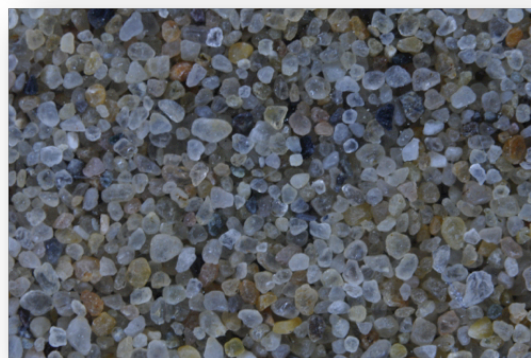
Skills

You can obtain engineering and research skills on data collection, statistical inference and/or schematizing measurement data into a numerical model. Experience with Matlab (or other programming skills) is an advantage, but the willingness to learn these skills should be sufficient.

Project and location

This research is part of the NEMO (Nearshore Monitoring and Modeling) project (http://nemo.citg.tudelft.nl) and can be performed at **Deltares** upon request.

More information

Bas Hoonhout, room CITG-3.95
bas.hoonhout@deltares.nl