Type
PhD research

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Persons involved:
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Deltares

Summary of the research
The swash zone is the part of the beach where waves run up and down the beach. It is a
dynamic region characterized by turbulent flows, strong sediment transport fluxes and
rapid instantaneous bed level changes. The combinations of these factors make this
region difficult to study, both numerically and experimentally.

In this research existing numerical models will be validated and improved. In short, the
models can be categorized into two categories: depth averaged and depth resolved
models. Where depth resolved models can give added insight in depth dependency of
processes (for instance how turbulent structures move from the water surface towards
the bed), depth resolved models benefit from their numerical simplicity and speed. For
both model types, novel sediment pickup and transport formulations will be proposed.
This also includes validating and improving the hydrodynamics of the models.

The end goal is to use these models to improve large scale morphodynamical models
(for instance Delft3D).

Keywords
Swash zone
Numerical modelling
Sediment transport
Coastal morphology