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Onshore migration of an intertidal bar: The TASTI field experiment

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Motivation, the onshore transport of sand during fair weather conditions is essential for beach recovery between storms. Our current knowledge, however, is not sufficient to properly predict the onshore movement of nearshore sandbars using morphological models. We aim to improve our understanding of the morphodynamics during these conditions and more specifically to determine which mechanisms are responsible for the onshore directed sand transport. To this end, the field experiment TASTI (Turbulence And Sand Transport Initiative) was conducted at the beach of Vejers, Denmark in the fall of 2016.

Small transport rigs, measurements of pressure (water depth, wave height), horizontal flow velocites and sand concentrations. These rigs are used to understand sand transport gradients over the intertidal zone.

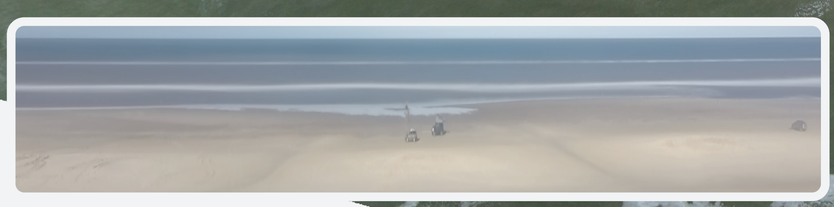
Turbulence and bedform rig, measurements of horizontal and vertical flow velocities (including turbu lence) at three elevations above the bed, vertical stack of 7 sand concentration sensors and a bedform profiler. Focus on effect of breaking-induced turbulence on sand transport.

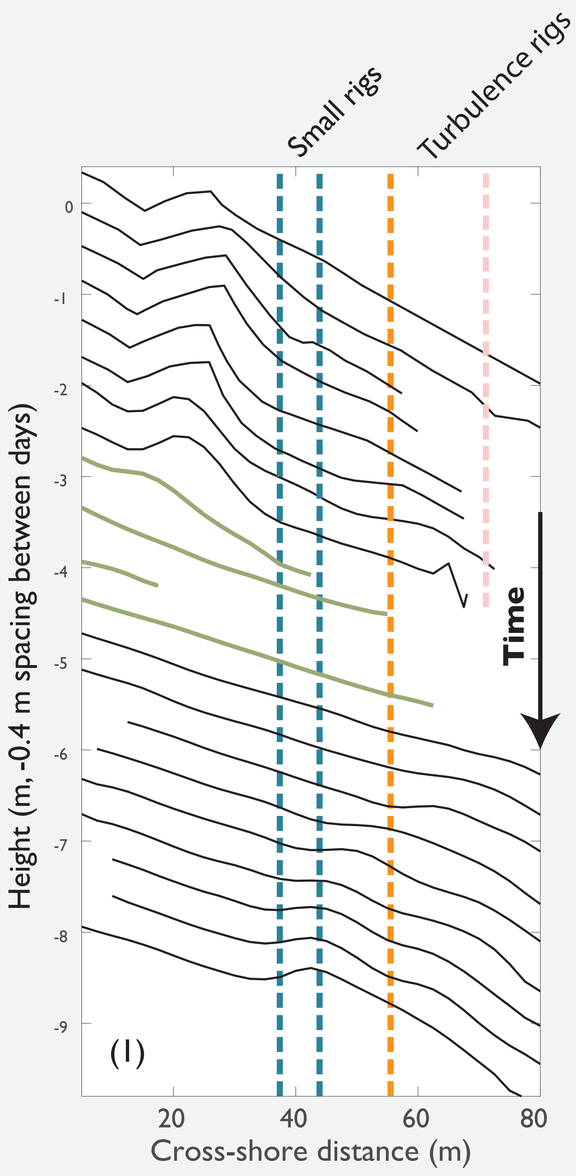
Turbulence and bedform rig, measure ments of horizontal and vertical flow velocities (including turbulence) at three elevations above the bed, 7 sand concentration sensors (5 very close to the bed) and 2 bedform profilers. Focus on effect of breaking-induced and bedform-induced turbulence on sand transport.

Pressure sensors, in a cross- and alongshore array. Focus on wave transformation and dissipation over the intertidal zone and the variability alongshore.

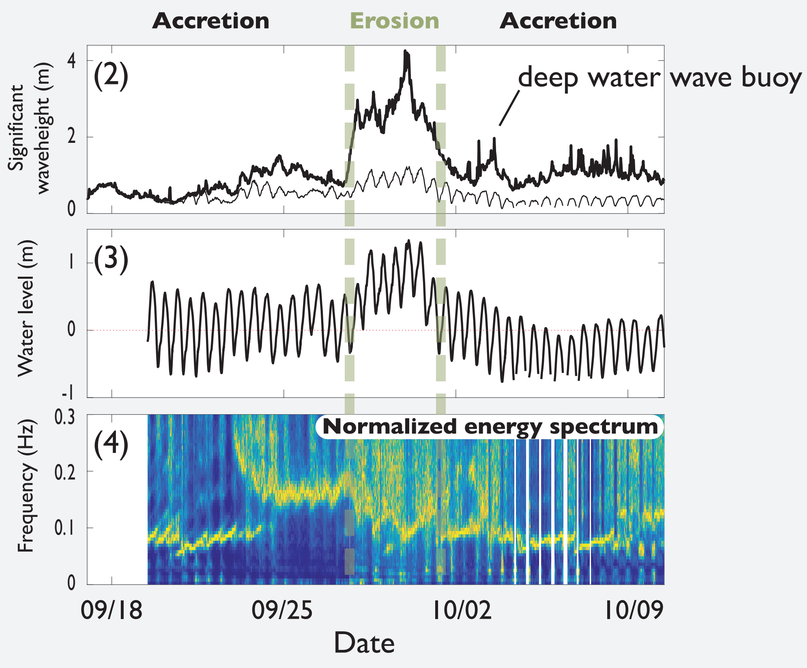
RTK-GPS measurements, daily over a 400 m alongshore area

Timex images with simple GoPro setup for position and alongshore variability of subtidal bars





Hydrodynamics at most offshore positioned pressure sensor



Measurements of hydrodynamics and large and small-scale morphodynamics were collected during two periods with onshore directed migration of the nearshore bar (1). These periods were characterized by low-energetic wave conditions (2), while the intertidal beach profile was completely flattened (1) during a storm, with high waves and water levels (2,3), in between these two periods. Within the accretive periods a large variety of wave conditions was measured; the first period with onshore bar migration comprised both swell waves (4, peak wave period of approx 12 s) and sea waves (approx 7 s), the second period was characterized by swell waves (4) and very shallow water above the crest of the bar (3).

It is anticipated that this dataset will provide a better understanding of the proceses involved in the onshore directed migration of longshore bars.

First results at Coastal Dynamics 2017 in Helsingør!