



Relating climate and sand transport to incipient dune development.

Marinka van Puijenbroek, Juul Limpens, Maurits Gleichman, and Frank Berendse

Nature Conversation and Plant Ecologie Group, Wageningen University, Wageningen, Netherlands
(marinka.vanpuijenbroek@wur.nl)

Sea levels are continuously rising, increasing the risk of flooding and coastal erosion in low-elevation countries, such as the Netherlands. Coastal dunes are seen as a flexible and natural type of coastal defence, that is able to keep pace with rising water levels. Until now most research has focussed on dynamics and maintenance of established dunes, largely ignoring two critical transitions in early dune development: the transition from bare beach to vegetated incipient dune and that from incipient dune to established foredune. This knowledge is essential to enable more accurate prediction and even stimulation of new dune formation through sand nourishment.

We explored the relative contributions of climate and sand transport to incipient dune development combining a 30 year time-series of aerial photographs (1979 – 2010) of the natural Wadden Island coast with high-resolution monitoring data of sand volume changes and climatic parameters.

We selected 20 strips of 2.5 km in length along the coast of the Wadden Islands, with a 2 km buffer between them to avoid autocorrelation. For each of these strips of coast we assessed the changes in presence and area of incipient dunes over periods of 5-6 years. Change in fore dune volume and beach width were derived from high resolution beach elevation data. Seawater level and climate data were derived from a nearby meteorological station

Preliminary analysis of the first half of the dataset showed that incipient dune area was positively related to beach width, but negatively to storm intensity. In our poster we will present the whole dataset and discuss the implications of our results for future dune development and anthropogenic sand nourishment schemes.