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# Aeolian sediment transport characteristics at an artificially scaped beach

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Our understanding of the impact of human actions on top of the natural processes leading to the dynamics of coastal landforms is inadequate. Here, we study the horizontal and vertical variability of Aeolian sediment transport on a managed beach at Mariakerke-Bad, Belgium. Preparing the beach against winter storms, the coastal town orders bulldozers to create an artificial plateau (high beach), thereby removing an excess of sand from the higher beach seawards, making an artificial cliff at a distance 50-60m from the dike. Moreover, a trench is dug at the the toe of the dike to limit Aeolian transport towards the hinterland. A two-hour transport event was measured using a grid of 12 MWAC sand traps. Meteorological conditions were measured at the artificial cliff and in front of the trench with an array of anemometers and a windvane. Wind was approximately onshore with an average wind speed of 9 m/s (measured at a height of 2 m above the surface). A striking result, during this short transport event, is the rapid change in topography on the high beach. An increase in sediment transport was measured over the first half of the high beach (positive gradient, erosion), followed by a decrease in sediment transport towards the dike (negative gradient, deposition) in the downwind direction. Similar results are found for the other array of sand traps 25m further. Surprisingly, calculating the total transport rate by the exponential decay function, q(z) = q0.exp(-B.z), the exponential parameter, B, increases downwind as one moves further of the cliff, meaning that the vertical spreading of sediment transport changes over distance. This can be attributed to the windfield perturbation at the cliff. Furthermore, we measure a drop in shear velocity in the downwind direction, which is confirmed by the observed deposition of sand in the region 30 m in front of the dike.