

1 Field Measurements on Spatial Variations in Aeolian 2 Sediment Availability at the Sand Motor Mega 3 Nourishment

4 Bas Hoonhout^{a,b,*}, Sierd de Vries^a

5 ^a*Delft University of Technology, Faculty of Civil Engineering and Geosciences,*
6 *Department of Hydraulic Engineering, Stevinweg 1, 2628CN Delft, The Netherlands.*

7 ^b*Deltares, Department of Hydraulic Engineering, Boussinesqweg 1, 2629HV Delft, The*
8 *Netherlands.*

9 Abstract

Spatial variations in aeolian sediment transport were measured at the Sand Motor mega nourishment in The Netherlands during a six week field campaign in the fall of 2014. A consistent significant increase in sediment transport in downwind direction (positive gradient) was measured over the intertidal beach area, indicating that the intertidal beach is a primary source of aeolian sediment, despite the high soil moisture contents. A small positive increase in transport in downwind direction was measured over the dry beach, indicating that local aeolian sediment supply was hampered. A consistent decrease in sediment transport in downwind direction (negative gradient) was measured at the transition between intertidal and dry beach, indicating local deposition of sediment. The negative gradients coincide with the berm edge and the onset of a shell pavement. Therefore deposition might be promoted by morphological feedback between a berm and the wind and the entrapment of sediment in the beach armor layer. The local sediment deposits cause the sediment supply to the dunes to be continued even during high water, resulting in a phased process. The influence of the beach armor layer reduces during storm events as the armor layer itself is being mobilized.

10 *Keywords:* aeolian transport; transport gradients; sediment availability;
11 sediment supply; beach armoring; field measurements; nourishments; Sand
12 Motor

*Corresponding author

Email addresses: `b.m.hoonhout@tudelft.nl` (Bas Hoonhout),
`bas.hoonhout@deltares.nl` (Bas Hoonhout)