

STATE OF THE ART OF AEOLIAN AND DUNE RESEARCH ON THE DUTCH AND BELGIAN COAST

A. de Groot¹, S. de Vries², B. Arens³, W. Bodde⁴, W. de Winter⁵, J. Donker⁵, L. Duarte Campos⁶, F. Galiforni Silva⁶, P. Goessen⁷, P. Hage⁵, B. Hoonhout^{2,8}, J. Keijsers¹, A. Montreuil⁹, J. Mulder¹⁰, C. Nolet¹, P. Rauwoens¹¹, M. Riksen, G. Ruessink⁵, M. Smit⁴, Y. Smit⁵, G. Strypsteen¹¹, B. van der Valk⁸, M. van Puijenbroek¹, K. Wijnberg⁶, I. Williams⁶

¹ Wageningen University & Research, alma.degroot@wur.nl, ² Delft University of Technology, ³ Arens Bureau voor Strand- en Duinonderzoek, ⁴ Witteveen + Bos, ⁵ Utrecht University, ⁶ University of Twente, ⁷ Hoogheemraadschap Hollands Noorderkwartier, ⁸ Deltares, ⁹ Vrije Universiteit Brussel, ¹⁰ Mulkust, ¹¹ KU Leuven

Five years ago, at the previous anniversary of the NCK days, an overview was presented of the state of the art of “Measuring and modelling coastal dune development in the Netherlands” (De Groot et al., 2012). At that moment, new coastal-dune research had sprung up in the Netherlands after a relatively quiet period of about two decades, and the individual research projects were just starting to interconnect.

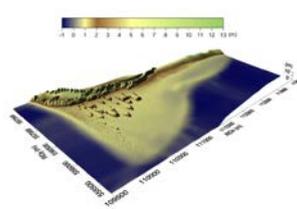
Since then, research has blossomed. A large number of PhD students, postdocs and staff of many institutes are involved, and coastal aeolian processes have become a permanent topic of recent NCK days. Young researchers are meeting a couple of times per year to discuss their work informally, and several PhD theses were defended.

The main current topics are:

- Sediment fluxes between the beach and dunes;
- Formation, erosion, and morphology of embryonic dunes and foredunes;
- Effects of human interventions on dune systems.
- Long-term development of dune systems.

These topics are studied from several angles and with various techniques:

- **Interdisciplinary approach:** the ongoing research takes place on various spatial and temporal scales, and takes both the fundamental and applied approach. Ecology has become an integral part of the studies, and often the studies are embedded in larger projects that consider the broader surroundings, ranging from underwater morphology to societal aspects.
- **Monitoring techniques:** recent developments in laser scanning and drone-based measurements have increased the amount of topographic data that can be gathered. New sand transport sensors are being applied. In addition, the ongoing monitoring programs by Rijkswaterstaat continue to be a vital basis for understanding the coastal system.
- **Field sites:** the number of study sites has increased strongly, so that almost all types of Dutch and Belgian beach-dune systems are being covered. Those include both artificial and natural locations.
- **Numerical models:** applied models range from the simple to the complex and include various model types (CA, process-based, CFD). The newest challenge is to couple models above and under water.



Examples of current Dutch and Belgian dune research.

De Groot, A.V., Vries de, S., Keijsers, J.G.S., Riksen, M.J.P.M., Ye, Q., Poortinga, A., Arens, S.M., Bochev-Van der Burgh, L.M., Wijnberg, K.M., Schretlen, J.L., Thiel de Vries van, J.S.M., 2012. Measuring and modeling coastal dune development in the Netherlands. In: NCK-days 2012 : Crossing borders in coastal research., 13 March 2012 - 16 March 2012, Enschede, the Netherlands.