

Ecological monitoring of Belgian beaches prior to beach nourishment



Vanden Eede Sarah* & Vincx Magda



The Belgian coastline consists mostly of sandy beaches with sea walls in front of the cities and dunes in between. Every kilometer is intensively used and needs protection against coastal erosion and flooding. However, some parts of the coastline do not achieve the required safety level. There has been a growing interest in beach nourishment, a soft coastal defense technique.

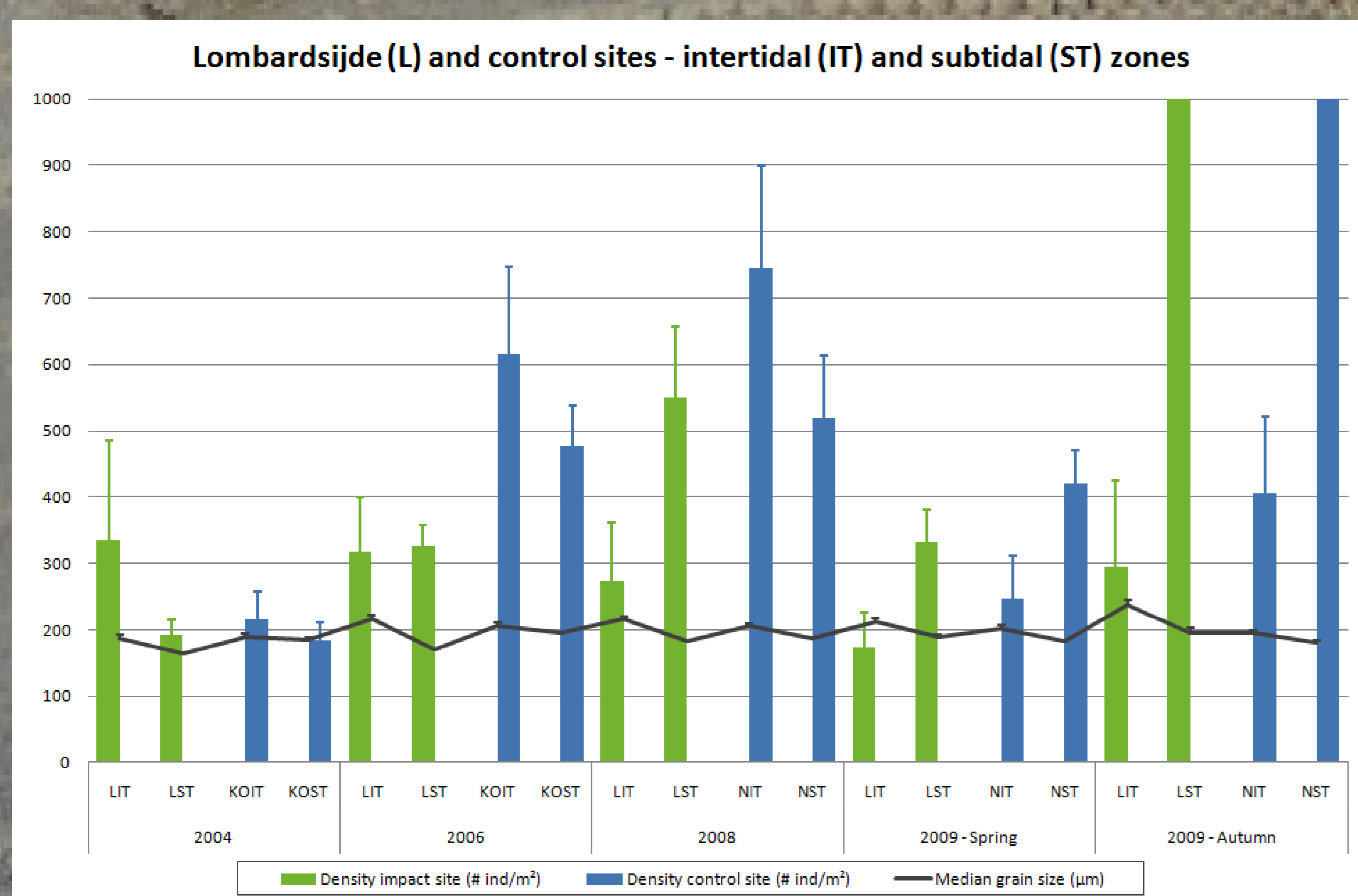
Even though most research has been carried out on the intertidal benthic macrofauna, little is known of long-term effects, recovery after nourishment or the cumulative effects of repeated replenishment at the same site.

A sound knowledge of the environmental status before the influence takes place (t_0 situation) is as indispensable to unravel possible impact effects as a good similarity between the impact and control site. Control sites allow us to distinguish the nourishment effect from natural variation.



Lombardsijde

Nourishment of $\pm 650\,000\text{m}^3$ sand (grain size: $200\text{-}250\mu\text{m}$) over 1200m between March and September 2009 – nourished sand from the new fairway to Ostend

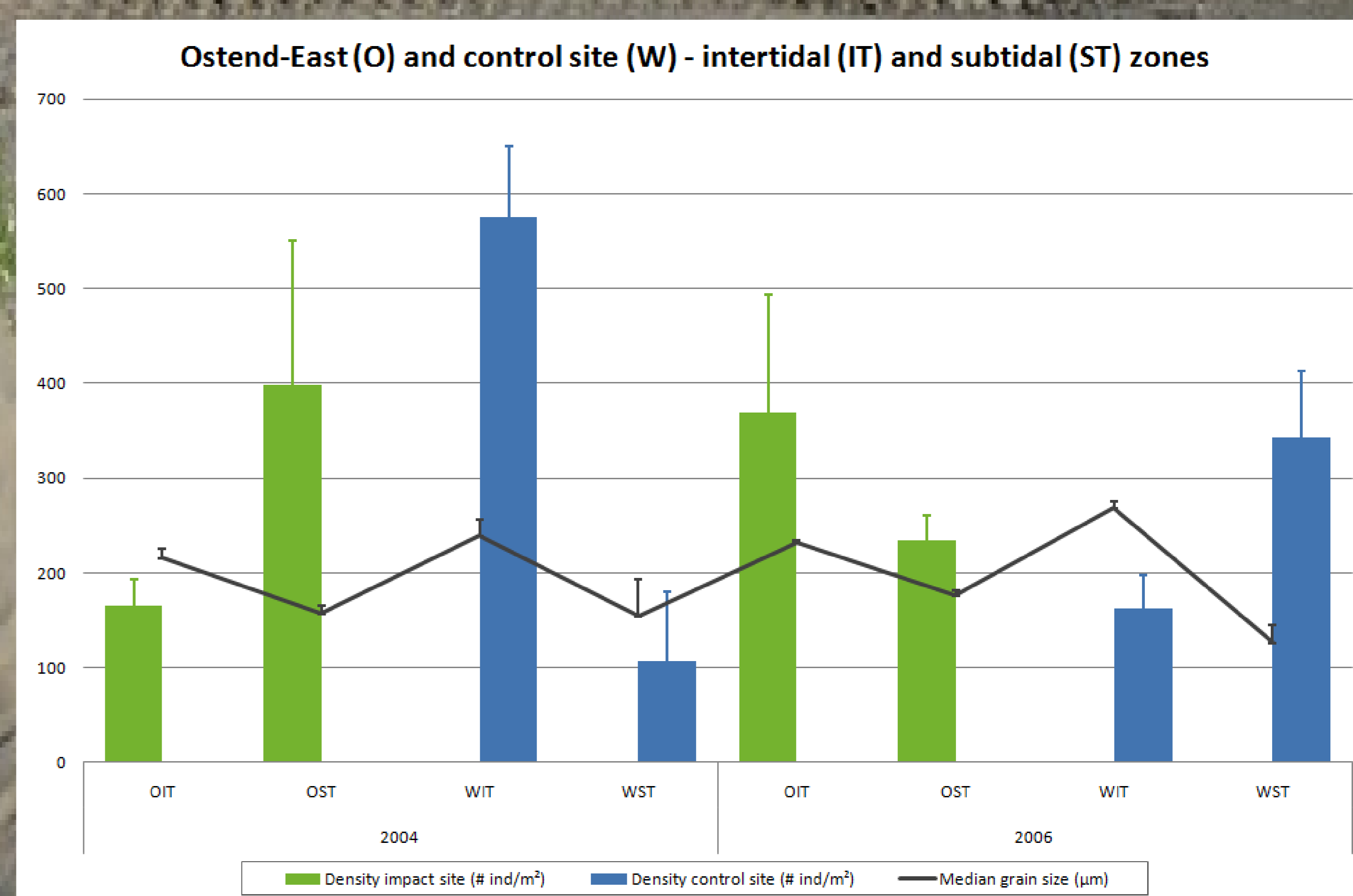


- No significant changes in median grain size (2004-2008). In 2009, the median grain size is higher in Autumn than in Spring.
- Lombardsijde (L) resembles its control sites but Nieuwpoort-Bad (N) is better than Koksijde-Oostduinkerke (KO) due to beach morphology.
- Autumn 2009: high densities in subtidal zones ($> 1000\text{ ind/m}^2$) → juvenile *Ensis* spp.
- All “changes” seem to happen in 2009, when the nourishment takes place

→ no distinct biotic changes between 2006 and 2008
 → t_0 data give good view of original situation (2004-2008)
 → detect some change in macrobenthic communities during nourishment activities (2009)
 → real effects remain to be discovered in future studies (t_1 2010, t_2 2011)

Ostend-East

Harbor structural works will lead to elevated sand transport while the eastern jetty of Ostend turns Ostend-East into a sand trap → natural equivalent of beach nourishment



- The median grain size of Ostend-East increases between 2004 and 2006.
- Ostend-East (O) resembles its control site Wenduine (W) but Bredene Beach will be the future control site due to practical reasons.
- Ostend-East is heavily impacted. It is located next to the elongated eastern jetty of Ostend and there is a dune foot wall where there used to be a natural dune-beach transition. Finding a suitable control site will always be a challenge.

→ t_0 data (2004-2006) give less complete view of original situation (2004-2008) than t_0 data of Lombardsijde
 → monitoring restarted early 2010
 → area and circumstances Ostend-East = Baai van Heist (only Flemish beach reserve) so monitoring Ostend-East → an insight into succession mechanisms of Baai van Heist