

Large and small scale changes in macrobenthic communities in Belgian Offshore wind farms



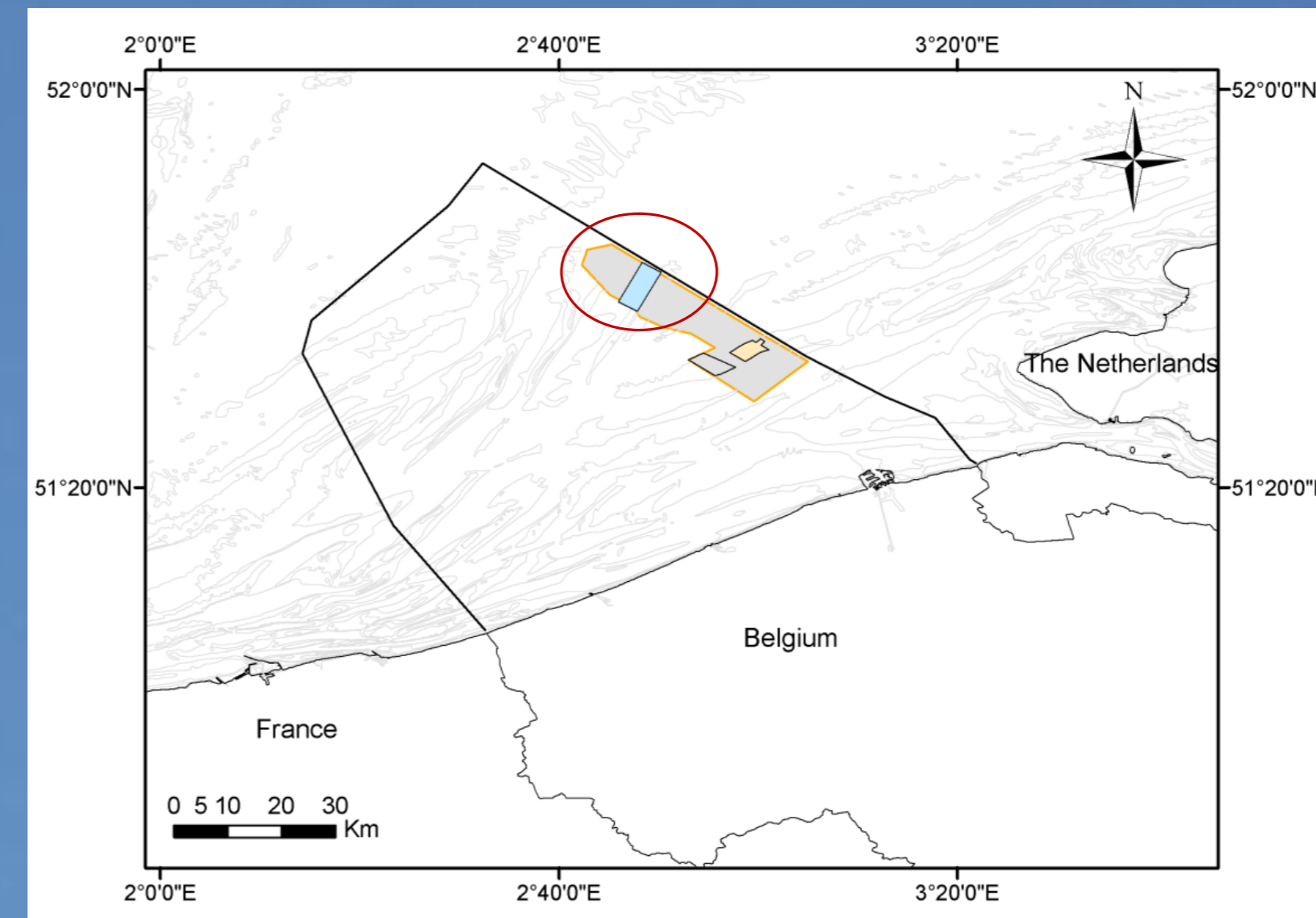
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Introduction & methodology

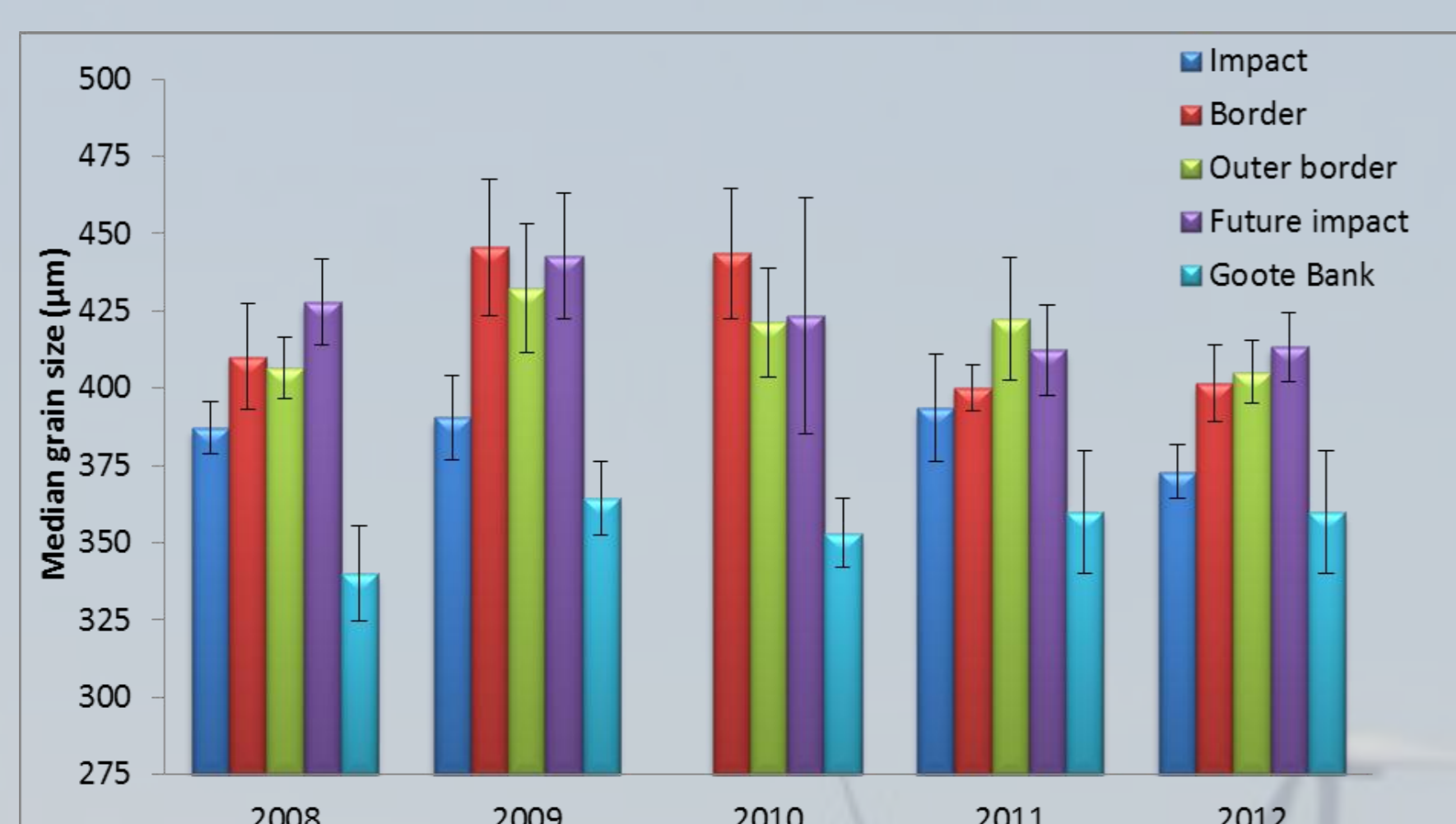
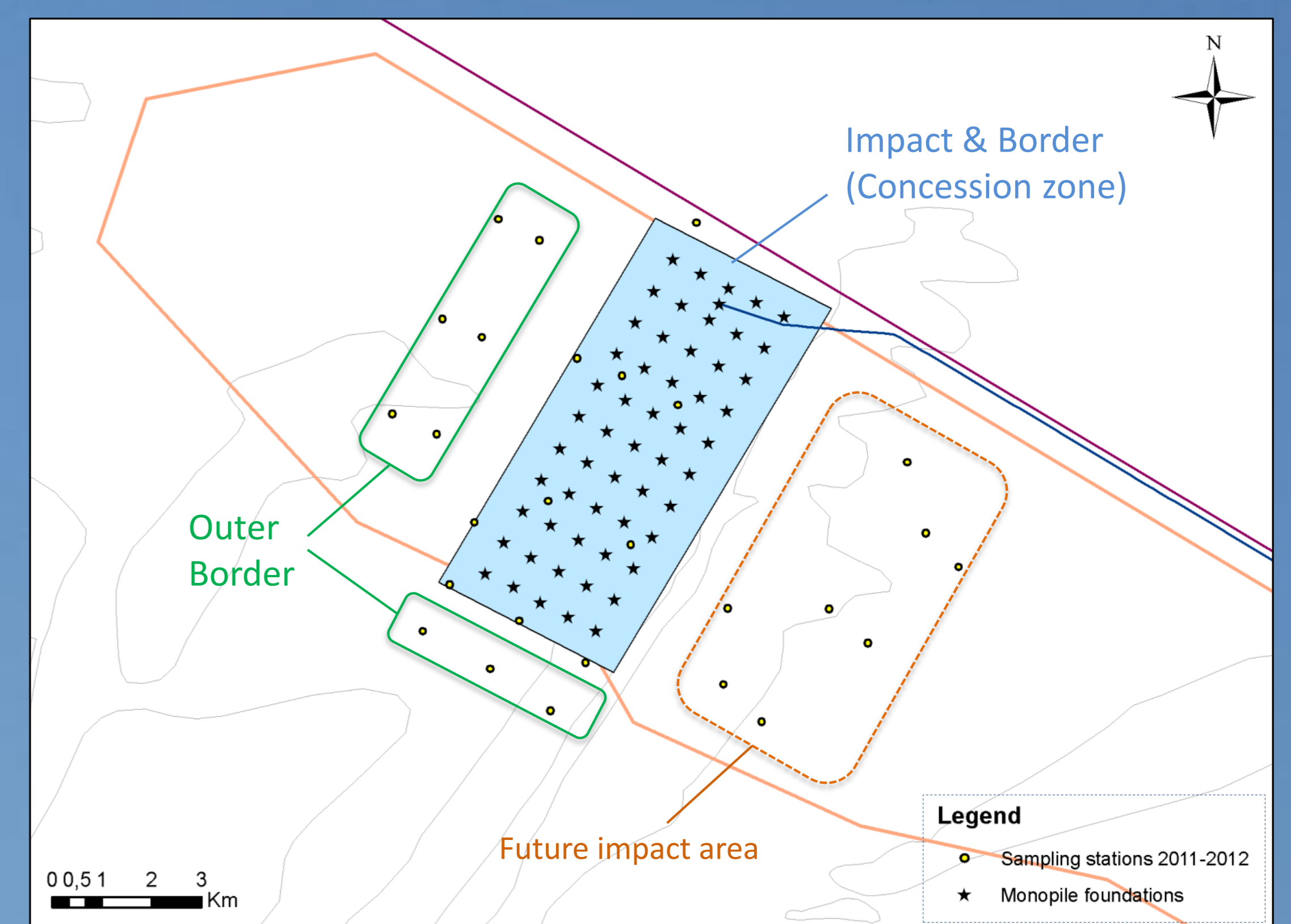
- Up till now only small-scale, operational effects detected in the Thorntonbank OWF → related to changing hydrodynamics and organic enrichment
- Belwind NV completed phase I in 2009 on the Bligh Bank with 55 monopile foundations
 - First macrofaunal samples taken inside Belgian OWF at a large-scale (> 200 m distance from foundations)
 - Fishery exclusion inside concession area (blue area on map) → will this effect the native macrofauna living in the soft sediments?
 - Will there be a higher food availability inside OWF? → detrital flux down to the seabed from the colonised foundations

- BACI-design on Bligh Bank
 - 2008 (Baseline)
 - 2009 (During construction)
 - 2010 - 2012 (after construction → operational effect monitoring)
 - 2011 & 2012 → **4 stations sampled inside impact area**
- Sampled with Van Veen grab
- Monitoring areas
 - Impact area & Border (Concession area, Fishery exclusion)
 - Outer border & Future impact area
 - Reference Goote Bank

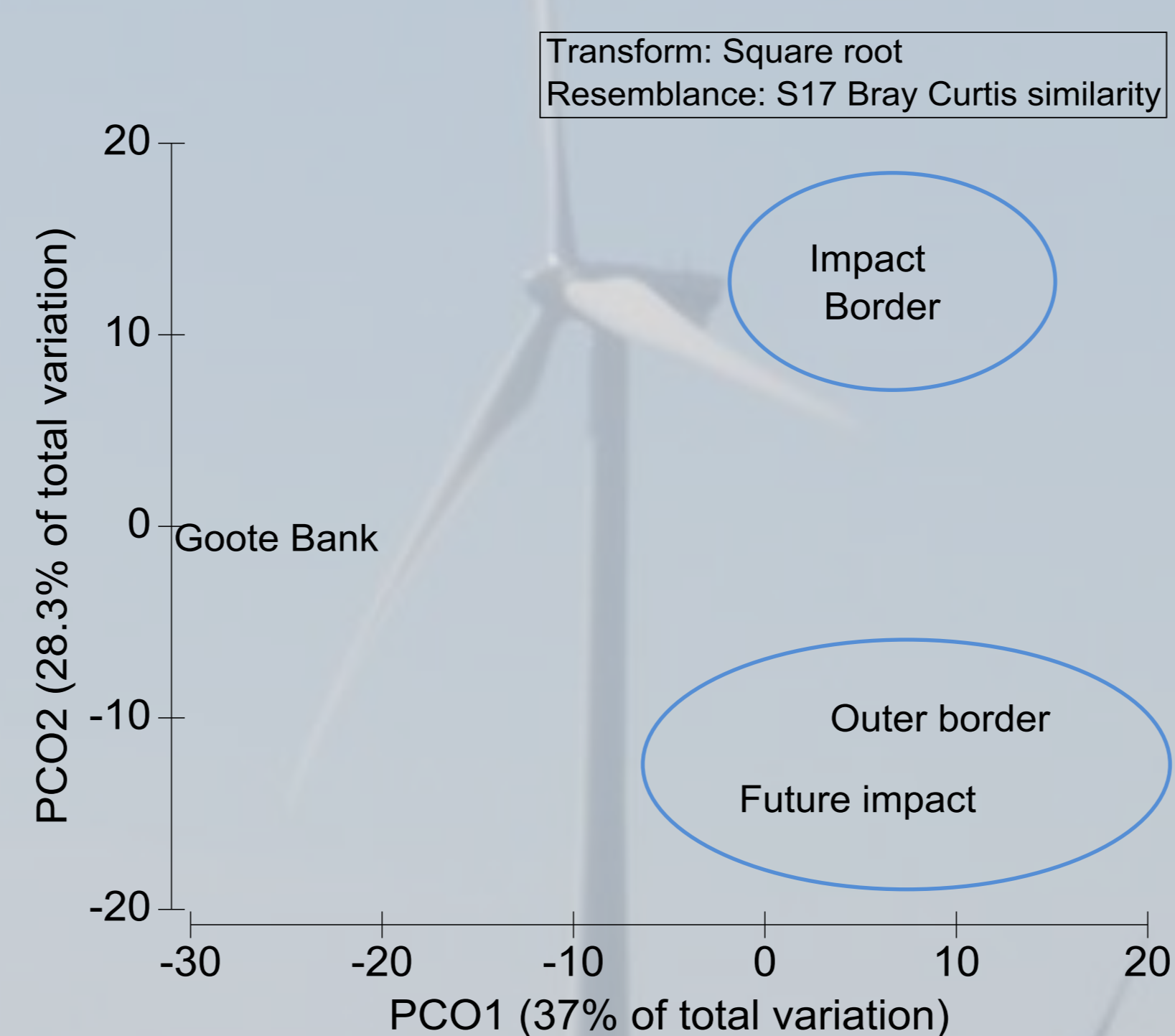


Important results

- No changes in species abundance, diversity or biomass (univariate)
- Differences in macrofaunal assemblage or species composition (multivariate analysis) between areas
 - Based on abundance:
Impact & Border ≠ Outer border & Future impact area
 - Based on Biomass:
Impact area ≠ Outer border & Future impact area
- Goote Bank and impact area significantly lower median grain size
- No changes in Total organic matter content (TOM %)



PCO plot averaged multivariate abundance data

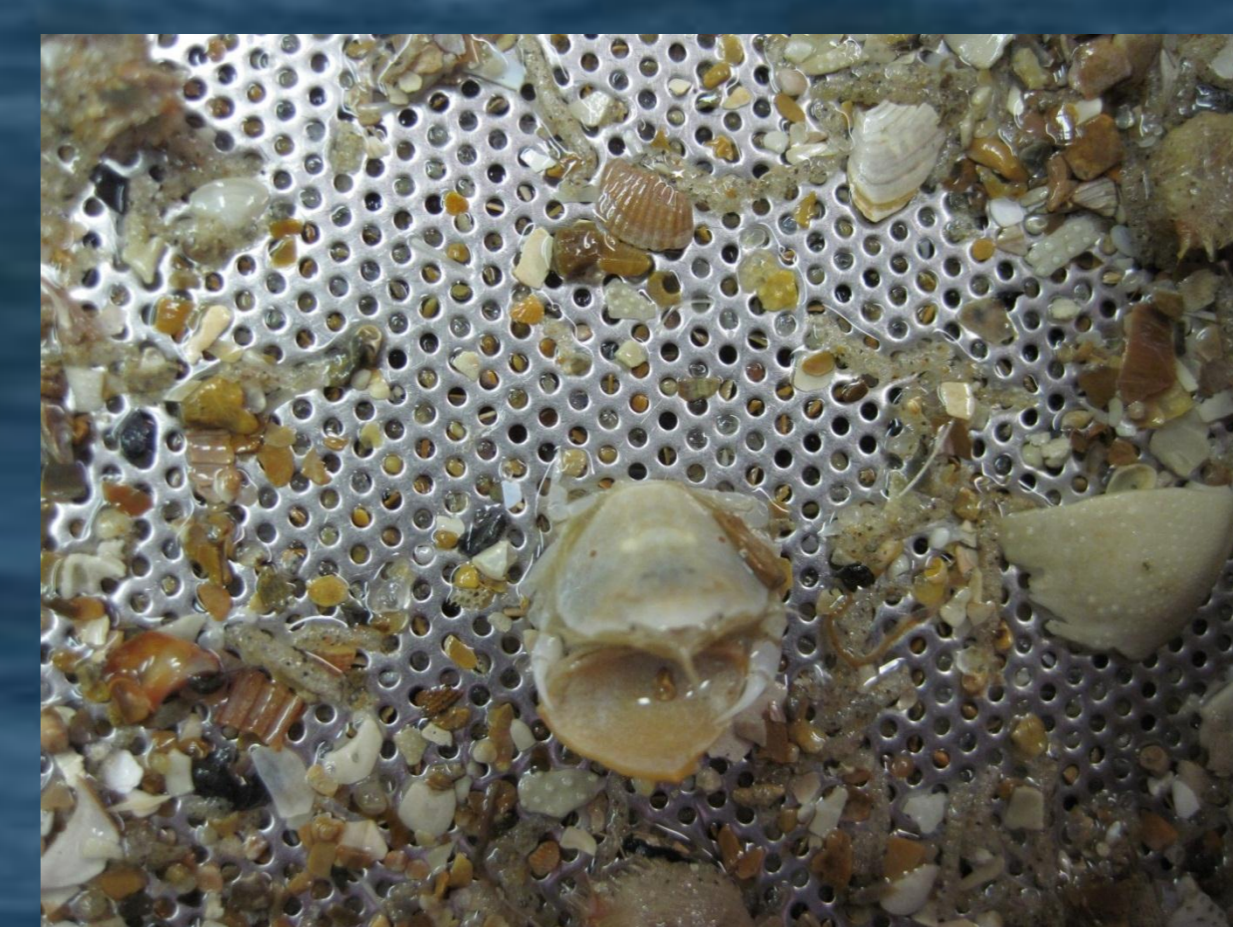


5 most abundant species (Based on Simper, Primer)

Area	Species
Impact	<i>Nephtys cirrosa</i>
	<i>Spio</i> sp.
	<i>Ophelia borealis</i>
	<i>Bathyporeia elegans</i>
	<i>Bathyporeia guilliamsoniana</i>
Border	<i>Nephtys cirrosa</i>
	<i>Bathyporeia guilliamsoniana</i>
	<i>Spio</i> sp.
	<i>Bathyporeia elegans</i>
	<i>Aonides paucibranchiata</i>
Outer border	<i>Nephtys cirrosa</i>
	<i>Bathyporeia guilliamsoniana</i>
	<i>Glycera</i> sp.
	<i>Nephtys</i> juv.
	<i>Spio</i> sp.
Future impact	<i>Nephtys cirrosa</i>
	<i>Bathyporeia guilliamsoniana</i>
	<i>Glycera</i> sp.
	<i>Aonides paucibranchiata</i>
	<i>Spiophanes bombyx</i>
Goote Bank	<i>Nephtys cirrosa</i>
	<i>Spio</i> sp.
	<i>Spiophanes bombyx</i>
	<i>Ophelia borealis</i>
	<i>Urothoe brevicornis</i>

Conclusions

- ✓ Macrofauna community and grain size on Goote Bank significantly different to all areas, during all years → not an ideal reference bank
- ✓ First signs of changes in macrofaunal species composition in the operational phase of Belwind OWF with 55 monopile foundations 2 - 3 years after construction at a large-scale
- ✓ Only after longer-term monitoring the exact large-scale effects will be determined
- ✓ Changes due to fishery exclusion within OWF? Higher food availability? Changing hydrodynamics? → Focus on food web interactions



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