A close up on the soft-sediment macrobenthos around offshore wind turbines

Coates Delphine *, Vanaverbeke Jan, Vincx Magda
Ghent University, Biology Department, Marine Biology Section

Marine Biology Ghent University

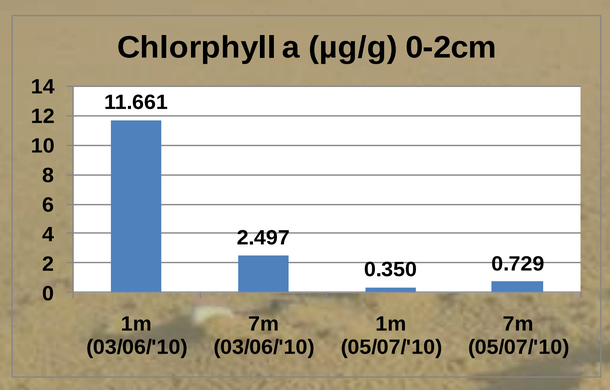
Management Unit of the North Sea Mathematical Models, Belgium

Introduction

• During 2009 and 2010 two offshore windfarms became functional in the Belgian part of the North Sea. Since then, no large scale impacts have been detected on the soft-sediment macrobenthos
• A small scale sampling strategy was carried out during 2010 to detect impacts on the macrobenthic communities around the fifth gravity based wind turbine on the Thorntonbank
• Macrobenthic communities can be highly dependent of sedimentological characteristics → median grain size and organic matter content

Methods

• Samples taken in four gradients → 2 perpendicular and 2 parallel to the currents
• 1 and 7m from scour protection system → Divers
• 15, 25, 50, 100 and 200 m → Van Veen grab
• Biotic factors: Macrobenthic density, diversity, biomass etc.
• Abiotic factors: grain size partition, total organic matter, chlorophyll a concentrations from 0-2cm depth



Density 1m (ind./m²)		Density 7m (ind./m²)	
Spiophanes bombyx	1000	*Echinoidea juv.*	3020
Jassa herdmani	320	*Lanice conchilega*	2000
Hydrozoa sp.	210	*Asteriidae juv.*	1420
Monocorophium ascherusicum	180	*Spiophanes bombyx*	1110
Asteriidae juv.	150	*Ophiurae juv.*	610

Monocorophium ascherusicum

Spiophanes bombyx

Lanice conchilega

Monocorophium ascherusicum

Density 1m (ind./m²)		Density 7m (ind./m²)	
Monocorophium ascherusicum	1310	*Echinoidea juv.*	1240
Jassa herdmani	410	*Jassa herdmani*	420
Phtisica marina	220	*Monocorophium ascherusicum*	260
Asteriidae juv.	110	*Spiophanes bombyx*	200

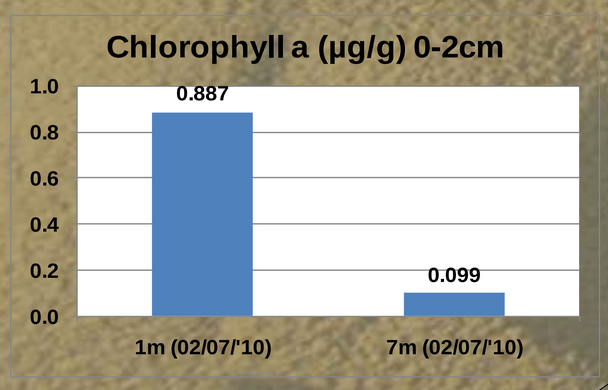
Density 1m (ind./m²)		Density 7m (ind./m²)	
Monocorophium ascherusicum	2850	*Asteriidae juv.*	220
Asteriidae juv.	670	*Hydrozoa sp.*	220
Corophium sp.	290	*Urothoe brevicornis*	140
Phtisica marina	290	*Jassa herdmani*	80

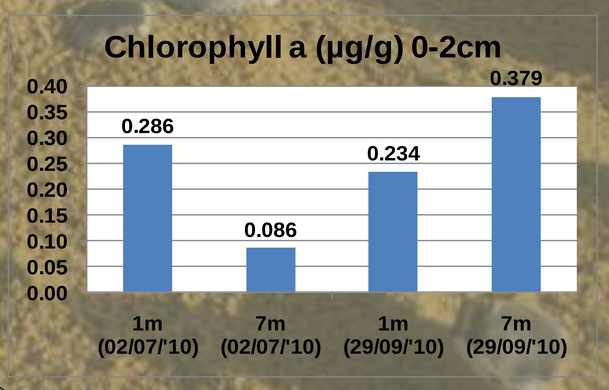
North East

North West

South East

South West

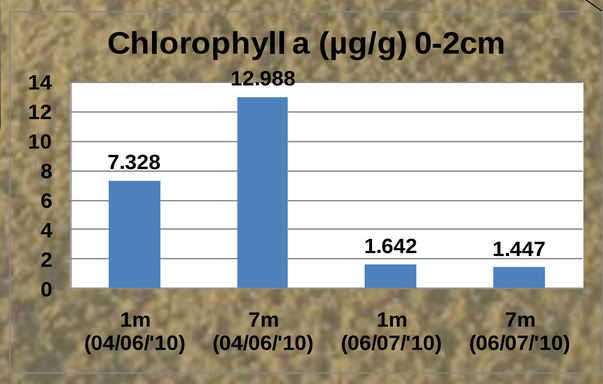




Spiophanes bombyx

Lanice conchilega

Density 1m (ind./m²)		Density 7m (ind./m²)	
Asteriidae juv.	4960	*Asteriidae juv.*	5090
Lanice conchilega	1590	*Lanice conchilega*	1880
Spiophanes bombyx	920	*Ophiurae juv.*	1110
Actiniaria sp.	650	*Spiophanes bombyx*	1090



Conclusions

→ There is a decline in grain size partition compared to previous studies but still in the medium grain size range (250-500µm)
→ Chlorophyll a concentrations are very high for sediments with a medium grain size and the concentrations drop rapidly in time (June → July) due to the high sediment permeability
→ Densities of generally rare macrobenthic species in this sediment type (*L. conchilega* and *M. ascherusicum*) highly increased (cfr. Large scale monitoring 2005-2010)
→ A small-scale monitoring strategy is important to determine the effects of wind turbines on the soft-sediment macrobenthos

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*** Delphine.coates@ugent.be, Marine Biology Research Group, Krijgslaan 281 Sterre S8, 9000 Ghent, Belgium 09 264 85 17**