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Benthic communities on old gas platforms as predictors for new offshore wind farms

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Background

Offshore wind farms in the North Sea provide a habitat for species such as anemones, soft corals, edible crabs and others not found on the sandy seafloor. Monitoring programs are conducted here, but due to the young age of the studied wind farms, still very little is known about the species community of these structures on the long term. With an expected life span of 20 to 40 years, the long term artificial reef effect of offshore structures is relevant for assessment of the impacts on the North Sea ecosystem. Offshore oil and gas platforms provide similar structures and have been present over 40 years. They give us insight in these long term effects. Here we present the results from a study of the biodiversity of a 40 year old North Sea platform.

Methods

- In 2014, we sampled L10-A using a diver operated airlift sampler.
- L10-A is located at 53.45°N 4.23°E, 50 km offshore, 30 m depth.
- Species were identified and a model (GAM) was created to describe the non-linear relationship between species richness and depth.

Results

We found a significant interaction (p=0.002) between depth and species richness (Figure 1). Amphipods were the most abundant group in all depths. Other abundant groups were mussels and anemones (Table 1). The most abundant large species was the Edible crab *C. pagurus.*

Table 1. Most abundant species in decreasing abundance for each investigated depth.

Depth	Common name	Species
0 m	Tube-building amphipod 1	*Jassa marmorata*
	Pillbug isopod	*Idotea pelagica*
	Blue mussel	*Mytilus edulis*
5 m	Tube-building amphipod 2	*Jassa herdmani*
	Gastropod mollusk	*Odostomia scalaris*
	Sandalled anemone	*Actinothoe sphyrodeta*
	Tube-building amphipod 3	*Monocorophium sextonae*
10 m	Tube-building amphipod 2	*Jassa herdmani*
	Tube-building amphipod 3	*Monocorophium sextonae*
	Orange anemone	*Diadumene cincta*
	Amphipod 1	*Stenothoe monoculoides*
15 m	Tube-building amphipod 2	*Jassa herdmani*
	Amphipod 2	*Metopa pusilla*
	Skeleton shrimp	*Phtisica marina*
	Tube-building amphipod 3	*Monocorophium sextonae*
20 m	Skeleton shrimp	*Phtisica marina*
	Colonial sea squirt	*Diplosoma listerianum*
	Tube-building amphipod 2	*Jassa herdmani*
	Plumose anemone	*Metridium senile*
24 m	Skeleton shrimp	*Phtisica marina*
	Plumose anemone	*Metridium senile*
	Colonial sea squirt	*Diplosoma listerianum*
	Tube-building amphipod 2	*Jassa herdmani*

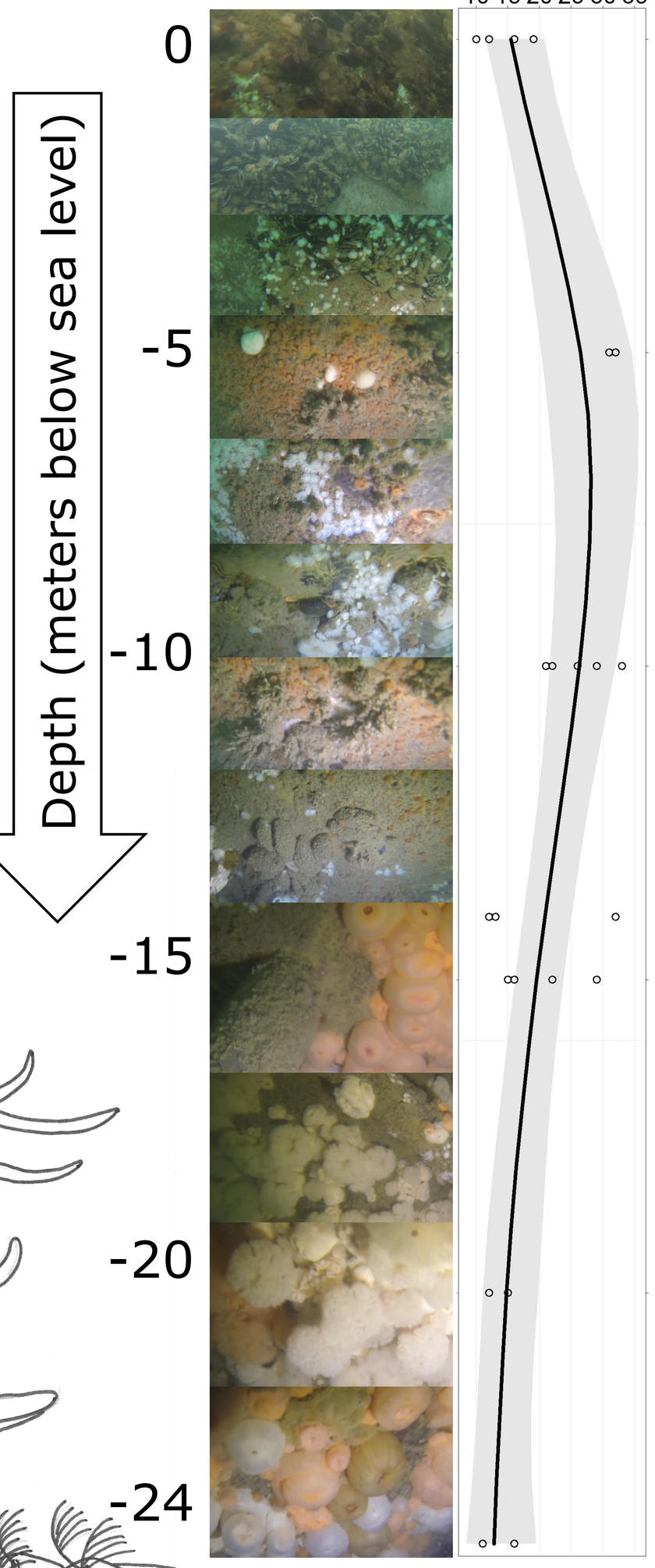

Figure 1. Photo representation of species community (left); relation between depth & species richness visualised by GAM (right)

Conclusions

- We attribute the low richness in deeper parts to the Plumose anemone, covering 100% of the surface in all deep samples.
- Groups such as hydroids and mussels create complex habitats, resulting in high richness between 5–15 m where these mixed.
- With the inventory of this first platform complete, we now focus on additional oil & gas platforms and other structures in the North Sea.

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