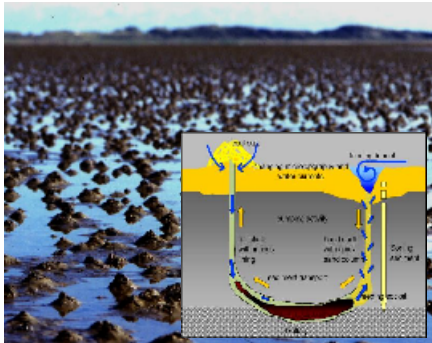
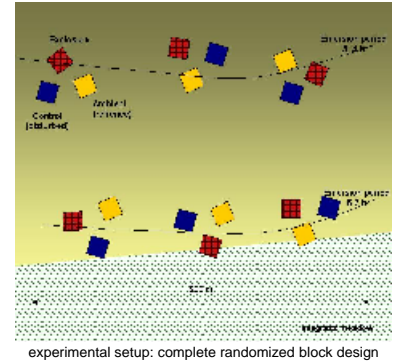


# 'Ecosystem engineering' in marine sediments: large scale permanent exclusion of the lugworm *Arenicola marina*

Nils Volkenborn, Karsten Reise, Dirk de Beer



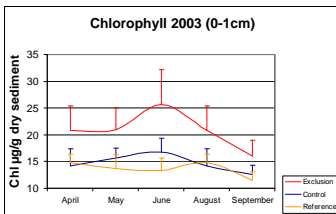
The lugworm is a dominant bioturbating and bioirrigating polychaete in the Wadden Sea. A large scale, permanent lugworm exclusion experiment (6 times 400 m<sup>2</sup>) is designed to investigate direct and indirect effects of the lugworm on ecosystem functioning.



First results indicate huge impacts of the lugworm on several components of the entire ecosystem. As an ecosystem engineer this polychaete alters sediment properties, sediment biogeochemistry and the benthic community structure.

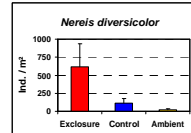
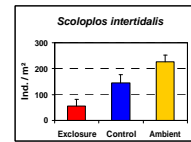
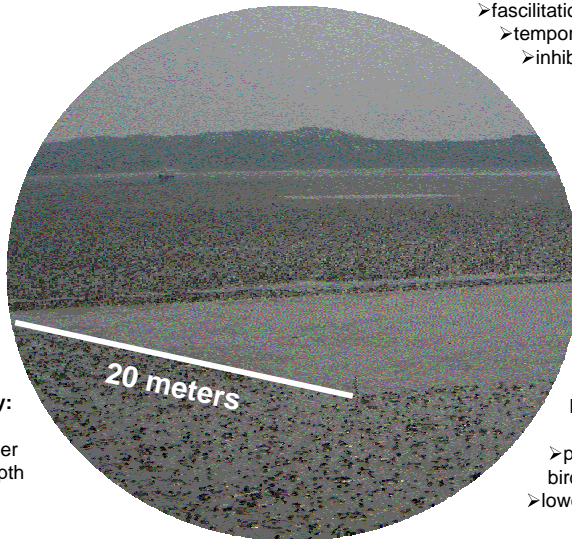
## Effects of lugworms on sediment properties:

- decreasing fraction of fine material
- lowering organic content
- increasing permeability
- lowering Chlorophyll content



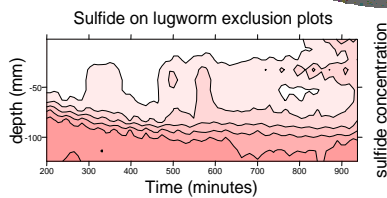
## Effects of lugworms on biodiversity and benthic community structure:

- facilitation of bacterivorous polychaetes and oligochaetes
- temporary inhibition of tube building polychaetes
- inhibition of bivalve recruitment



## Effects of lugworms on biogeochemistry:

- washing out nutrients in the porewater
- increasing oxygen penetration depth
- lowering sulfide concentrations



## Effects of lugworms on bird foraging

- positive and negative response by different bird species
- lower foraging efficiency



## Perspectives:

This large scale lugworm exclusion experiment will be run for 8 more years. First results indicate the role of one single key species for ecosystem functioning. On a total experimental area of 7200 m<sup>2</sup> the experiment offers opportunities for experts to contribute to this interesting field of interdisciplinary research on key species function, food web efficiency and ecosystem stability.



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