DISTRIBUTION OF ECO-ENGINEERING SPECIES IN ESTUARIES

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River and delta morphodynamics


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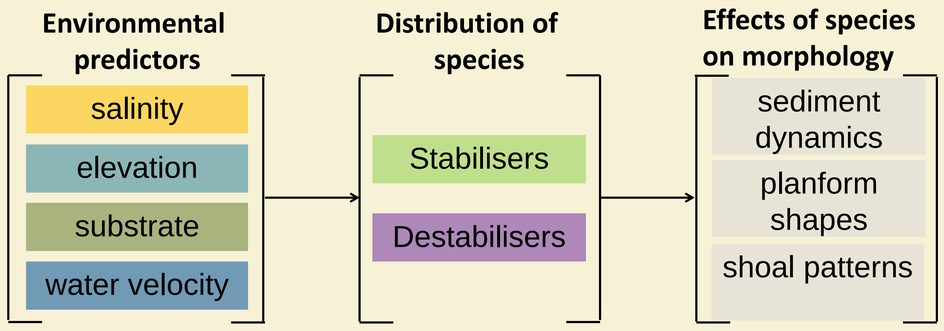
Question

How does the distribution of eco-engineering species affect the morphology of the system?



Towards Answers

- **Finding distributions and biomasses of stabilisers and destabilisers in an estuary gradient**
- **Finding the correlation among the species distribution, planform shapes, and shoal patterns in different estuaries**
- **Finding out if stabilisers confine the estuary over time**
- **Finding out if destabilisers make estuaries deeper**

Ecological data

Information about 100 eco-engineering species was collected from literature and a data base http://eol.com with a:

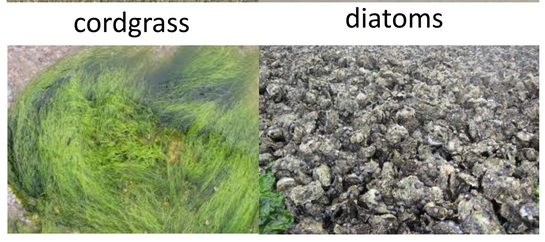
- **Genus, species, taxonomic group**
- **Functional group: stabilisers, destabilisers**
- **Min, opt, max for elevation/depth, salinity, flow velocity, mud content preference**
- **Size, growth rate, abundance, number of seeds, dispersal potential, generation time**

From environmental factors we predicted spatial distribution of species.

Stabilisers


cordgrass

diatoms


seagrass

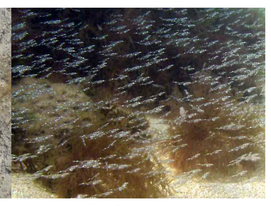
oysters

Destabilisers


snails

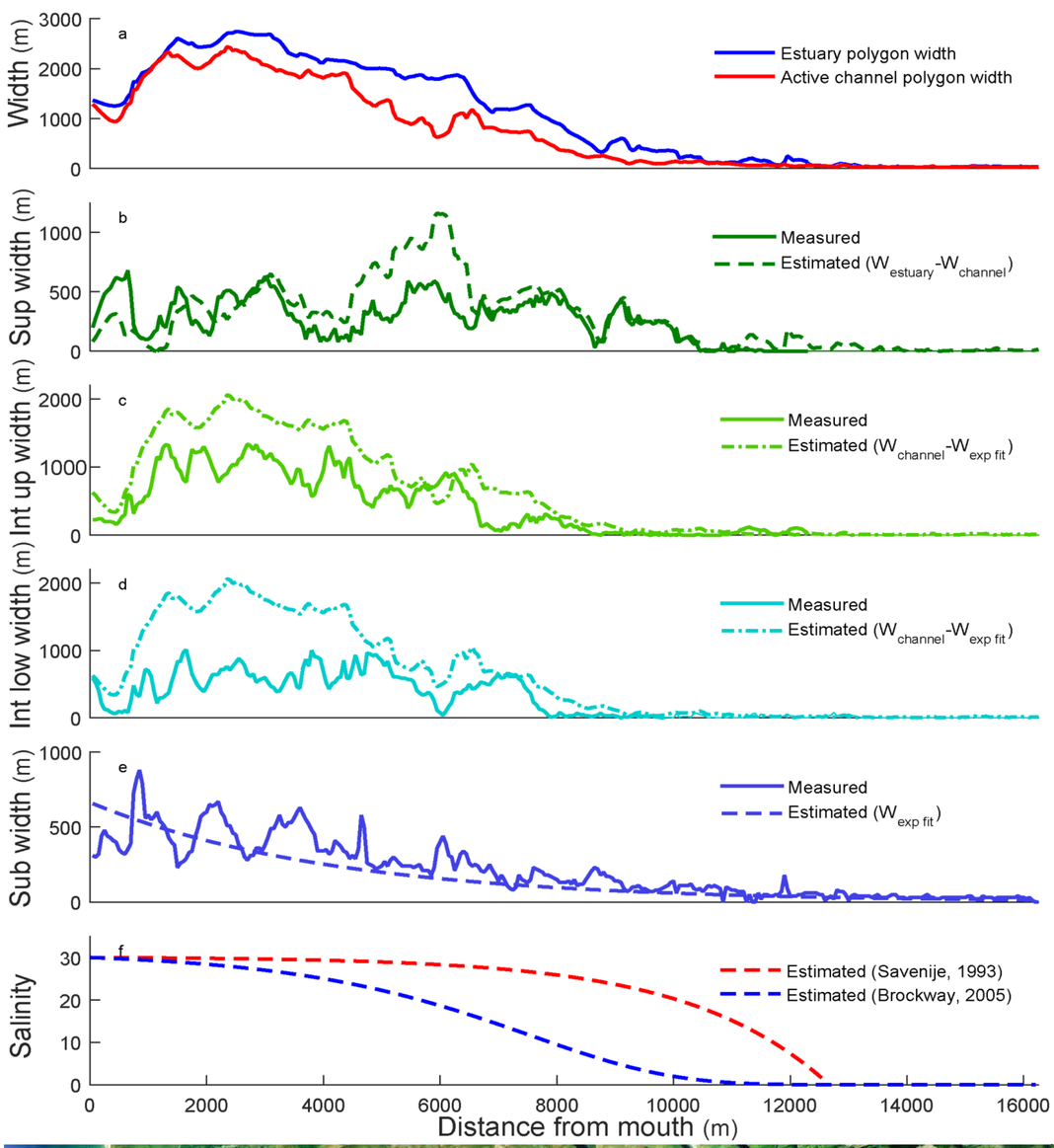

shells

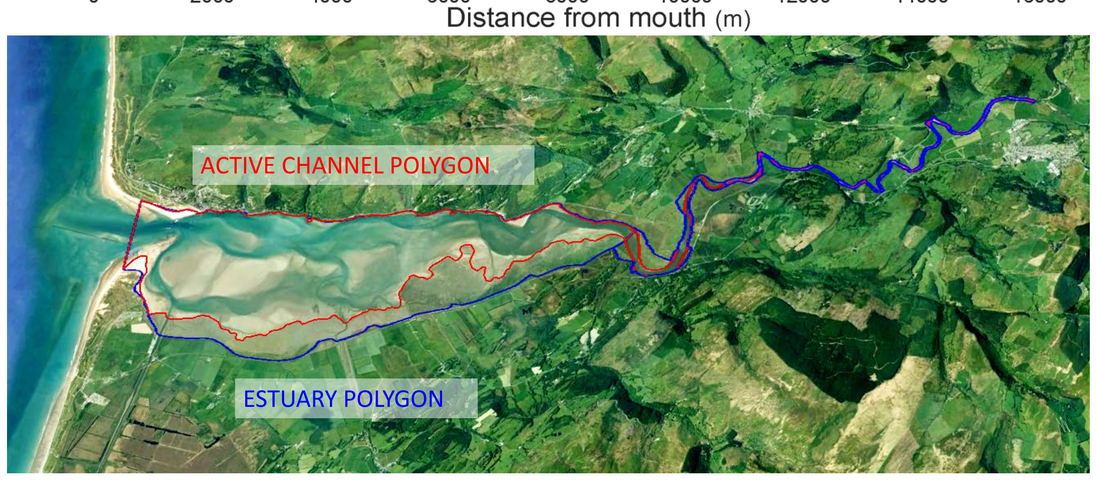

worms


shrimps

Morphological data

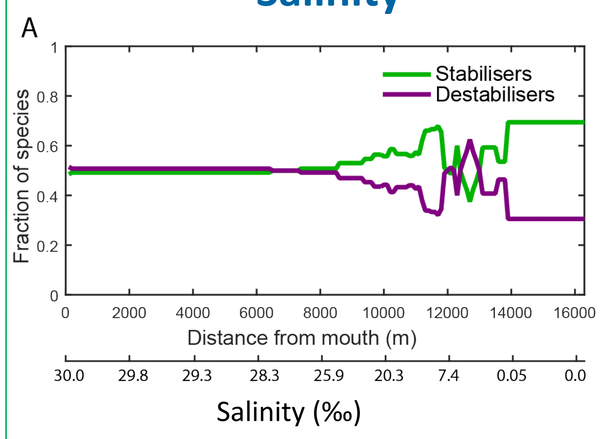
- **Channel planform was visually recorded in Google Earth.**
- **We compared estimations of depth zones based on estuary outline with measurements from bathymetry (Leuven et al., subm).**
- **Salinity was predicted with Savenije (1993) and Brockway (2005).**



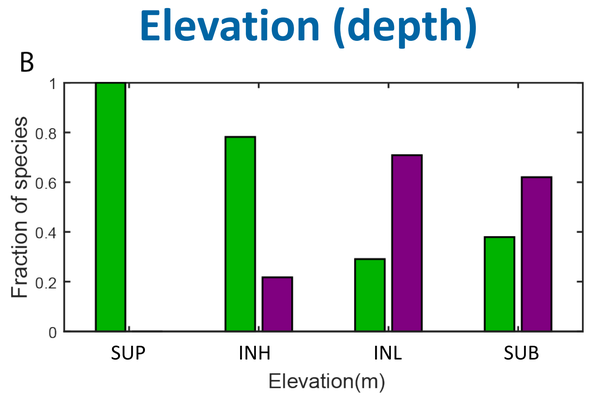


Distibution of stabilisers and destabilisers in estuary gradient

Salinity



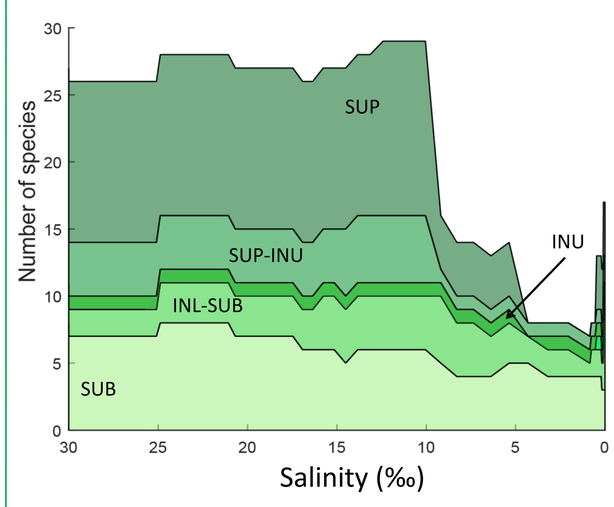
Elevation (depth)



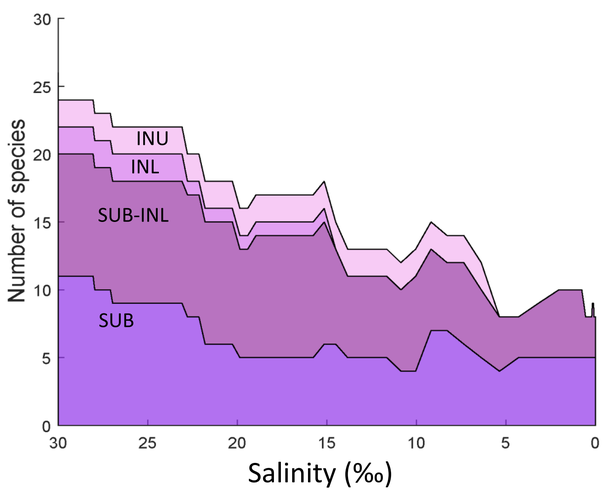
Richness of stabilisers and destabilisers

1) in salinity gradient

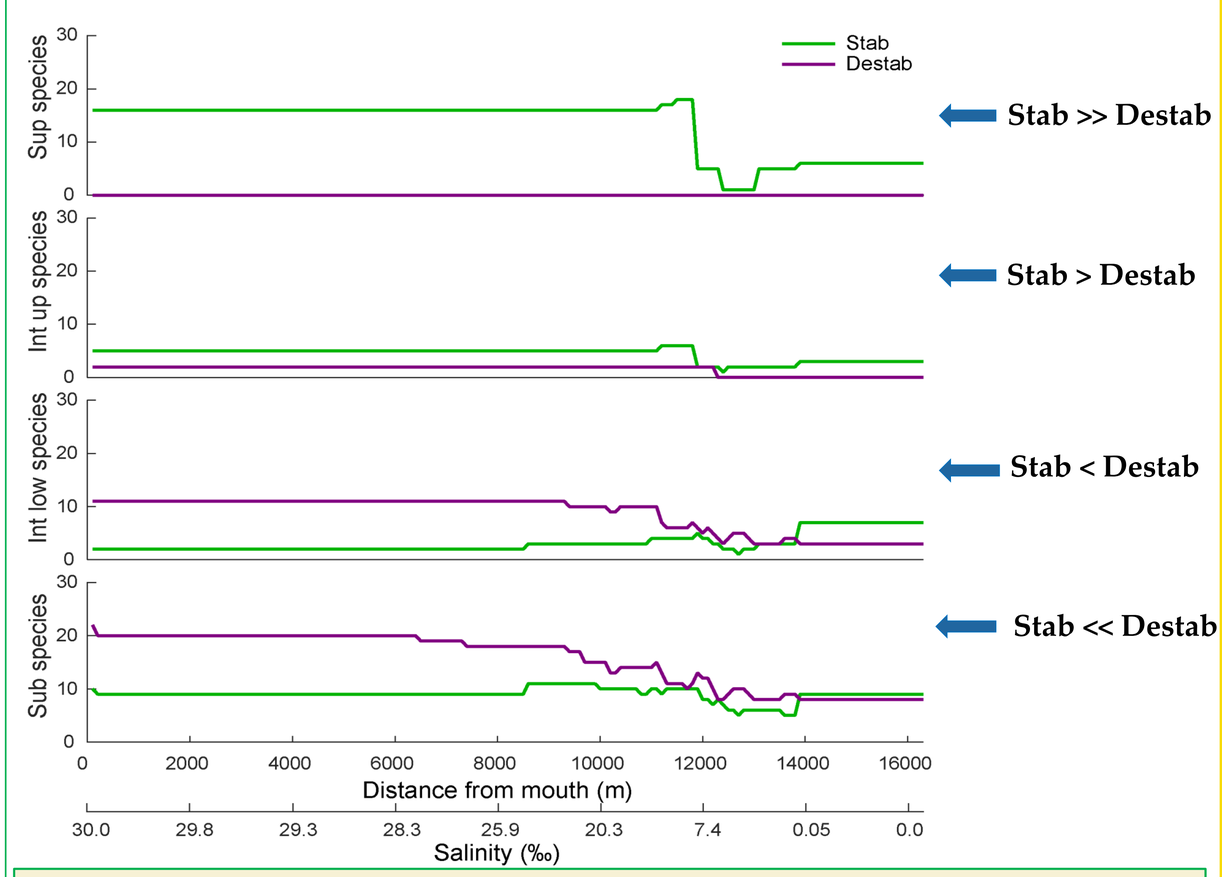
Stabilisers



Destabilisers



2) in combined salinity and elevation (depth) gradients



Future work

- **Add flow velocity as an environmental stressor of species distribution and as proxi for substrate type**
- **Add biomass for 'ecoengineering potential' of the species into the calculation**

Conclusions

- **Proportion of stabilising/destabilising species in estuary gradient shows increase in stabilisers going from estuary mouth to fresh water**
- **Most stabilisers settle above high water level and destabilisers below**

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