University of Antwerp
Faculty of Science

ECO SPHERE

The ECOSPHERE research group aims to study aquatic and valley ecosystems that are continuously challenged by natural and anthropogenic stressors. The research focuses on acquiring fundamental and applied knowledge at different levels of structural and functional organisation in order to underpin environmental management decisions.
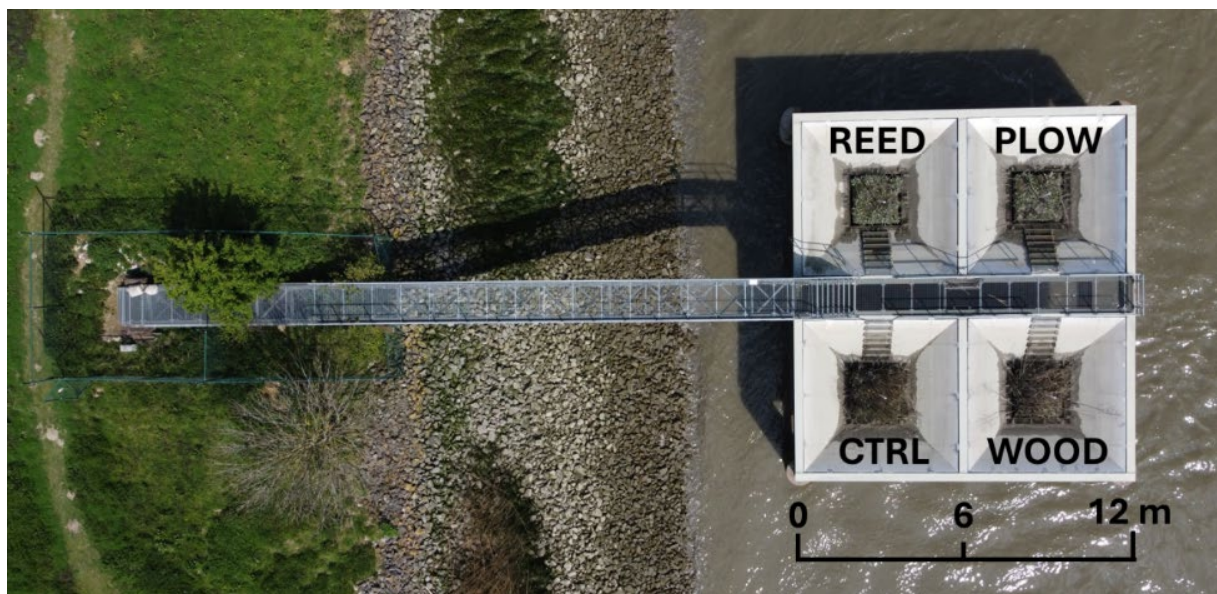
MASTER THESIS SUBJECT 2025-2026

Long-term effects of soil amendments on marsh soil properties

Research group: ECOSPHERE

Hosting laboratory: CDE – building C, CGB

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An aerial view of the mesocosm installation near Kruibeke where one part of the field experiment for this thesis will take place. Picture taken by Tim van den Broeck.

- ➢ **This topic mostly contains** ☒ literature study, ☒ lab work, ☒ field work, ☐ experimental work, ☐ GIS, ☐ numerical modelling, ☐ other: ………………………………………………………………….
- ➢ **Possession of driver's license B is** ☐ needed, ☒ recommended, ☐ not needed
- ➢ **Possession of certificates needed:** ☐ FELASA C, ☐ other: …………………………………………………

Summary – Within the Scheldt River basin, many tidal wetlands have been restored for their ecosystem service provisioning. The methods used to restore this nature are known to have a large influence on the biogeochemical functioning. Some of the factors that influence the functioning of recently restored tidal marshes are porosity and organic matter content. If these factors are not optimal in restored marsh soil, adaptations can be made in the form of soil amendment addition to support soil processes. Thus, these amendments are hypothesized to jumpstart biogeochemical functioning, but it remains unknown what the long-terms effects are of the addition of these soil modifications for restored tidal marshes.

To now properly evaluate whether the long-term effects of soil amendment implementation are beneficial for the creation of functional nature, soil properties are one of the key aspects that need to be monitored. Tidal marshes are after all known for their nutrient exchange capacity and water quality regulation, for which soil properties are of major importance. In Kruibeke a large tidal mesocosm setup has been installed in 2017 in which multiple types of soil amendments were implemented. Now is an appropriate time to evaluate the long-term effects of soil amendment application on marsh soil properties, after almost a decade of tidal action in the setup. More recently, soil amendments have also been implemented during the restoration of the Ketenisseschor in the context of the Bankbusters project, which allows to investigate the effect of soil amendments on field scale. Within the larger research framework of tidal estuarine nature restoration (e.g. Sigmaplan for the Scheldt estuary) the information gained from this study is valuable and can be linked to various other biotic and abiotic factors including e.g. benthos and vegetation presence.

For this thesis, you will help field-technicians with soil samplings focussing on e.g. bulk density, grainsize distribution, organic matter content... and optionally the study of various other linked biotic and abiotic factors. Afterwards, you will assist in the processing of the taken samples and analyses of the resulting data. The findings of this study can be compared to prior experiments performed in this mesocosm, and literature data. This will result in an improvement of our understanding of the effects of soil modifications on ecosystem service delivery in restored tidal marshes with regards to marsh soil properties. A sense for adventure, perseverance, and detail is recommended.

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