

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 2026-2027

Beneath the surface: investigating silicon storage in a tropical lake–wetland ecosystem

Research group: ECOSPHERE

Hosting laboratory: CDE (maybe Meise Botanic Garden)

Promotor(s): Jonas Schoelynck (jonas.schoelynck@uantwerpen.be) and Giulia Lodi (giulia.lodi@uantwerpen.be)

Daily supervision: Giulia Lodi



Figure 1. Lake Mburo, Uganda, and its surrounding wetland landscape.

- 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

Silicon is an important element in freshwater ecosystems, supporting the growth of diatoms and accumulating in wetland vegetation such as papyrus (*Cyperus papyrus*). Following the death and decomposition of these organisms, biogenic silica (BSi) may dissolve and return to the water or become incorporated into sediments, which can act as important silicon reservoirs. However, the spatial distribution and potential drivers of sedimentary BSi storage remain poorly understood in tropical freshwater ecosystems.

This Master's thesis will investigate how BSi storage varies across different sedimentary environments in Lake Mburo and its surrounding papyrus wetlands in Uganda. A total of 29 sediment cores, collected from the lake bottom ($n = 11$), lakeside papyrus wetlands ($n = 6$), and two riverside papyrus wetland areas with different fire histories ($n = 12$), will be analysed at 2 cm depth intervals. Measurements of BSi, carbon and nitrogen will be used to quantify sedimentary silica stocks, investigate their vertical distribution and explore relationships between silica storage and sediment composition. Depending on feasibility, additional analyses of diatoms and phytoliths may help identify the biological sources of sedimentary silica.

Through laboratory analyses and environmental data interpretation, the student will contribute to understanding the role of sediments in tropical freshwater silicon cycling. The findings will also support a broader silicon mass balance for the Lake Mburo ecosystem, complementing existing measurements of riverine silicon transport, aquatic silicon pools and silicon uptake by papyrus vegetation.



Figure 2. Sediment sampling in the Lake Mburo ecosystem, Uganda.

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