

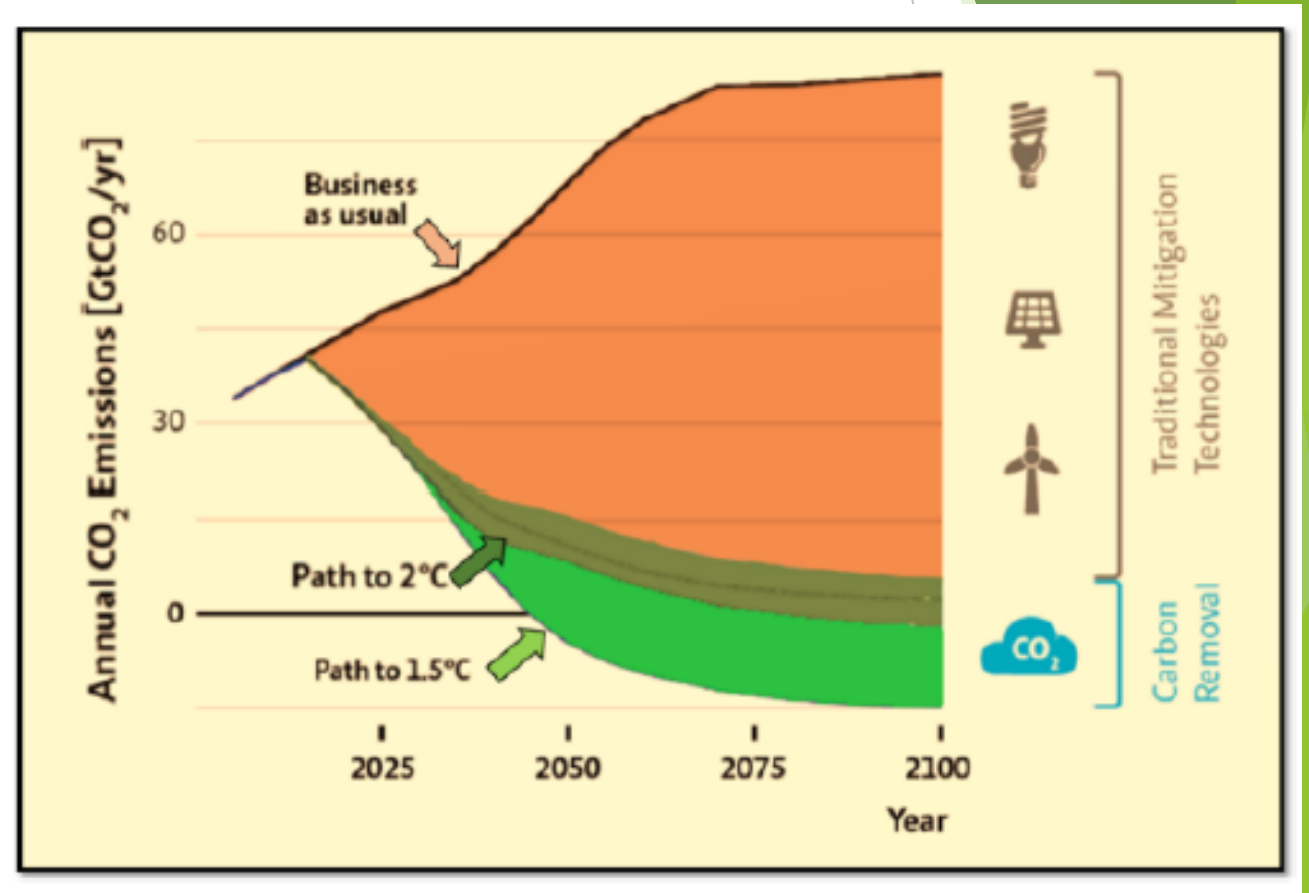
A photograph of a forest with large, moss-covered trees and a path covered in fallen leaves. The trees are green and have thick trunks. The ground is covered in brown leaves and moss. The sky is blue and visible through the canopy.

Master's Thesis topics about enhanced weathering

Thesis of Prof. Sara Vicca and collaborators

Problem

- ▶ Keep global warming < 2°C
- ▶ 2 things will be needed:
 - 1) Reduce our emissions
 - 2) Remove CO₂ from the atmosphere



Carbon dioxide removal?



“high-tech vacuum cleaners”

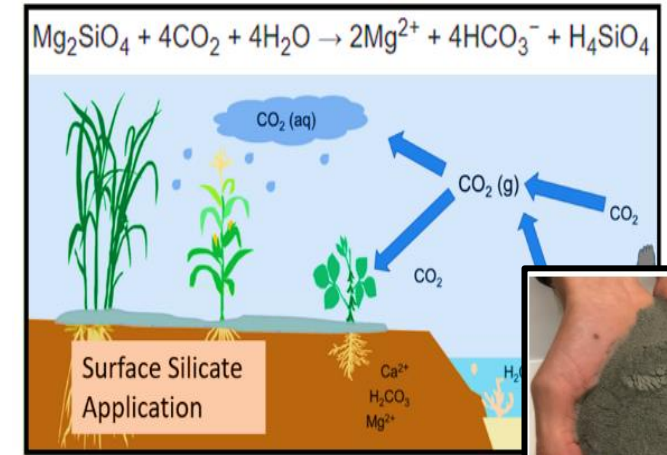
+ Little land required

- Consumes a lot of energy, expensive



+ Consumes no energy, cheap technique

- A lot of land required



And ...
spreading
volcanic rock powder
on land

+ Area can be used double (for example combine with agricultural land, or forest land)

+ Relatively low energy consumption
? #CO₂/ton rock uptake, #CO₂/hectare

First thesis topic:

- ▶ Combine afforestation & enhanced weathering
- ▶ In a young ('baby-forest'), recently planted near Leuven (letterbos)
- ▶ Rock dust (basalt) has been applied recently
- ▶ Experimental work in Antwerp (Campus drie eiken) + Field work (letterbos)



Goals of thesis:

- 1) measure CO₂ uptake by rocks (in porewater, soil)
- 2) Characterize tree species, follow-up tree growth & leaf nutrients
- 3) Synergies between forestry & EW?

Enhanced tree growth because of nutrient release from volcanic rocks?
How much more CO₂ can be captured per unit of area?



Last but not least

- ▶ **Unique chance to contribute to delivering urgently needed data for carbon dioxide removal (ipcc) 😊**
- ▶ Work in nature 😊
- ▶ Fun research group 😊

Interested/questions?

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Second thesis topic: Effect of biota on enhanced silicate weathering: A mesocosm experiment

- ▶ Enhanced weathering = Negative Emission Technology
- ▶ Capture CO₂ for long-term storage
- ▶ Co-benefit: release of nutrients in soil



▶ Contact:

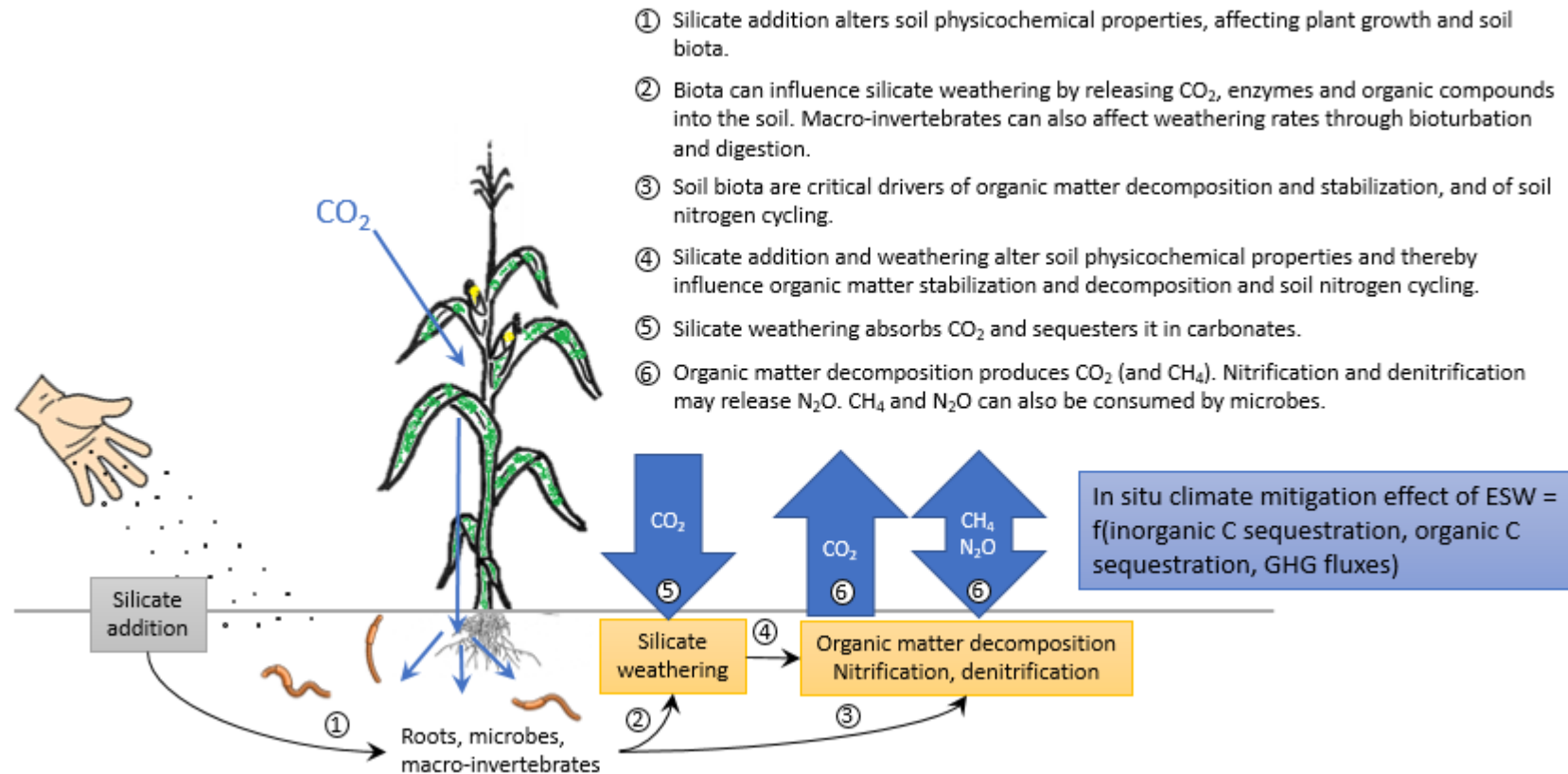
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Enhanced weathering

- ▶ Sequestration of CO₂ by silicate mineral in contact with water
- ▶ Influenced by different processes



Mesocosm experiment with basalt

- ▶ Summer experiment at Drie Eiken campus
- ▶ Effect of worms, mycorrhiza and plants (maize) on weathering of basalt
- ▶ Effect of basalt on biota:
 - ▶ Plant biomass, growth and yield
 - ▶ Worm and mycorrhiza abundance
- ▶ Great variety of work
 - ▶ Lab work
 - ▶ Field work
 - ▶ Data analysis

