A simple profile-scale model of soil organic matter turnover accounting for physical protection and priming: model description and sensitivity analysis

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MaxRootC: WP6

Task 6.2.3

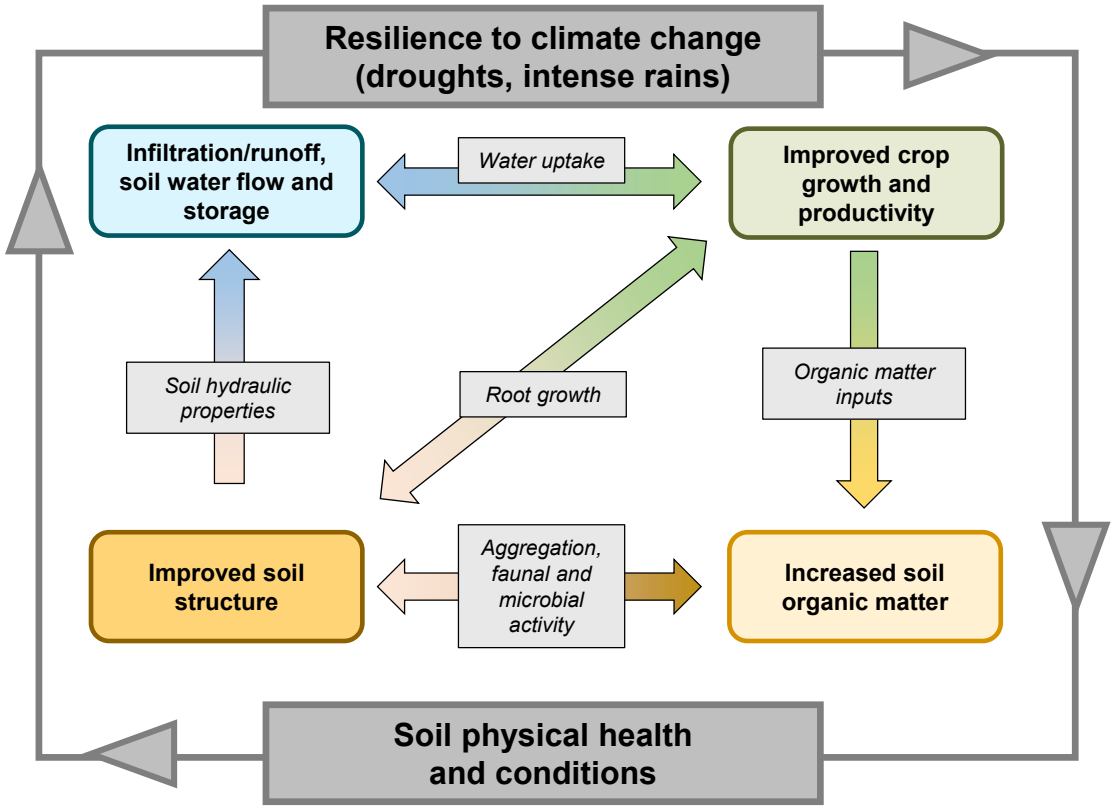
A sensitivity analysis …. to explore which processes matter most for …. soil C dynamics in contrasting soil types (e.g. structured clays soils vs. sandy soils)

What is most important?

…… OM inputs (total), partitioning between roots and shoots, microbial carbon use efficiency and priming, soil structure, tillage intensity, root depth and distribution?

Photo: SLU

*USSF (**U**ppsala model of **S**oil **S**tructure and **F**unction)*



Schematic: Tino Colombi, Nick Jarvis

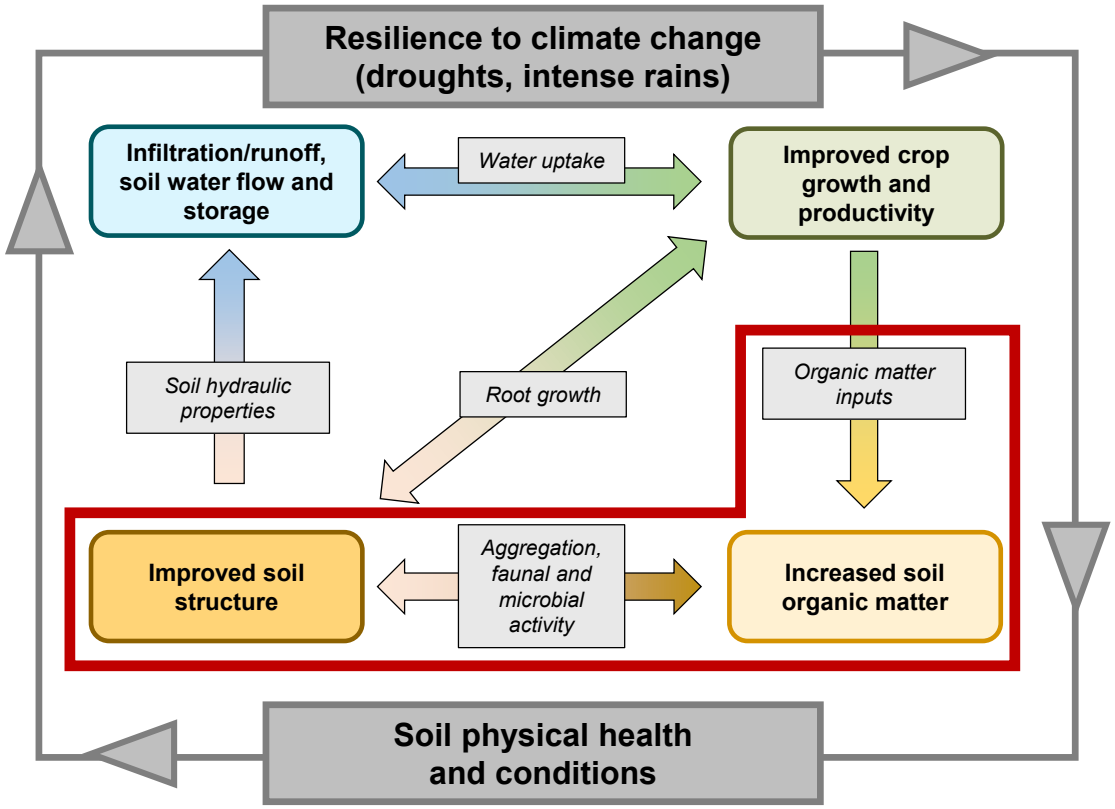
Strengths

- Feedbacks between soil and crop properly represented, including the effects of soil structure dynamics

Limitations

- Slow to run (5-10 minutes per year)
- Complex (100+ parameters)

*ICBM-P⁴ (**P**hysical **P**rotection and **P**riming in a soil **P**rofile)*



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Advantages

- Fast (seconds)
- Simple (15 parameters)
- Solved analytically for steady-state stocks

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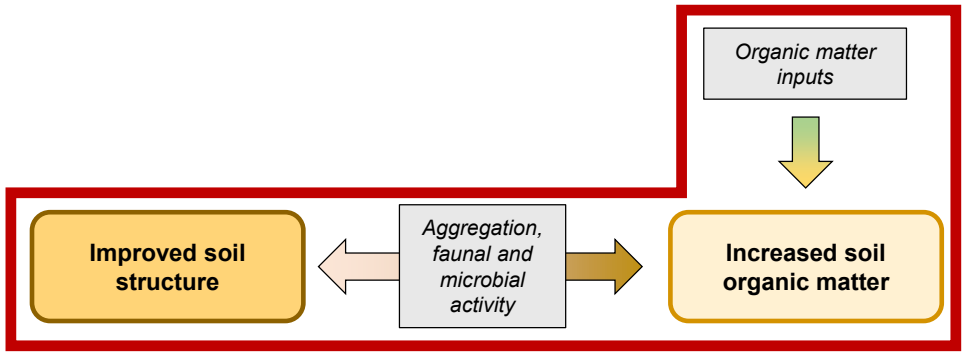

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…. but soil-plant feedbacks mediated via soil hydrological processes are lost …

Please see our poster in session C1 for an overview of the ICBM-P⁴ model and the results of a sensitivity analysis and ”reality-check” ….