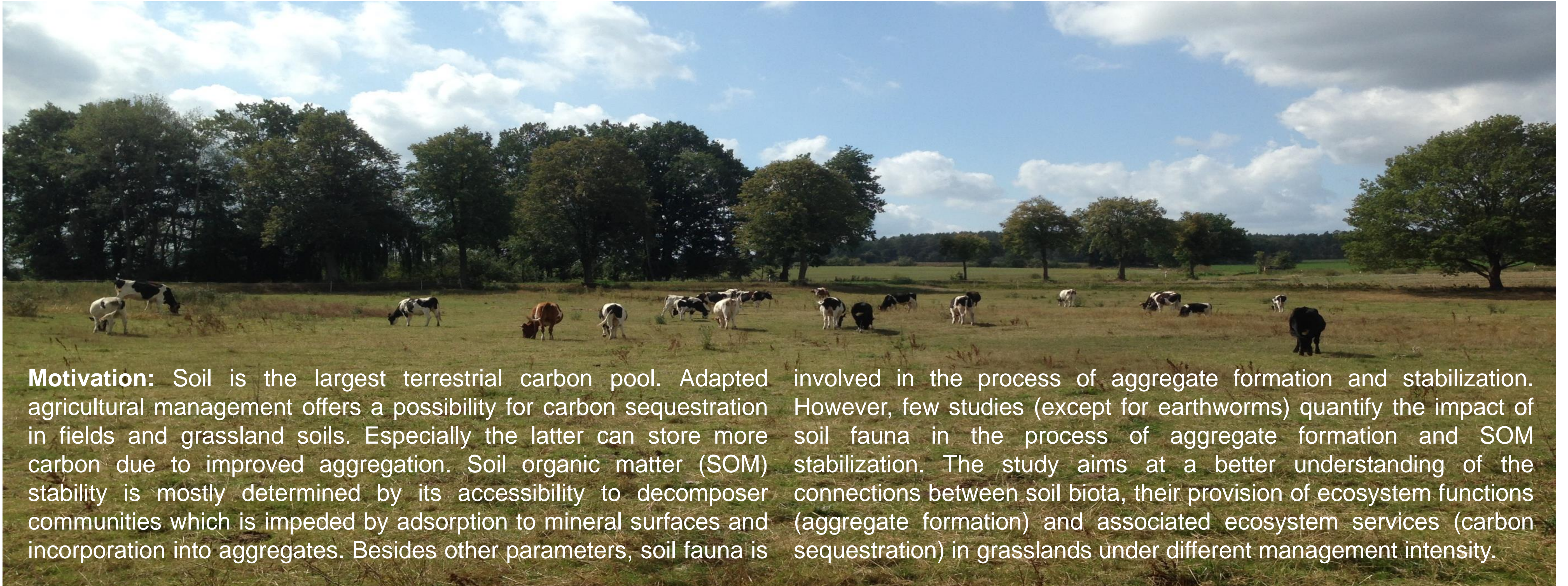


# Towards a better understanding of carbon sequestration in grassland soils – Soil fauna and aggregate formation

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**Motivation:** Soil is the largest terrestrial carbon pool. Adapted agricultural management offers a possibility for carbon sequestration in fields and grassland soils. Especially the latter can store more carbon due to improved aggregation. Soil organic matter (SOM) stability is mostly determined by its accessibility to decomposer communities which is impeded by adsorption to mineral surfaces and incorporation into aggregates. Besides other parameters, soil fauna is

involved in the process of aggregate formation and stabilization. However, few studies (except for earthworms) quantify the impact of soil fauna in the process of aggregate formation and SOM stabilization. The study aims at a better understanding of the connections between soil biota, their provision of ecosystem functions (aggregate formation) and associated ecosystem services (carbon sequestration) in grasslands under different management intensity.

## Research questions

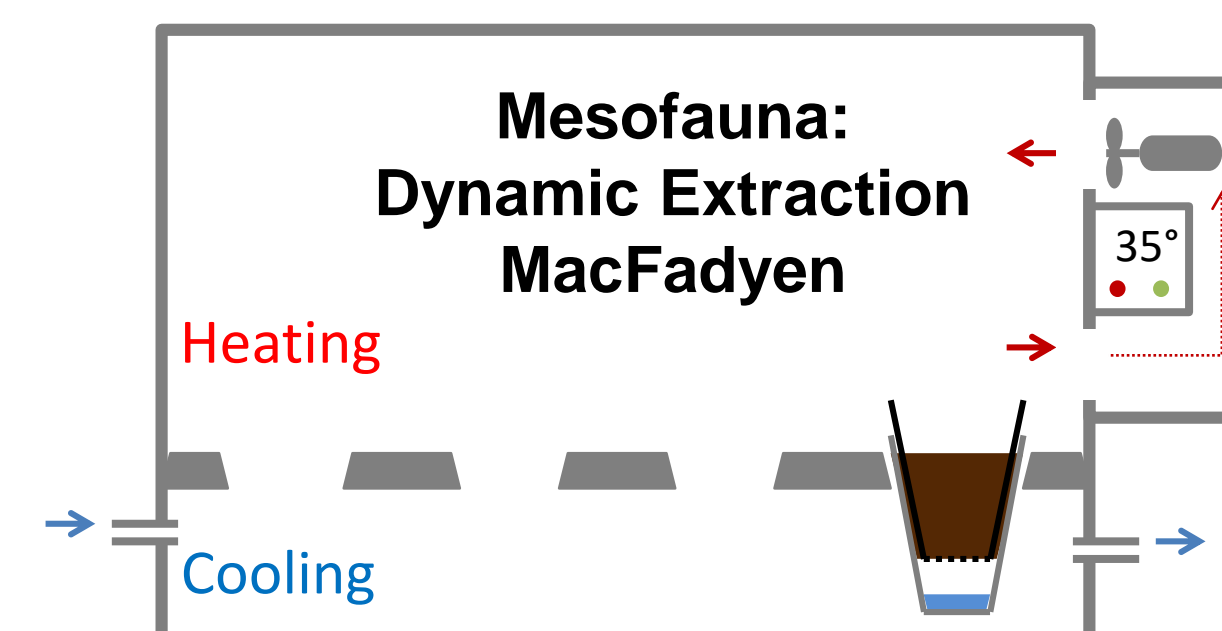
- How does grassland management of different intensity effect the soil fauna (meso- and macrofauna) community?
- What are the connections between soil fauna community and aggregate structure and stability in grassland ecosystems?
- How much carbon is stored in aggregates (macroaggregates [macroAGG] and microaggregates [microAGG]) in comparison to the amount in other SOM pools (particulate organic matter [POM], silt and clay associated carbon, dissolved organic carbon [DOC])?

## Sampling Design

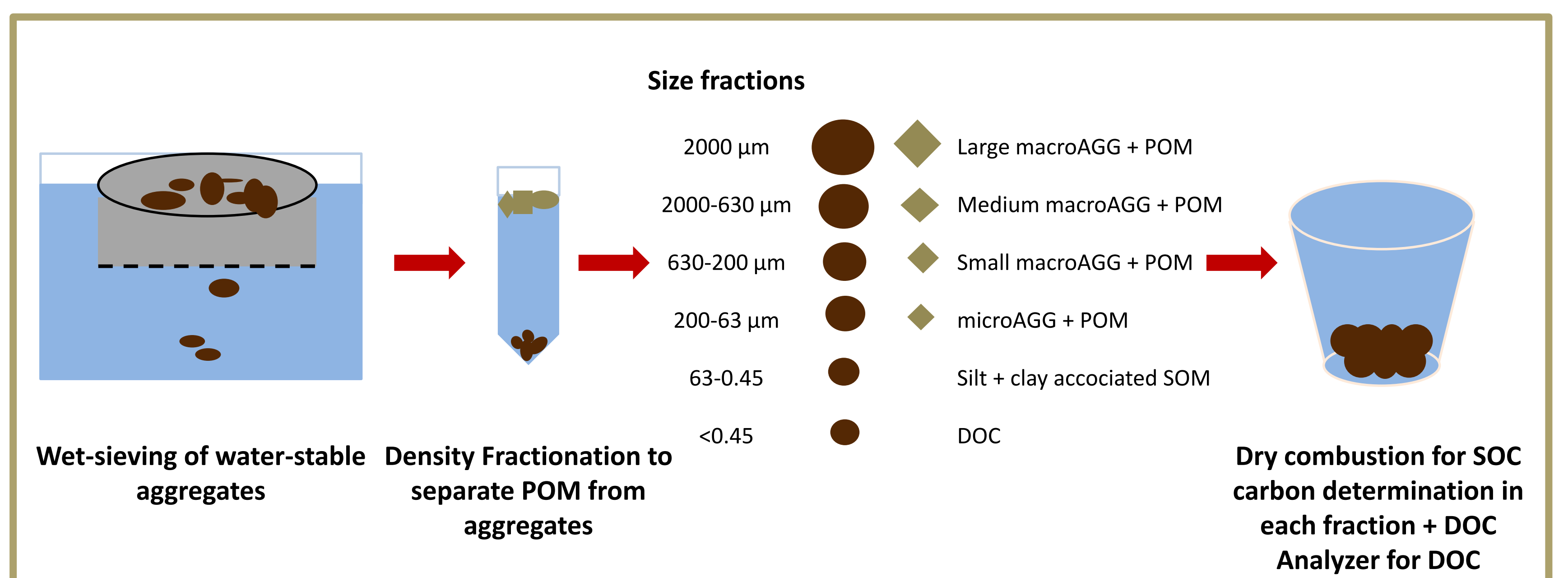


- For two seasons (autumn & spring), comparison of grasslands of different management intensity (based on cutting frequency and livestock unit days  $\text{ha}^{-1} \text{yr}^{-1}$ )
- At each site, 8 randomly selected plots of 1  $\text{m}^2$  size (located at least 50 m away from each other and 15 m from the edge)
- At each 1  $\text{m}^2$  plot: 1 soil monolith for macrofauna (12 x 12 cm x 10 cm depth); 1 soil core for mesofauna extraction (6 cm diameter, 8 cm depth)

## Methodology



Soil cores from mesofauna extraction will be subsequently analyzed for water-stable AGG and SOC in different SOM pools



## Outlook

- Complement field study with controlled experiments, to understand the effect of soil fauna on the process of aggregate formation
- Mesocosm study: different soil biota + sieved soil (artificial soil/soil from field sites) + microbial inoculum (from grassland soil) + plant litter + combination of clover, grasses and typical herbs + simulated grazing pressure of different intensity