

# Exploring the influence of shallow water table on the carbon cycle under different cropping systems

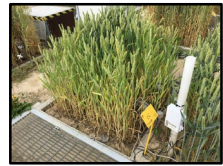
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Soil water content intensely affects C dynamics. Shallow water table (**WT**) influences **22-32%** of the global land area but its role on C balance is poorly studied on **mineral soils**.



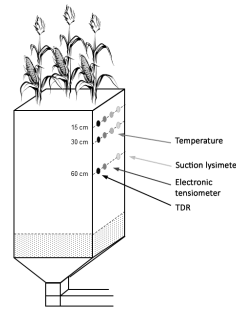
## Study objective:

Examining the effect of **shallow WT** and alternative cropping systems on **C balance fluxes**.



18 drainable lysimeters

2 replications x

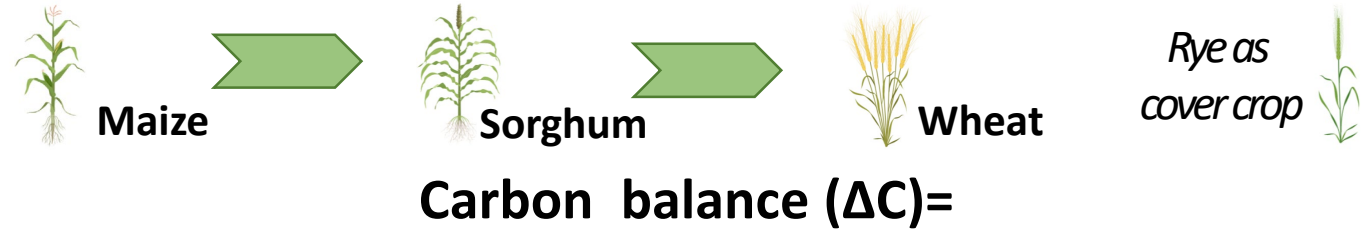


## 3 water table levels

- 60 cm depth (**WT60**)
- 120 cm depth (**WT120**)
- Free drainage (**FD**)

## 3 cropping systems

- Conventional (**CV**)
- Conventional with cover cropping (**CV**)
- Conservation agriculture (**CA**)



**Inputs** ↑

- Digestate
- Stalks
- Roots and exudates

**Outputs** ↓

- Heterotrophic respiration (**HR**)
- Leaching
- Methane

## Roots

Based on **R/S** ratio previously measured



## HR



## CH<sub>4</sub>

24 **dynamic chambers** connected to a continuous **FTIR** gas analyzer (Gaset DX4015)  
**>110 000 fluxes**

## Bare soil

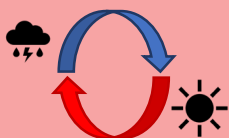
- Chamber system

## Cropping season

- *in-situ* calibrated model based on Arrhenius equation

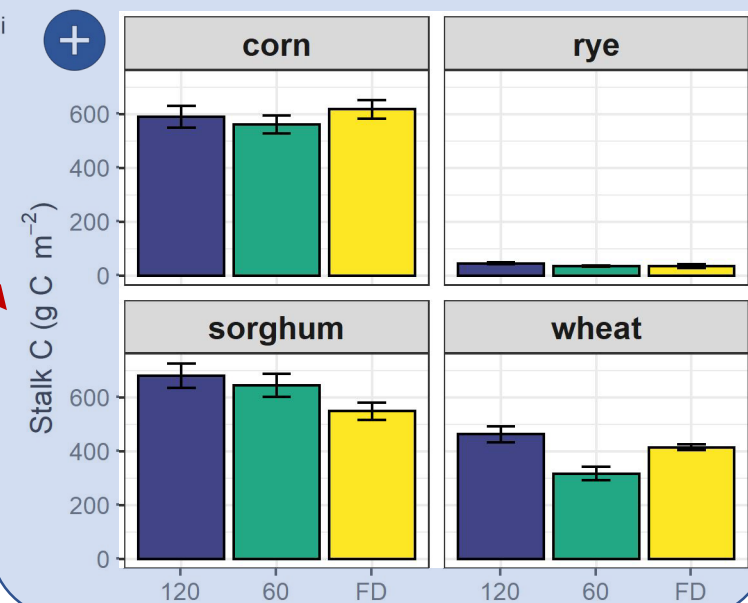
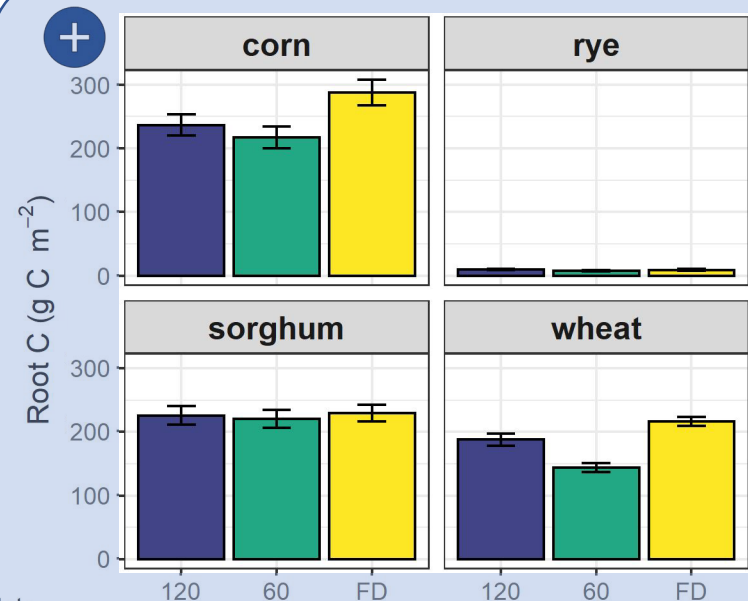
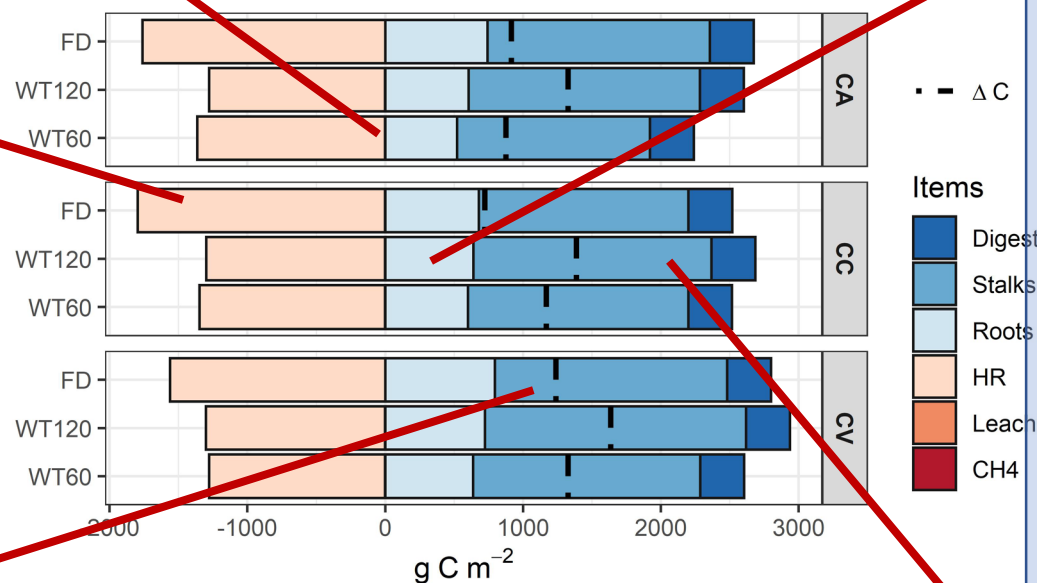
– **Methane and C leaching** were negligible

– The **drying–rewetting** cycles due to rain/irrigation increased **soil respiration** under FD

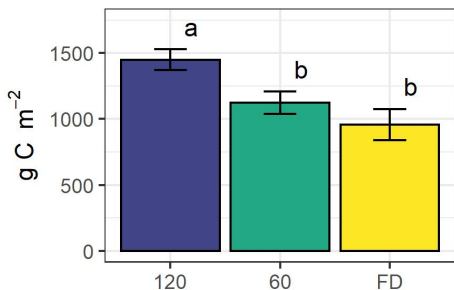


A positive C balance was measured under all treatments!

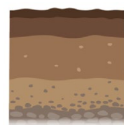
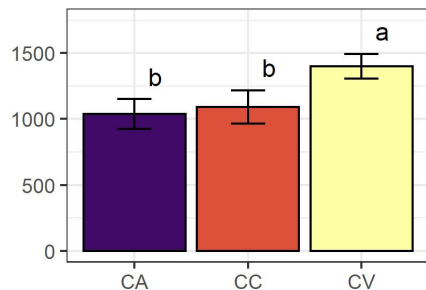
### C balance



### Water table



### Cropping system



A SOC increment was also confirmed by soil sampling