

# SOILAssist: Experimental field measurements during harvest – soil and machinery

M. Siekmann, M. Lorenz, J. Brunotte, K. Nolting

## Soil – field measurements

- Measuring soil pressure and soil deformation
- Soil sampling (undisturbed soil cores) before and after wheeling at various depths (20, 35, 50 cm)
- Penetration resistance (penetrometer)
- Simple Soil Structure Assessment for the farmer (Brunotte et al., 2013)
- Earthworm activity (number of channels, concentration points)

## Soil – laboratory measurements

- Analysis of undisturbed soil cores to identify changes in soil structure and functionality
- Dry bulk density, particle density
- Soil moisture
- Pore size distribution, water retention characteristics (pF)
- Air capacity, (usable) field capacity, plant available soil water, permanent wilting point
- Saturated water conductivity, unsaturated air conductivity



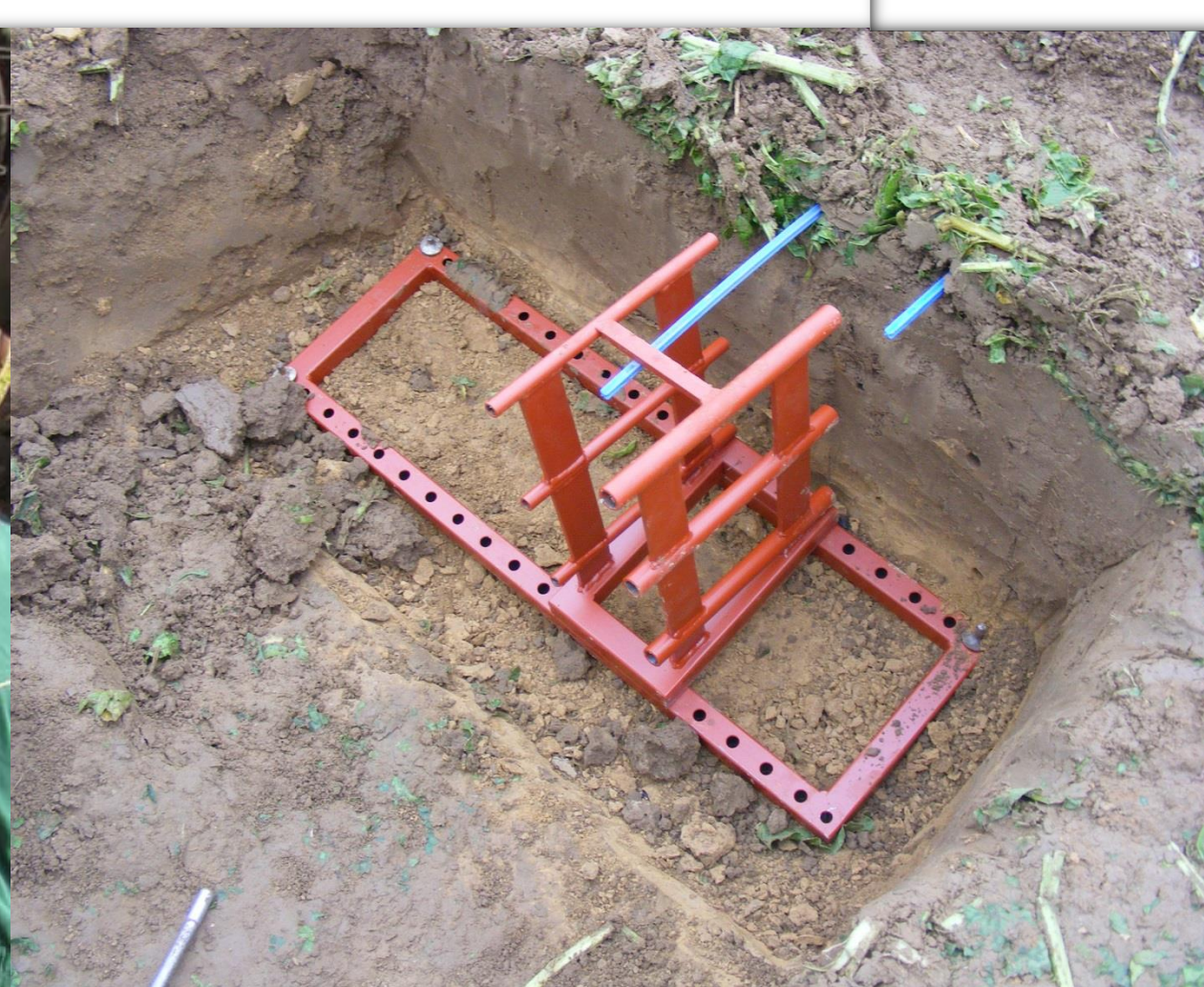
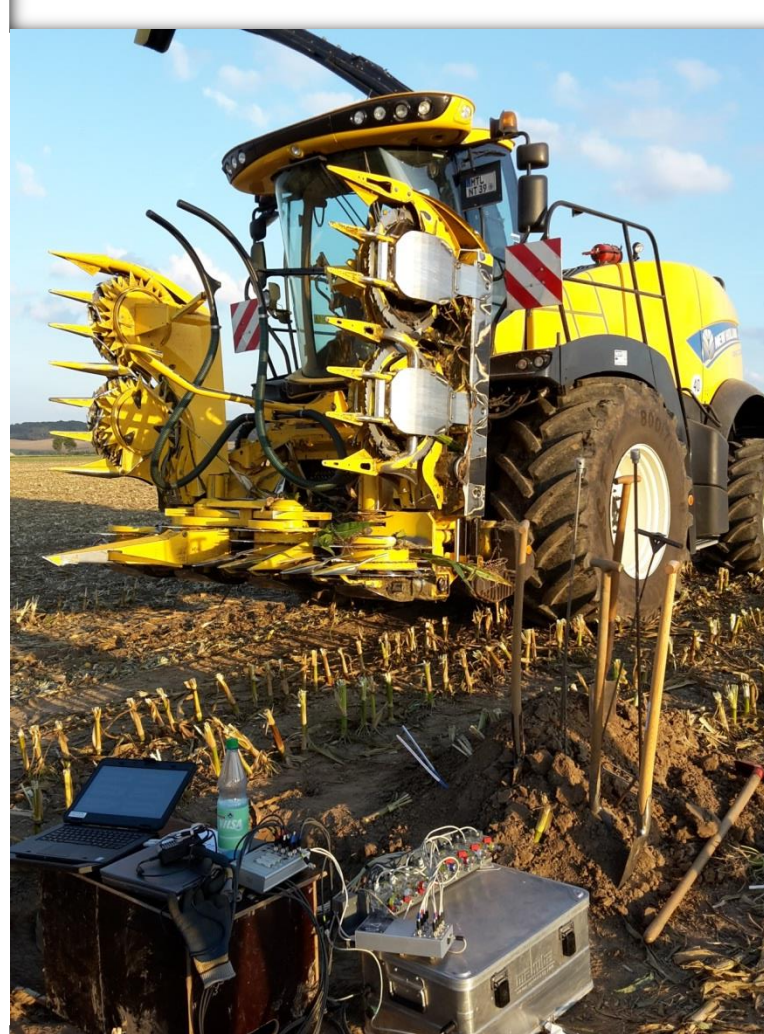
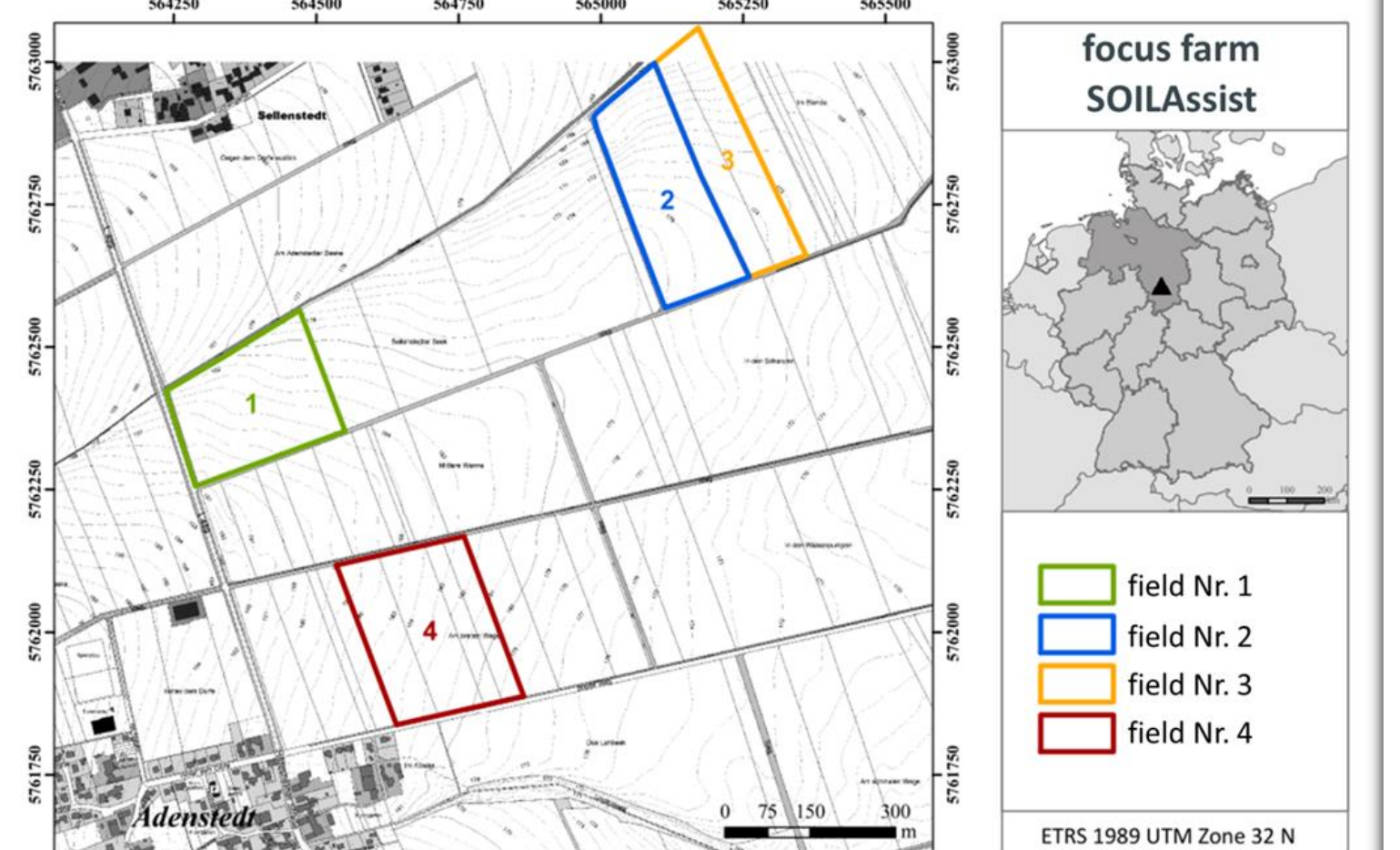
## Machinery – investigation of wheeling effects

- Wheeling experiments with agricultural machinery with different loads in different plots in the field in typical crop rotations
- Soil pressure and soil deformation will be measured at various depths using measurement probes
- Different machinery from the harvest chain with different wheel loads and tire inflation pressure
- On-site weighing of machinery
- Contact area

## Study fields and crop rotation (2015/16, 2016/17)

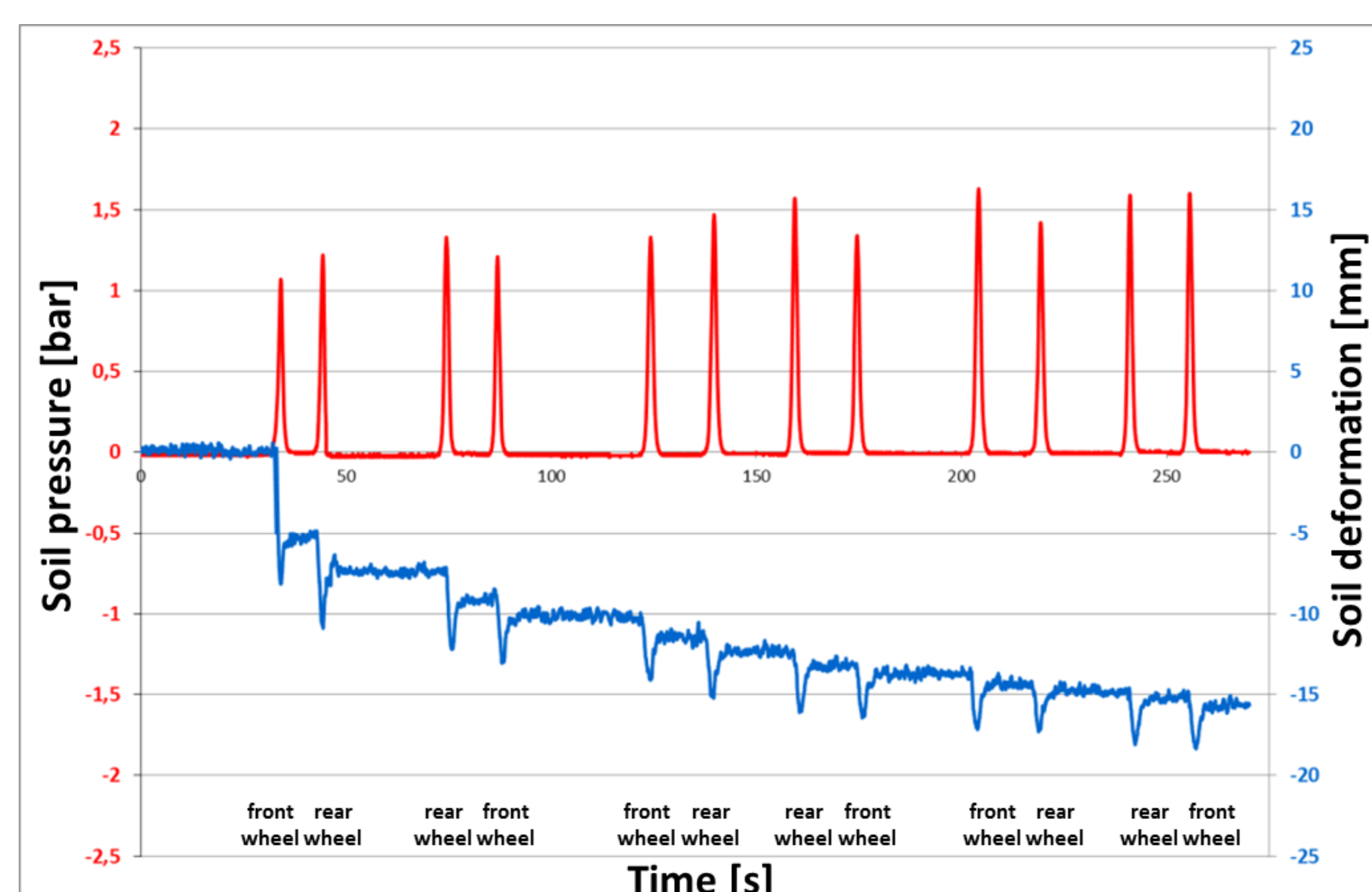
- 1 silage corn → winter wheat
- 2 winter wheat → sugar beet
- 3 sugar beet → winter wheat
- 4 winter wheat → silage corn

Field 1 is separated into different tillage practices



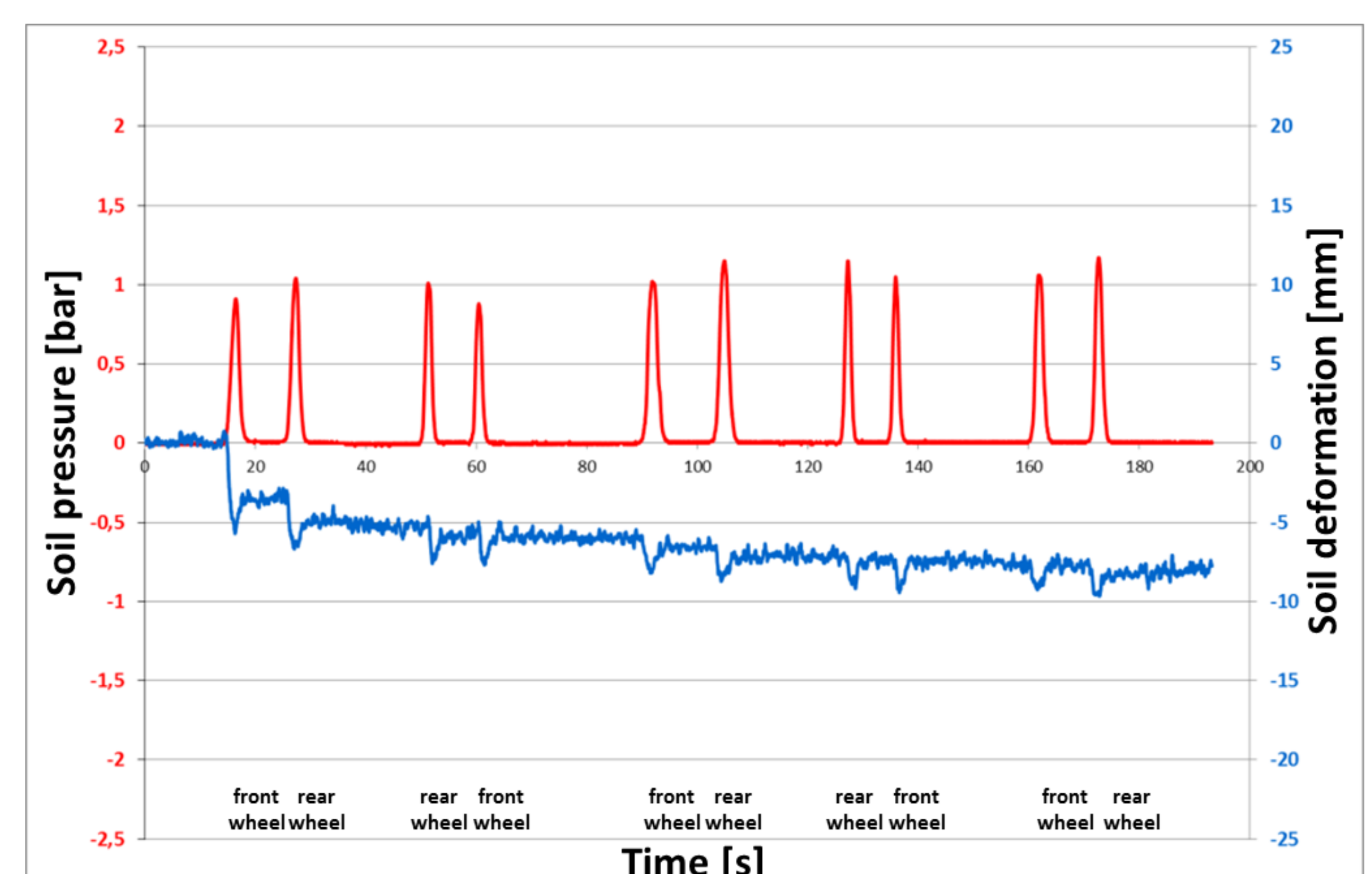
Soil pressure and soil deformation (depth: 20 cm) during repeated wheeling (2 axles) on a ploughed field

Wheel load: 2.1 t, tires: Michelin XM 495/70 R24, tire pressure: **2.1 bar**



Soil pressure and soil deformation (depth: 20 cm) during repeated wheeling (2 axles) on a ploughed field

Wheel load: 2.1 t, tires: Michelin XM 495/70 R24, tire pressure: **0.8 bar**



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Contact:

maike.siekmann@thuenen.de  
Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries

