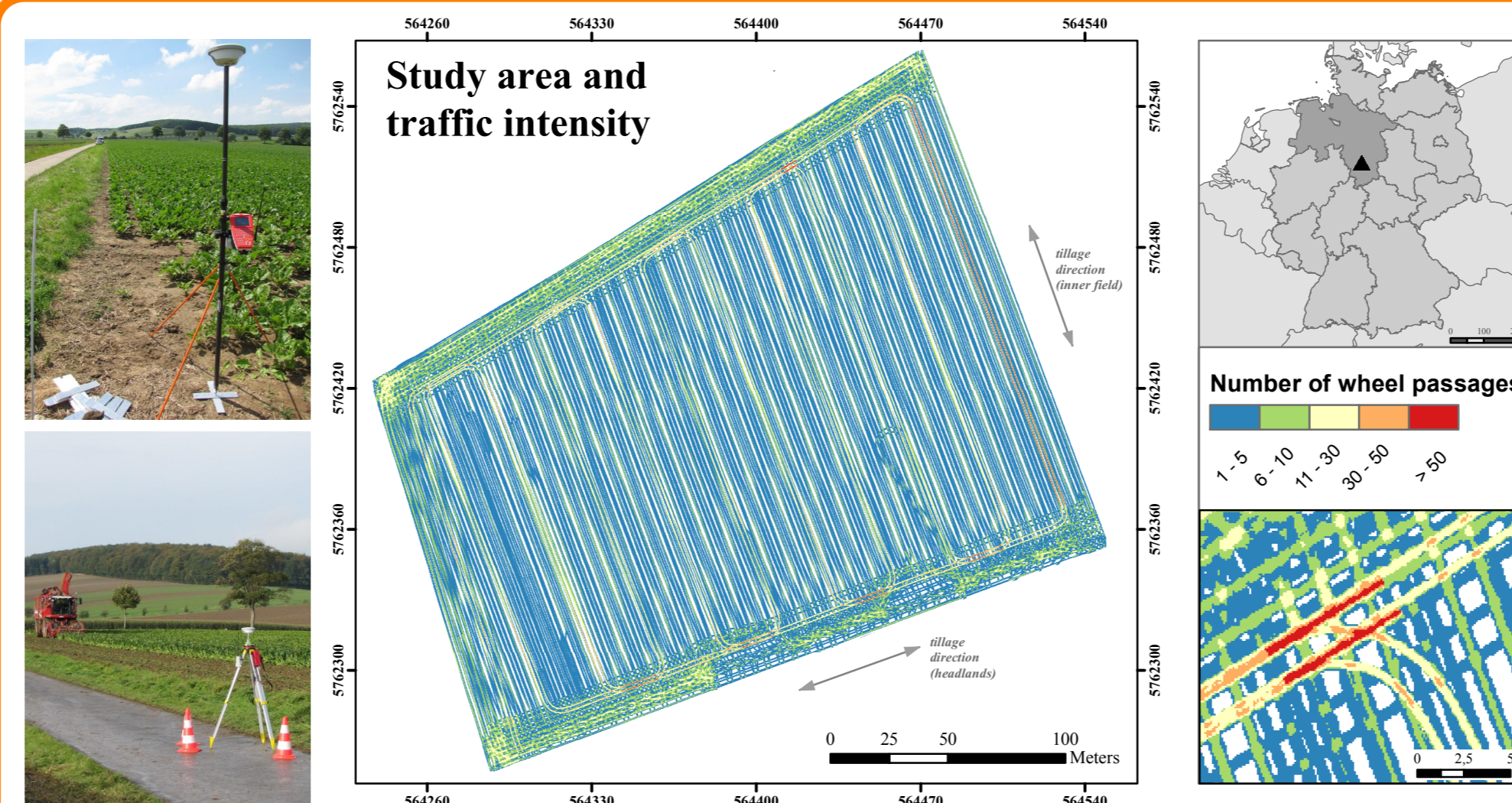


SOILAssist - Project partner Kiel: Spatial modelling of field traffic intensity and related effects on soil functions

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Project description I:

This subproject as part of the SOILAssist-project focus on modelling field traffic intensity and its effects on soil physical functions. Therefore, the subproject is divided into two main parts. The first one aims to monitor all traffic activities and set up a GIS-based simulation model for field traffic modelling. The second one focus on the development of a 3D-soil information model.



Project description II:

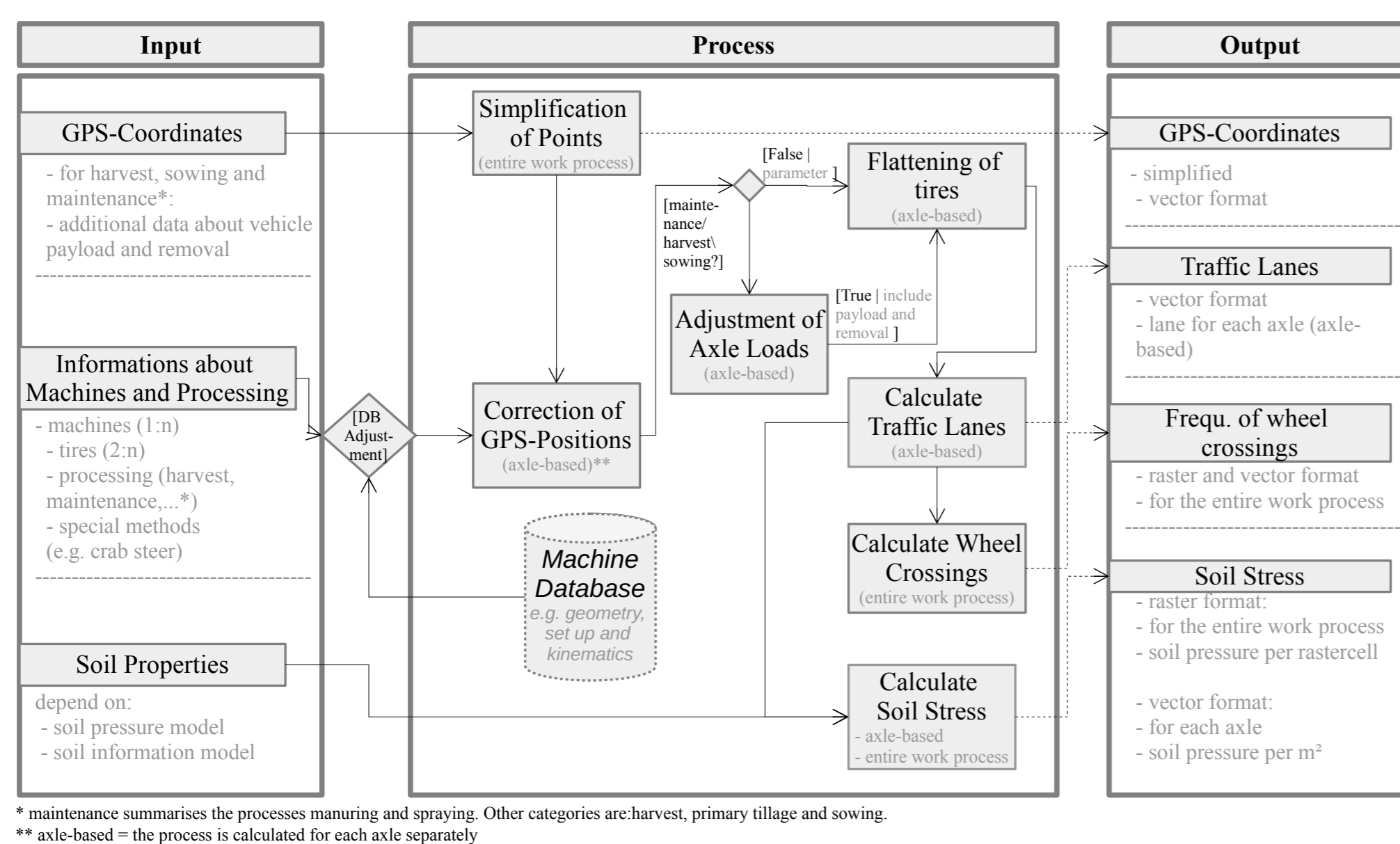
Combining both models enables to calculate the spatial distribution of contact area pressures along with changes in soil properties for entire fields. Traffic scenarios can be computed for reducing field traffic intensity and related effects on soil functions can be assessed. This approach will be combined with the models developed by AP 1.3 (soil compaction model) and AP 3 (assistance system).

The major objectives are:

- (I) to set-up a GIS-based model to accurately represent (map) the wheel track patterns based on the data recorded by RTK-GPS,
- (II) to calculate the percentage of the area wheeled at different loads and contact pressures by different machinery,
- (III) to model the spatial distribution of wheel loads and contact area pressures applied during the individual tillage operations,
- (IV) to estimate the percentage of ground area trafficked at different wheel

- loads and contact area pressures, comparing the effects of different traffic scenarios,
- (V) to relate wheeling intensity to the functional responses of the soil,
- (VI) development of a 3D soil information model to characterise spatio-temporal changes in traffic conditions,
- (VII) to combine the models for derivation of soil compaction risk and related effects on soil physical functions

Concept of traffic tool:



Elements of the soil information model:

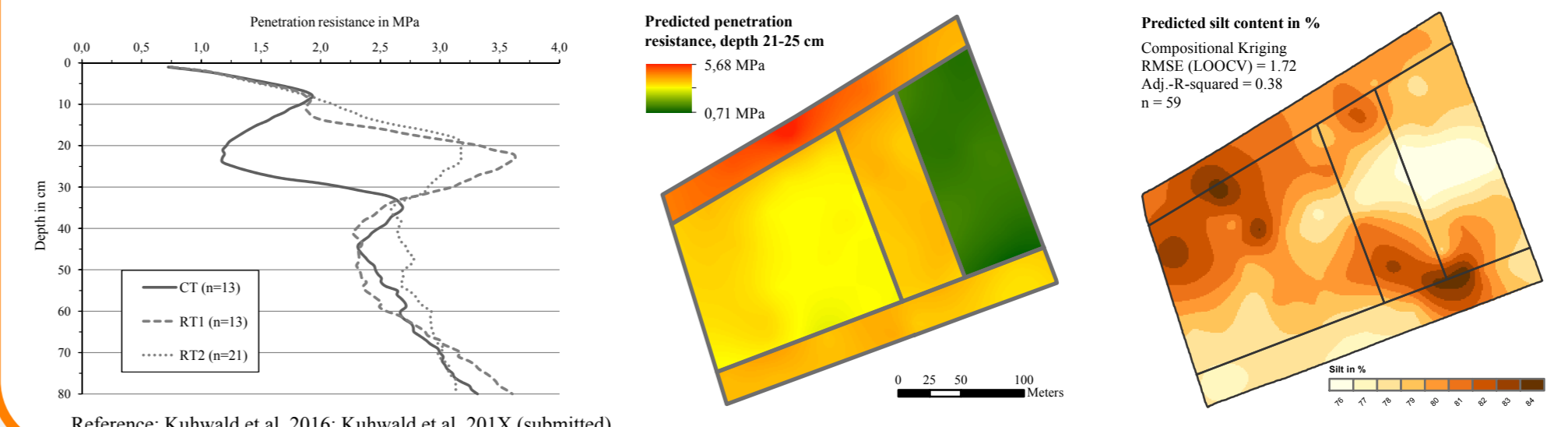
Soil management effects



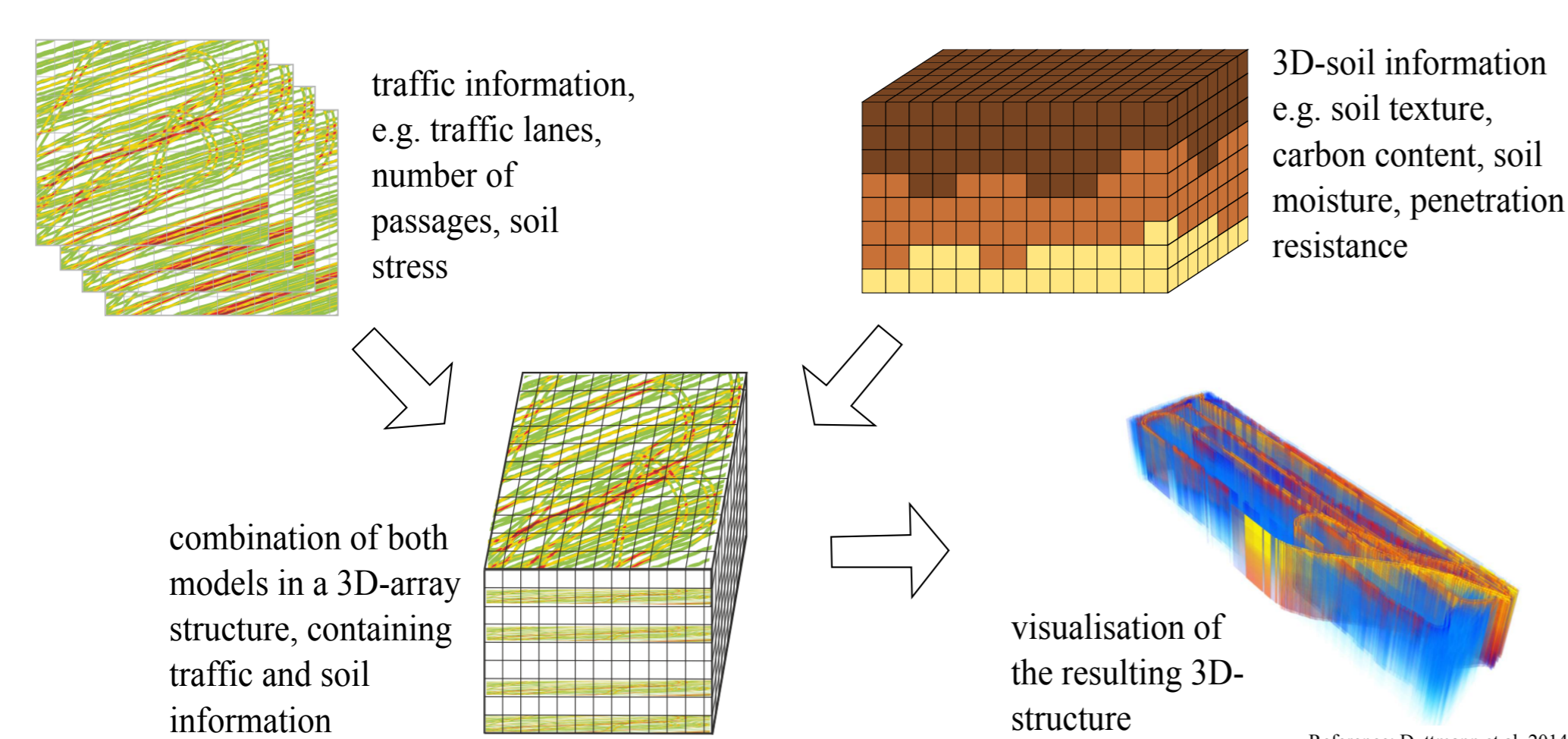
Field and lab work



Analyses and model development



Combination of both models:



Outlook:

The models developed in this subproject of the SOILAssist-project will be connected with the models of AP 1.3 (soil compaction and deformation model) and AP 3 (assistance system). Considering spatio-temporal variations of the input-parameters, the integration of the different models will result in an assistance tool for sustainable field traffic. The assistance tool supports the farmer by calculating the optimal way to drive considering field borders, available machinery, machinery setup, actual crop, soil properties and weather conditions.